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

January 28, 2010

SUBJECT: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada, Data Validation

Dear Ms. Arnold,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on November 23, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 22109:

SDG #	Fraction
R0904370/K0909421, R0905402 R0905434/K0909363, R0905524 R0905539, R0905567 R0905626/K0909568, R0905635 R0905636, R0905693	Volatiles, Semivolatiles, Chlorinated Pesticides, Polychlorinated Biphenyls, Polychlorinated Biphenyls as Congeners, Metals, Wet Chemistry, TPH as Extractables, Dioxins/Dibenzofurans

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
- USEPA, Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Diobenzofurans Data Review, September 2005

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

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Attachment 1

Stage 2B/4 **LDC #22109 (Tronox LLC-Northgate, Henderson NV / Tronox Phase B 2009)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	VOA (8260B)		SVOA (8270C)		Pest. (8081A)		PCBs (8082)		PCB Cong. (1668A)		Metals (SW846)		TPH-E (8015B)		Dioxins (8290)		Alk. (2320B)		NH_3-N (350.1M)		Br Cl,SO_4 (9056)		NO_2-N (9056)		NO_3-N (353.2)		CN- (9012)		Cond. (120.1)		Cr(VI) (218.6/ (7199)			
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	R0904370/K0909421	11/23/09	12/16/09	0	1	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	2	0	3	0	2	0	2	0	2	0	2		
B	R0905402	11/23/09	12/16/09	5	19	1	18	1	20	1	6	-	-	1	18	1	17	-	-	1	18	1	18	1	18	1	18	1	18	1	18	-	-	1	18		
C	R0905434/K0909363	11/23/09	12/16/09	0	2	0	4	0	4	0	4	-	-	0	4	-	-	-	-	0	4	0	4	0	4	0	4	0	4	0	4	0	4	0	4		
D	R0905524	11/23/09	12/16/09	6	19	2	18	1	9	0	2	-	-	2	18	2	18	-	-	2	18	2	18	2	18	2	18	2	18	2	18	-	-	2	18		
E	R0905539	11/23/09	12/16/09	4	20	2	20	0	5	-	-	-	-	2	20	2	20	-	-	2	20	2	20	2	20	2	20	2	20	2	20	-	-	2	20		
F	R0905567	11/23/09	12/16/09	4	20	1	19	0	17	0	2	-	-	1	19	1	20	-	-	1	19	1	19	1	19	1	19	1	19	1	21	-	-	1	19		
G	R0905626/K0909568	11/23/09	12/16/09	0	4	0	7	0	8	0	8	-	-	0	8	-	-	-	-	0	8	0	8	0	8	0	8	0	8	0	8	0	8	0	8		
H	R0905635	11/23/09	12/16/09	-	-	-	-	-	-	-	-	-	-	2	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
I	R0905636	11/23/09	12/16/09	-	-	-	-	-	-	-	-	-	-	4	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
J	R0905693	11/23/09	12/16/09	-	-	-	-	-	-	-	-	-	-	1	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Total	T/LR			19	85	6	88	2	65	1	24	0	2	13	128	6	77	0	2	6	89	6	89	6	89	6	90	6	89	6	91	0	14	6	89	0	1200

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

Stage 2B/4

LDC #22109 (Tronox LLC-Northgate, Henderson NV / Tronox Phase B 2009)

LDC	SDG#	DATE REC'D	(3) DATE DUE	pH (9040 /9045)		Phos-phorus (365.1)		CLO_4 (314.0)		TSS (2540D)		TDS (2540C)		MBAS (5540C)		TOC (9060/ L/K)		Chlorate (300.1)																			
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	R0904370/K0909421	11/23/09	12/16/09	0	2	0	2	0	2	0	2	0	3	0	2	0	2	0	2																		
B	R0905402	11/23/09	12/16/09	1	18	1	18	1	18	-	-	-	-	1	18	1	18	1	18																		
C	R0905434/K0909363	11/23/09	12/16/09	0	4	0	4	0	4	0	4	0	4	0	4	0	4	0	4																		
D	R0905524	11/23/09	12/16/09	2	18	2	18	2	18	-	-	-	-	2	18	2	18	2	18																		
E	R0905539	11/23/09	12/16/09	2	20	2	20	2	20	-	-	-	-	2	20	2	20	2	20																		
F	R0905567	11/23/09	12/16/09	1	19	1	19	1	19	-	-	-	-	1	19	1	19	1	19																		
G	R0905626/K0909568	11/23/09	12/16/09	0	8	0	8	0	8	0	8	0	8	0	8	0	8	0	8																		
Total	T/LR			6	89	6	89	6	89	0	14	0	15	6	89	6	89	6	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	599

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

EDD CHECKLIST

LDC #: 22109
SDG #: R0904370, R0905402, R0905434/K0909363, R0905524, R0905539, R0905567, R0905626/K0909568 R0905635, R0905636, R0905693

Reviewer: JE
2nd Reviewer: BC

Tronox Northgate Henderson Worksheet

EDD Area	Yes	No	NA	Findings/Comments
I. Completeness				
Is there an EDD for the associated Tronox validation report?	X			
II. EDD Qualifier Population				
Were all qualifiers from the validation report populated into the EDD?	X			
III. EDD Lab Anomalies				
Were EDD anomalies identified?	X			
If yes, were they corrected or documented for the client?	X			See EDD_discrepancy_ form_LDC22109_122209.doc
IV. EDD Delivery				
Was the final EDD sent to the client?	X			

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Volatiles

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP3

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 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/09	2-Methyl-2-propanol	0.017 (≥0.05)	All samples in SDG R0904370	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
8/17/09	2-Butanone	30.4	All samples in SDG R0904370	J- (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
8/17/09	2-Methyl-2-propanol	0.018 (≥0.05)	All samples in SDG R0904370	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SPLP3-BLK	8/17/09	Acetone Chloroform	3.4 ug/L 2.2 ug/L	All samples in SDG R0904370

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
RSAU5-0.5BSPLP3	Acetone Chloroform	3.6 ug/L 2.0 ug/L	3.6U ug/L 2.0U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0904370	RSAU5-0.5BSPLP3	2-Butanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0904370	RSAU5-0.5BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0904370	RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0904370

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP3	Acetone Chloroform	3.6U ug/L 2.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A1
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/06/09
Page: 1 of 1
Reviewer: MG
2nd Reviewer: V

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 8/05/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD ✓
IV.	Continuing calibration/ICV	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	RSAU5-0.5BSPLP3	11		21		31	
2	166133-MB	12		22		32	
3	SPLP3-Blk	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	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: 22109A1
SDG #: See Cover

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
(Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$
(Y) N N/A Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/17/09	ICAL	NNNU		2,017	All + Bl/c	J/UJ/A (C)

LDC #: 32109A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: DVC
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	8/17/09	F1818	NNNN		0.018	All + B/C	J/UJ/A (C)
			M (-)	30.4		↓	J-/UJ/A ↓

LDC #: 22109A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 8/17/09
Conc. units: ug/L
Associated Samples: 1 (bl)

Compound	Blank ID	Sample Identification								
	SPLP3-BLK	1								
F	3.4	3.6 J								
K	2.2	2.0 J								

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-30B
SA203-46B
TB092209-SO1
TB092209-SO2
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-10BRE
SA148-30B
SA148-35B
SA148-45B
TB092309-SO1
TB092309-SO3
RSAT7-44BMS
RSAT7-44BMSD

Introduction

This data review covers 21 soil samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 with the following exceptions:

Sample	Compound	Total Time From BFB Tuning Until Analysis	Required Analysis Time (in Hours) From BFB Tuning Until Analysis	Flag	A or P
SA148-10B	All TCL compounds	12 hrs. 2 mins.	12 hrs.	None	P

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	All water samples in SDG R0905402	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/3/09	Chloromethane	27.7	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B 173161-MB	J+ (all detects)	P
10/4/09	Acetone	28.7	RSAT7-44B SA148-10BRE SA148-30B SA148-35B SA148-45B RSAT7-44BMS RSAT7-44BMSD 173191-MB	J+ (all detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/28/09	2-Methyl-2-propanol	0.029 (≥0.05)	All water samples in SDG R0905402	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
173161-MB	10/3/09	Chloroform	1.5 ug/Kg	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B

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
RSAT7-25B	Chloroform	1.1 ug/Kg	1.1U ug/Kg

Samples TB092209-SO1, TB092209-SO2, TB092309-SO1, and TB092309-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample EB092309-SO1A4 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092309-SO1A4	9/23/09	Acetone Dichloromethane	4.7 ug/L 0.23 ug/L	SA148-0.5B SA148-10B SA148-10BRE SA148-30B SA148-35B SA148-45B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA148-0.5B	Acetone	7.5 ug/Kg	7.5U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA148-10BRE	Acetone	2.7 ug/Kg	2.7U ug/Kg
SA148-45B	Acetone	2.8 ug/Kg	2.8U ug/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	All soil samples in SDG R0905402

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAT7-0.5B	Acetone	2.0 ug/Kg	2.0U ug/Kg
RSAT7-44B	Toluene	0.57 ug/Kg	0.57U ug/Kg
RSAT8-10B	Acetone Toluene	2.9 ug/Kg 0.42 ug/Kg	2.9U ug/Kg 0.42U ug/Kg
RSAT8-25B	Toluene	0.57 ug/Kg	0.57U ug/Kg
SA203-10B	Toluene	0.35 ug/Kg	0.35U ug/Kg
SA148-10BRE	Acetone Toluene	2.7 ug/Kg 0.37 ug/Kg	2.7U ug/Kg 0.37U ug/Kg
SA148-45B	Acetone	2.8 ug/Kg	2.8U ug/Kg

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 with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
RSAT7-44BMS/MSD (RSAT7-44B)	1,2,3-Trichloropropane	60 (70-130)	66 (70-130)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
173191-LCS	1,2,3-Trichloropropane	70 (75-125)	RSAT7-44B SA148-10BRE SA148-30B SA148-35B SA148-45B 173191-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA148-10BRE	Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	191604 (241155-964618) 327689 (421140-1684558) 315643 (406626-1626504) 149302 (197391-789562)	All TCL compounds	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905402	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SA148-10BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAT8-25B	RSAT8009-25B				
2-Butanone	15U	1.2	-	13.8 (≤15)	-	-
Toluene	0.57	0.61	-	0.04 (≤7.5)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	SA148-10B	All TCL compounds	None	P	GC/MS instrument performance check (o)
R0905402	TB092209-SO1 TB092209-SO2 EB092309-SO1A4 TB092309-SO1 TB092309-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B	Chloromethane	J+ (all detects)	P	Continuing calibration (%D) (c)
R0905402	RSAT7-44B SA148-10BRE SA148-30B SA148-35B SA148-45B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905402	TB092209-SO1 TB092209-SO2 EB092309-SO1A4 TB092309-SO1 TB092309-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905402	RSAT7-44B	1,2,3-Trichloropropane	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905402	RSAT7-44B SA148-10BRE SA148-30B SA148-35B SA148-45B	1,2,3-Trichloropropane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905402	SA148-10BRE	All TCL compounds	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B TB092209-SO1 TB092209-SO2 EB092309-SO1A4 SA148-0.5B SA148-10B SA148-10BRE SA148-30B SA148-35B SA148-45B TB092309-SO1 TB092309-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905402	SA148-10BRE	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905402	RSAT7-25B	Chloroform	1.1U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905402	SA148-0.5B	Acetone	7.5U ug/Kg	A	be
R0905402	SA148-10BRE	Acetone	2.7U ug/Kg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905402	SA148-45B	Acetone	2.8U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905402	RSAT7-0.5B	Acetone	2.0U ug/Kg	A	bf
R0905402	RSAT7-44B	Toluene	0.57U ug/Kg	A	bf
R0905402	RSAT8-10B	Acetone Toluene	2.9U ug/Kg 0.42U ug/Kg	A	bf
R0905402	RSAT8-25B	Toluene	0.57U ug/Kg	A	bf
R0905402	SA203-10B	Toluene	0.35U ug/Kg	A	bf
R0905402	SA148-10BRE	Acetone Toluene	2.7U ug/Kg 0.37U ug/Kg	A	bf
R0905402	SA148-45B	Acetone	2.8U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B1
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: V

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/22-23/09
II.	GC/MS Instrument performance check	SW	
III.	Initial calibration	SW	%RSD r ✓
IV.	Continuing calibration/LCV ✓	SW	CW ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 7,8
XVII.	Field blanks	SW	TB = 14, 15, 23, 24 EB = 16 FB = FB080309-SO (R0904279)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil + Water

1	RSAT7-0.5B	S	11	SA203-10B	S	21	SA148-35B	S	31	172107-MB	
2	RSAT7-10B		12	SA203-30B		22	SA148-45B		32	173161	
3	RSAT7-25B		13	SA203-46B		23	TB092309-SO1	W	33	173191	
4	RSAT7-44B		14	TB092209-SO1	W	24	TB092309-SO3		34		
5	RSAT8-0.5B		15	TB092209-SO2		25	RSAT7-44BMS	S	35		
6	RSAT8-10B		16	EB092309-SO1A4		26	RSAT7-44BMSD		36		
7	RSAT8-25B	D	17	SA148-0.5B	S	27			37		
8	RSAT8009-25B	D	18	SA148-10B		28			38		
9	RSAT8-44B		19	SA148-10BRE		29			39		
10	SA203-0.5B		20	SA148-30B		30			40		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: 22109 B7
SDG #: Su Creek

VALIDATION FINDINGS WORKSHEET
GC/MS Performance Check

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were the BFB performance results reviewed and found to be within the EPA Functional Guideline criteria?
Y N N/A Were all samples analyzed within the 12 hour clock criteria?

#	Laboratory ID	12 Hour Clock (Time/date)	Finding	Associated Samples	Qualifications
	18	BFB = 10:48	2 mins outside	12 hr clock	None (0)
		#18 = 22:50			

m/z	ION ABUNDANCE CRITERIA
50	15 - 40.0% of m/z 95
75	30.0 - 60.0% of m/z 95
95	Base peak, 100% relative abundance
96	5.0 - 9.0% of m/z 95
173	Less than 2.0% of m/z 174

m/z	ION ABUNDANCE CRITERIA
174	Greater than 50.0% of m/z 95
175	5.0 - 9.0% of mass 174
176	Greater than 95.0% but <101% of m/z 174
177	5.0 - 9.0% of m/z 176

LDC #: 22109 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: 1

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

- (Y) N N/A — Did the laboratory perform a 5 point calibration prior to sample analysis?
- (Y) N N/A — Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
- (Y) N N/A — Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$
- (Y) N N/A — Did the initial calibration meet the acceptance criteria?
- Y (N) N/A — Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	9/18/09	ICAL	NNNN		0.028	All water + 172107-MB	J/UJ/A (c)

INICAL.1SB

LDC #: 22109B)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y (N) N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y (N) N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	9/28/09	C1047	NNNN		0.029	All water + 172107-MB	J/UJ/A (c)
	10/03/09	H1296	A (7)	27.7		1-3, 5-13, 17, 18, 173161-MB	J+ dets/A
	10/04/09	H1330	F (7)	28.7		4, 19-22, 25, 26, 173191-MB	J+ dets/A

CONCAL.1SB

LDC #: 22109 B1
SDG #: Sw Cmw

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: SVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/03/09
Conc. units: ug/kg

Associated Samples: 1-3, 5-13, 17, 18 (bl)

Compound	Blank ID	Sample Identification								
	173161-MB	3								
K	1.5	1.1/U								
		(All	others	either	ND or	> MB)				

Blank analysis date:
Conc. units:

Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22109 BJ
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: L

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 17-22 (6e)

Compound	Blank ID 16	Blank ID	Sample Identification							
Sampling Date	4/23/09		17	19	22					
F	4.7		7.5/4	2.7/4	2.8/4					
E	0.23									
			CAN others either ND or > EB)							

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: All soils (6f)

Compound	~~FB080309-SO~~ Blank ID	~~Blank ID~~	Sample Identification							
Sampling Date	8/03/09	1	4	6	7	11	JVC ~~FB~~ 19	22		
4.2 F	2.1	2.0/4		2.9/4			2.7/4	2.8/4		
0.6 CC	0.30		0.57/4	0.42/4	0.57/4	0.35/4	0.37/4			
		CAN others either ND or > FB)								

LDC #: 22109B7
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		25/26	Several compounds	have %R and %RPD			4	No qual
			outside limits	( )	( )	( )		(either MS/MSD ok)
			(See attached	summary)	( )	( )		
				( )	( )	( )		
			XX	60 (70-130)	66 (70-130)	( )	↓	J-/UJ/A (m)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	< 22%	61-145%	< 14%
S.	Trichloroethene	62-137%	< 24%	71-120%	< 14%
V.	Benzene	66-142%	< 21%	76-127%	< 11%
CC.	Toluene	59-139%	< 21%	76-125%	< 13%
DD.	Chlorobenzene	60-133%	< 21%	75-130%	< 13%

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905402
Date Collected: 9/22/09
Date Received: 9/23/09
Date Analyzed: 10/ 4/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAT7-44B
Lab Code: R0905402-004

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909453-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909453-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	53.5	71.5	75		46.7	65.6	71		70 - 130	14	30
1,1,1-Trichloroethane (TCA)	ND	70.9	71.5	99		67.6	65.6	103		70 - 130	5	30
1,1,2,2-Tetrachloroethane	ND	48.5	71.5	68	*	47.5	65.6	72		70 - 130	2	30
1,1,2-Trichloroethane	ND	50.8	71.5	71		48.0	65.6	73		70 - 130	6	30
1,1-Dichloroethane (1,1-DCA)	ND	69.9	71.5	98		63.3	65.6	96		70 - 130	10	30
1,1-Dichloroethene (1,1-DCE)	ND	66.1	71.5	92		59.9	65.6	91		70 - 130	10	30
1,1-Dichloropropene	ND	59.2	71.5	83		56.0	65.6	85		70 - 130	6	30
1,2,3-Trichlorobenzene	ND	36.3	71.5	51	*	34.0	65.6	52	*	70 - 130	6	30
1,2,3-Trichloropropane	ND	42.8	71.5	60	*	43.5	65.6	66	*	70 - 130	2	30
1,2,4-Trichlorobenzene	ND	40.3	71.5	56	*	38.8	65.6	59	*	70 - 130	4	30
1,2,4-Trimethylbenzene	ND	49.2	71.5	69	*	44.0	65.6	67	*	70 - 130	11	30
1,2-Dibromo-3-chloropropane (DBC	ND	39.0	71.5	55		40.4	65.6	62		50 - 150	4	30
1,2-Dibromoethane	ND	48.5	71.5	68	*	46.3	65.6	71		70 - 130	5	30
1,2-Dichlorobenzene	ND	48.6	71.5	68	*	44.5	65.6	68	*	70 - 130	9	30
1,2-Dichloroethane	ND	57.7	71.5	81		53.4	65.6	81		70 - 130	8	30
1,2-Dichloropropane	ND	58.7	71.5	82		55.7	65.6	85		70 - 130	5	30
1,3,5-Trimethylbenzene	ND	48.8	71.5	68	*	45.6	65.6	70		70 - 130	7	30
1,3-Dichlorobenzene	ND	51.1	71.5	71		46.6	65.6	71		70 - 130	9	30
1,3-Dichloropropane	ND	51.2	71.5	72		47.4	65.6	72		70 - 130	8	30
1,4-Dichlorobenzene	ND	52.4	71.5	73		47.3	65.6	72		70 - 130	10	30
2,2-Dichloropropane	ND	72.9	71.5	102		64.6	65.6	98		70 - 130	12	30
2-Butanone (MEK)	ND	57.4	71.5	80		52.3	65.6	80		50 - 150	9	30
2-Chlorotoluene	ND	55.0	71.5	77		49.9	65.6	76		70 - 130	10	30
2-Hexanone	ND	32.4	71.5	45	*	32.2	65.6	49	*	70 - 130	0	30
2-Methyl-2-propanol	ND	1120	1430	78		1150	1310	88		50 - 150	3	30
4-Chlorotoluene	ND	51.4	71.5	72		48.6	65.6	74		70 - 130	6	30
4-Isopropyltoluene	ND	49.6	71.5	69	*	45.3	65.6	69	*	70 - 130	9	30
4-Methyl-2-pentanone	ND	43.7	71.5	61	*	41.0	65.6	63	*	70 - 130	6	30
Acetone	ND	81.1	71.5	113		78.7	65.6	120		50 - 150	3	30
Benzene	ND	56.9	71.5	80		50.5	65.6	77		70 - 130	12	30
Bromobenzene	ND	48.9	71.5	68	*	47.2	65.6	72		70 - 130	4	30
Bromochloromethane	ND	62.6	71.5	87		57.3	65.6	87		70 - 130	9	30
Bromodichloromethane	0.91	59.7	71.5	82		54.8	65.6	82		70 - 130	8	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Northgate Environmental	**Service Request:**	R0905402
Project:	Tronox LLC Henderson/2027.001	**Date Collected:**	9/22/09
Sample Matrix:	Soil	**Date Received:**	9/23/09
		Date Analyzed:	10/ 4/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	RSAT7-44B	**Units:**	µg/Kg
Lab Code:	R0905402-004	**Basis:**	Dry

Analytical Method: 8260B

		Matrix Spike RQ0909453-03				Duplicate Matrix Spike RQ0909453-04					
Analyte Name	**Sample Result**	**Result**	**Amount**	**% Rec**		**Result**	**Amount**	**% Rec**		**% Rec Limits**	**RPD**	**RPD Limit**
Bromoform	ND	51.2	71.5	72		47.2	65.6	72		70 - 130	8	30
Bromomethane	ND	49.5	71.5	69		43.6	65.6	66		50 - 150	13	30
Carbon Tetrachloride	ND	65.1	71.5	91		58.9	65.6	90		70 - 130	10	30
Chlorobenzene	ND	52.1	71.5	73		48.1	65.6	73		70 - 130	8	30
Chloroethane	ND	63.9	71.5	89		54.5	65.6	83		70 - 130	16	30
Chloroform	3.0	70.8	71.5	95		68.2	65.6	99		70 - 130	4	30
Chloromethane	ND	67.1	71.5	94		63.2	65.6	96		70 - 130	6	30
Dibromochloromethane	ND	51.6	71.5	72		49.7	65.6	76		70 - 130	4	30
Dibromomethane	ND	55.0	71.5	77		52.0	65.6	79		70 - 130	6	30
Dichlorodifluoromethane (CFC 12)	ND	53.4	71.5	75		49.9	65.6	76		70 - 130	7	30
Dichloromethane	ND	62.8	71.5	88		58.8	65.6	90		70 - 130	7	30
Diisopropyl Ether	ND	74.0	71.5	103		67.8	65.6	103		70 - 130	9	30
Ethyl tert-Butyl Ether	ND	74.5	71.5	104		66.1	65.6	101		70 - 130	12	30
Ethylbenzene	ND	55.1	71.5	77		49.4	65.6	75		70 - 130	11	30
Hexachlorobutadiene	ND	40.7	71.5	57	*	33.2	65.6	51	*	70 - 130	20	30
Isopropylbenzene (Cumene)	ND	57.6	71.5	81		51.3	65.6	78		70 - 130	12	30
Methyl tert-Butyl Ether	ND	62.3	71.5	87		58.5	65.6	89		70 - 130	6	30
Naphthalene	ND	40.3	71.5	56		40.9	65.6	62		50 - 150	1	30
Styrene	ND	56.7	71.5	79		52.1	65.6	79		70 - 130	8	30
Tetrachloroethene (PCE)	ND	55.9	71.5	78		50.7	65.6	77		70 - 130	10	30
Toluene	0.57	54.0	71.5	75		49.6	65.6	75		70 - 130	9	30
Trichloroethene (TCE)	ND	58.4	71.5	82		52.8	65.6	81		70 - 130	10	30
Trichlorofluoromethane (CFC 11)	ND	69.8	71.5	98		64.3	65.6	98		70 - 130	8	30
Vinyl Chloride	ND	62.3	71.5	87		56.2	65.6	86		70 - 130	10	30
cis-1,2-Dichloroethene	ND	67.3	71.5	94		60.5	65.6	92		70 - 130	11	30
cis-1,3-Dichloropropene	ND	59.0	71.5	83		54.3	65.6	83		70 - 130	8	30
m,p-Xylenes	ND	108	143	75		97.1	131	74		70 - 130	11	30
n-Butylbenzene	ND	51.4	71.5	72		46.1	65.6	70		70 - 130	11	30
n-Propylbenzene	ND	51.4	71.5	72		48.1	65.6	73		70 - 130	7	30
o-Xylene	ND	53.4	71.5	75		48.5	65.6	74		70 - 130	10	30
sec-Butylbenzene	ND	52.4	71.5	73		47.0	65.6	72		70 - 130	11	30
tert-Amyl Methyl Ether	ND	68.0	71.5	95		63.0	65.6	96		70 - 130	8	30
tert-Butylbenzene	ND	50.7	71.5	71		44.5	65.6	68	*	70 - 130	13	30
trans-1,2-Dichloroethene	ND	63.9	71.5	89		59.1	65.6	90		70 - 130	8	30

Comments:

LDC #: 22109 B)
SDG #: Cu Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples (LCS)

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

[✓ Y] N N/A Was a LCS required?
Y [✓ N] N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		173191-LCS	XX	70 (75-125)	( )	( )	4, 19-22, 173191-MB	J-/UJ/P (A)
			MM	62 (↓)	( )	( )	↓	No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y (N) N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		19	PFB	191604 (241155-964618)		J/UJ/A (i)
			DFB	327689 (421140-1684558)		
			CBZ	315643 (406626-1626504)		
			4DCB	149302 (197391-789562)		
						(all TCL)

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 22109 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: SVB
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		19	IS outside limits		X /A (O)

Comments: _____

DC #: 22109 BJ
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Compound	Concentration (ng/kg)		RPD
	7	8	parent only
M	15 U	1.2	13.8 (≤ 15 D) -
CC	0.57	0.61	0.04 (≤ 7.5 D) -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434

Sample Identification

SA148-10BSPLP3
SA148-35BSPLP3

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 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	All samples in SDG R0905434	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
10/2/09	2-Methyl-2-propanol	0.027 (≥0.05)	All samples in SDG R0905434	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SPLP-BLK	10/2/09	Acetone Chloroform	4.0 ug/L 2.4 ug/L	All samples in SDG R0905434

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
SA148-10BSPLP3	Acetone Chloroform	4.1 ug/L 2.3 ug/L	4.1U ug/L 2.3U ug/L
SA148-35BSPLP3	Acetone Chloroform	6.5 ug/L 2.3 ug/L	6.5U ug/L 2.3U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905434	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905434

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905434	SA148-10BSPLP3 SA148-35BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905434	SA148-10BSPLP3 SA148-35BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905434	SA148-10BSPLP3 SA148-35BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905434

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905434	SA148-10BSPLP3	Acetone Chloroform	4.1U ug/L 2.3U ug/L	A	bl
R0905434	SA148-35BSPLP3	Acetone Chloroform	6.5U ug/L 2.3U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109C1
SDG #: R0905434
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JK
2nd Reviewer: [signature]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/23/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD (no r²)
IV.	Continuing calibration/ICV	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec.
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	SA148-10BSPLP3	11	173080-MB	21		31	
2	SA148-35BSPLP3	12	SPLP-Blk	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	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: 22109C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: L

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

- (Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
- (Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
- Y (N) N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? NA
- Y N (N/A) Did the initial calibration meet the acceptance criteria?
- Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	9/18/09	ICAL	NNNN		0.028	All + Blks	J/UJ/A (C)

LDC #: 22109C1
SDG #: Su Cur

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/02/09	C1190	NNNN		0.027	All + Blks	J/UJ A (C)

LDC #: 22109C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/07/09 (bl)
Conc. units: ug/L Associated Samples: All

Compound	Blank ID	Sample Identification								
	SPLP_BK	1	2							
F	4.0	4.1 U	6.5 U							
K	2.4	2.3 U	2.3 U							

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO1A4
EB092809-SO2A4
SA29-0.5B
SA29-10B
SA29-25B
SA29-25BDL
SA29-40B
SA120-0.5B
SA120-10B
SA120-25B
SA120-43B
SA209-0.5B
SA209-10B
SA209009-10B
SA209-25B
SA209-35B
SA212-0.5B
SA212-13B
SA212009-13B
SA212-30B
SA212-44B
TB092809-SO1
TB092809-SO2
TB092809-SO3
TB092809-SO4
SA29-40BMS
SA29-40BMSD

Introduction

This data review covers 21 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/09	2-Methyl-2-propanol	0.017 (≤0.05)	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4 174059-MB	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/9/09	Chloromethane	27.8	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4 174059-MB	J- (all detects) UJ (all non-detects)	A
10/12/09	2-Methyl-2-propanol	36.3	EB092809-SO1A4 EB092809-SO2A4 174059-MB	J+ (all detects)	A
10/12/09	2-Butanone	26.0	EB092809-SO1A4 EB092809-SO2A4 174059-MB	J- (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
10/9/09	2-Methyl-2-propanol	0.018 (≥0.05)	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4 174059-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
173528-MB	10/6/09	Dichloromethane	0.68 ug/Kg	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-43B SA209-0.5B SA209009-10B SA209-25B SA209-35B SA212-0.5B

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
173738-MB	10/7/09	Acetone	2.7 ug/Kg	SA29-25BDL SA120-25B SA209-10B SA212-13B SA212009-13B SA212-30B SA212-44B
174059-MB	10/9/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	0.41 ug/L 0.27 ug/L	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4

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
SA29-10B	Dichloromethane	0.44 ug/Kg	0.44U ug/Kg
SA29-25B	Dichloromethane	0.82 ug/Kg	0.82U ug/Kg
SA209-35B	Dichloromethane	0.65 ug/Kg	0.65U ug/Kg

Samples TB092809-SO1, TB092809-SO2, TB092809-SO3, and TB092809-SO4 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB092809-SO1	9/28/09	Acetone	11 ug/L	EB092809-SO1A4 SA120-0.5B SA120-10B SA120-25B SA120-43B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB092809-SO2	9/28/09	Acetone	2.6 ug/L	EB092809-SO1A4 SA120-0.5B SA120-10B SA120-25B SA120-43B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
TB092809-SO3	9/28/09	Bromodichloromethane Bromoform Dibromochloromethane	0.41 ug/L 4.2 ug/L 4.4 ug/L	EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-25BDL SA29-40B
TB092809-SO4	9/28/09	Acetone	2.3 ug/L	EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-25BDL SA29-40B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA120-0.5B	Acetone	6.5 ug/Kg	6.5U ug/Kg
SA120-10B	Acetone	13 ug/Kg	13U ug/Kg
SA120-25B	Acetone	15 ug/Kg	15U ug/Kg
SA120-43B	Acetone	11 ug/Kg	11U ug/Kg
SA212-13B	Acetone	6.0 ug/Kg	6.0U ug/Kg
SA212009-13B	Acetone	17 ug/Kg	17U ug/Kg
SA212-30B	Acetone	16 ug/Kg	16U ug/Kg
SA212-44B	Acetone	11 ug/Kg	11U ug/Kg

Samples EB092809-SO1A4 and EB092809-SO2A4 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092809-SO1A4	9/28/09	Dichloromethane Toluene	0.55 ug/L 0.22 ug/L	All soil samples in SDG R0905524
EB092809-SO2A4	9/28/09	Acetone Chlorobenzene	4.7 ug/L 0.33 ug/L	All soil samples in SDG R0905524

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA29-0.5B	Acetone Toluene	5.0 ug/Kg 0.37 ug/Kg	5.0U ug/Kg 0.37U ug/Kg
SA29-10B	Dichloromethane	0.44 ug/Kg	0.44U ug/Kg
SA29-25B	Dichloromethane	0.82 ug/Kg	0.82U ug/Kg
SA29-25BDL	Dichloromethane	1.0 ug/Kg	1.0U ug/Kg
SA120-0.5B	Acetone Toluene	6.5 ug/Kg 0.40 ug/Kg	6.5U ug/Kg 0.40U ug/Kg
SA120-25B	Dichloromethane	0.58 ug/Kg	0.58U ug/Kg
SA209-0.5B	Acetone	8.6 ug/Kg	8.6U ug/Kg
SA209-10B	Dichloromethane	0.45 ug/Kg	0.45U ug/Kg
SA209-35B	Dichloromethane	0.65 ug/Kg	0.65U ug/Kg
SA212-13B	Acetone	6.0 ug/Kg	6.0U ug/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	All soil samples in SDG R0905524

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA29-0.5B	Toluene	0.37 ug/Kg	0.37U ug/Kg
SA29-25B	Toluene	0.57 ug/Kg	0.57U ug/Kg
SA29-40B	Toluene	0.46 ug/Kg	0.46U ug/Kg
SA120-0.5B	Toluene	0.40 ug/Kg	0.40U ug/Kg
SA212-44B	Toluene	0.48 ug/Kg	0.48U ug/Kg

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) and relative percent differences (RPD) were not within QC limits for several compounds, the MS, MSD, or LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
173738-LCS	2-Methyl-2-propanol Acetone	145 (75-125) 140 (75-125)	SA29-25BDL SA120-25B SA209-10B SA212-13B SA212009-13B SA212-30B SA212-44B 173738-MB	J+ (all detects) J+ (all detects)	P
174059-LCS	Chloromethane Dichlorodifluoromethane	74 (75-125) 67 (75-125)	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4 174059-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
174383-LCS	Dichloromethane	74 (75-125)	EB092809-SO1A4 EB092809-SO2A4 174383-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA29-25B	Pentafluorobenzene 1,4-Dichlorobenzene-d4	104975 (147260-589038) 115449 (126309-505236)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA29-25BDL	Pentafluorobenzene 1,4-Dichlorobenzene-d4	124572 (153716-614862) 119348 (127236-508944)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905524	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SA29-25BDL	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA209-10B and SA209009-10B and samples SA212-13B and SA212009-13B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
2-Butanone	10U	1.6	-	8.4 (≤10)	-	-
Acetone	11	11	-	0 (≤21)	-	-
Dichloromethane	0.45	5.3U	-	4.85 (≤5.3)	-	-
Toluene	0.70	0.89	-	0.19 (≤5.3)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Acetone	6.0	17	-	11 (≤28)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Toluene	4.8U	0.88	-	3.92 (≤4.8)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905524	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4	Chloromethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905524	EB092809-SO1A4 EB092809-SO2A4	2-Methyl-2-propanol	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905524	EB092809-SO1A4 EB092809-SO2A4	2-Butanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905524	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905524	SA29-25BDL SA120-25B SA209-10B SA212-13B SA212009-13B SA212-30B SA212-44B	2-Methyl-2-propanol Acetone	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905524	TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4	Chloromethane Dichlorodifluoromethane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905524	EB092809-SO1A4 EB092809-SO2A4	Dichloromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	SA29-25B SA29-25BDL	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	EB092809-SO1A4 EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-25BDL SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B TB092809-SO1 TB092809-SO2 TB092809-SO3 TB092809-SO4	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905524	SA29-25BDL	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905524	SA29-10B	Dichloromethane	0.44U ug/Kg	A	bl
R0905524	SA29-25B	Dichloromethane	0.82U ug/Kg	A	bl
R0905524	SA209-35B	Dichloromethane	0.65U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905524	SA120-0.5B	Acetone	6.5U ug/Kg	A	bt
R0905524	SA120-10B	Acetone	13U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905524	SA120-25B	Acetone	15U ug/Kg	A	bt
R0905524	SA120-43B	Acetone	11U ug/Kg	A	bt
R0905524	SA212-13B	Acetone	6.0U ug/Kg	A	bt
R0905524	SA212009-13B	Acetone	17U ug/Kg	A	bt
R0905524	SA212-30B	Acetone	16U ug/Kg	A	bt
R0905524	SA212-44B	Acetone	11U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905524	SA29-0.5B	Acetone Toluene	5.0U ug/Kg 0.37U ug/Kg	A	be
R0905524	SA29-10B	Dichloromethane	0.44U ug/Kg	A	be
R0905524	SA29-25B	Dichloromethane	0.82U ug/Kg	A	be
R0905524	SA29-25BDL	Dichloromethane	1.0U ug/Kg	A	be
R0905524	SA120-0.5B	Acetone Toluene	6.5U ug/Kg 0.40U ug/Kg	A	be
R0905524	SA120-25B	Dichloromethane	0.58U ug/Kg	A	be
R0905524	SA209-0.5B	Acetone	8.6U ug/Kg	A	be
R0905524	SA209-10B	Dichloromethane	0.45U ug/Kg	A	be
R0905524	SA209-35B	Dichloromethane	0.65U ug/Kg	A	be
R0905524	SA212-13B	Acetone	6.0U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905524	SA29-0.5B	Toluene	0.37U ug/Kg	A	bf
R0905524	SA29-25B	Toluene	0.57U ug/Kg	A	bf
R0905524	SA29-40B	Toluene	0.46U ug/Kg	A	bf
R0905524	SA120-0.5B	Toluene	0.40U ug/Kg	A	bf
R0905524	SA212-44B	Toluene	0.48U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D1
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/28/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD ✓
IV.	Continuing calibration/ICV	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D1 = 13, 14 D2 = 18, 19
XVII.	Field blanks	SW	EB = 1, 2 TB = 22-25 FB = FB080309-SO (R0904279)

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	EB092809-SO1A4	W	11	SA120-43B	S	21	SA212-44B	S	31	174383-MB
2	EB092809-SO2A4		12	SA209-0.5B		22	TB092809-SO1	W	32	173528-
3	SA29-0.5B	S	13	SA209-10B	D1	23	TB092809-SO2		33	173738-
4	SA29-10B		14	SA209009-10B	D1	24	TB092809-SO3		34	174059
5	SA29-25B		15	SA209-25B		25	TB092809-SO4		35	
6	SA29-25BDL		16	SA209-35B		26	SA29-40BMS	S	36	
7	SA29-40B		17	SA212-0.5B		27	SA29-40BMSD		37	
8	SA120-0.5B		18	SA212-13B	D	28			38	
9	SA120-10B		19	SA212009-13B	D	29			39	
10	SA120-25B		20	SA212-30B		30			40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

PBF PCB

4DCB

LDC #: 22109D)
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
(Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$
(Y) N N/A Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/17/09	ICAL	NNNN		0.017	22-25, 174059-MB	J/UJ/A (C)

INICAL.1SB

LDC #: 22109D)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: DV
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	10/09/09	F314v	A (-)	27.8		22-25, 174059-MB	J-/UJ/A (c)
			NNNN		0.018	↓	J/UJ/A
	10/12/09	X488)	NNNN (+)	36.3		1, 2, 174383-MB	J+ det A
			M (-)	26.0		↓	J-/UJ/A

LDC #: 22109D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/06/09
Conc. units: ug/kg
Associated Samples: 3-5, 7-9, 11, 12, 14-17 (bl)

Compound	Blank ID	Sample Identification								
	173528-MB	4	5	16						
E	0.68	0.44 J	0.82 J	0.65 J						
		(All others either ND or > MB)								

1,36

Blank analysis date: 10/07/09
Conc. units: ug/kg
Associated Samples: 6, 10, 13, 18-21

Compound	Blank ID	Sample Identification								
	173738-MB									
F	2.7	(All results either ND or > MB)								

5.4

LDC #: 22109 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: VG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/09/09
Conc. units: ug/L
Associated Samples: 22-25 (ND)

Compound	Blank ID	Sample Identification								
	174059-MB									
NNN	0.41									
KKK	0.27									

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22109 DJ
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JMG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

Blank units: ug/L **Associated sample units:** ug/L ; ug/kg

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 1, 8-11, 17-21 (bt)

Compound	Blank ID 22	Blank ID 24	Sample Identification							
Sampling Date	9/28/09	→	8	9	10	11	18	19	20	21
F	11	2.6	6.5/4	13/4	15/4	11/4	6.0/4	17/4	16/4	11/4

Blank units: ug/L **Associated sample units:** ug/L ; ug/kg

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 2 - 7

Compound	Blank ID 23	Blank ID 25	Sample Identification							
Sampling Date	9/28/09									
P	0.41		(All results either ND or > TB)							
X	4.2									
T	4.4									
F		2.3								

(12 - 16 => diff shipping times)

LDC #: 22109 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
Reviewer: JVC
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All soils (6e)

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/28/09		3	4	5	6	8	10	12	13
9.4 F		4.7	5.0/4				6.5/4		8.6/4	
0.66 DD		0.33								
1.10 E	0.55			0.44/4	0.82/4	1.0/4		0.58/4		0.45/4
0.44 CC	0.22		0.37/4				0.40/4			

Blank units: _____ **Associated sample units:** same as above
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: All soils (6e)

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/28/09		16	18						
F		4.7		6.0/4						
DD		0.33								
E	0.55		0.65/4							
CC	0.22									
			(All others either ND or > EB)							

LDC #: 22109D)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/Kg (bf)

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: All soils

Compound	Blank ID FB080309-SD	Blank ID	Sample Identification							
Sampling Date	8/03/09		3	5	7	8	21			
F	2.1									
CE	0.30		0.37/4	0.57/4	0.46/4	0.40/4	0.48/4			
			(All others either ND or > FB)							

4.2
0.60

Blank units: _____ **Associated sample units:** _____

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 22109 D1
SDG #: Lee Creek

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: SV6
2nd Reviewer:

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		26/27	Several compounds	have %R	and %RPD		7	No qual
			outside (limits)	( )	( )			(either MS/MSD passing)
			(see attached)	summary	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	< 22%	61-145%	< 14%
S.	Trichloroethene	62-137%	< 24%	71-120%	< 14%
V.	Benzene	66-142%	< 21%	76-127%	< 11%
CC.	Toluene	59-139%	< 21%	76-125%	< 13%
DD.	Chlorobenzene	60-133%	< 21%	75-130%	< 13%

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905524
Date Collected: 9/28/09
Date Received: 9/29/09
Date Analyzed: 10/ 7/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA29-40B
Lab Code: R0905524-006

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909580-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0909580-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	62.9	71.6	88		57.0	63.7	89		70 - 130	10	30
1,1,1-Trichloroethane (TCA)	ND	70.9	71.6	99		68.2	63.7	107		70 - 130	4	30
1,1,2,2-Tetrachloroethane	ND	55.4	71.6	77		49.4	63.7	78		70 - 130	11	30
1,1,2-Trichloroethane	ND	56.7	71.6	79		50.7	63.7	80		70 - 130	11	30
1,1-Dichloroethane (1,1-DCA)	ND	66.9	71.6	93		62.6	63.7	98		70 - 130	7	30
1,1-Dichloroethene (1,1-DCE)	0.89	67.7	71.6	93		63.6	63.7	98		70 - 130	6	30
1,1-Dichloropropene	ND	52.6	71.6	73		50.5	63.7	79		70 - 130	4	30
1,2,3-Trichlorobenzene	ND	35.9	71.6	50	*	29.5	63.7	46	*	70 - 130	20	30
1,2,3-Trichloropropane	ND	53.9	71.6	75		49.7	63.7	78		70 - 130	8	30
1,2,4-Trichlorobenzene	ND	34.8	71.6	49	*	29.3	63.7	46	*	70 - 130	17	30
1,2,4-Trimethylbenzene	ND	46.4	71.6	65	*	42.1	63.7	66	*	70 - 130	10	30
1,2-Dibromo-3-chloropropane (DBC	ND	49.9	71.6	70		45.7	63.7	72		50 - 150	9	30
1,2-Dibromoethane	ND	55.7	71.6	78		51.5	63.7	81		70 - 130	8	30
1,2-Dichlorobenzene	ND	51.4	71.6	72		46.3	63.7	73		70 - 130	10	30
1,2-Dichloroethane	ND	60.3	71.6	84		54.4	63.7	85		70 - 130	10	30
1,2-Dichloropropane	ND	55.3	71.6	77		50.8	63.7	80		70 - 130	8	30
1,3,5-Trimethylbenzene	ND	47.5	71.6	66	*	43.2	63.7	68	*	70 - 130	10	30
1,3-Dichlorobenzene	ND	47.2	71.6	66	*	42.1	63.7	66	*	70 - 130	11	30
1,3-Dichloropropane	ND	54.5	71.6	76		50.4	63.7	79		70 - 130	8	30
1,4-Dichlorobenzene	ND	48.6	71.6	68	*	45.0	63.7	71		70 - 130	8	30
2,2-Dichloropropane	ND	67.6	71.6	94		66.2	63.7	104		70 - 130	2	30
2-Butanone (MEK)	ND	60.2	71.6	84		55.1	63.7	86		50 - 150	9	30
2-Chlorotoluene	ND	47.6	71.6	66	*	43.3	63.7	68	*	70 - 130	9	30
2-Hexanone	ND	33.8	71.6	47	*	30.2	63.7	47	*	70 - 130	11	30
2-Methyl-2-propanol	ND	1260	1430	88		1300	1270	102		50 - 150	3	30
4-Chlorotoluene	ND	48.2	71.6	67	*	43.2	63.7	68	*	70 - 130	11	30
4-Isopropyltoluene	ND	45.9	71.6	64	*	41.8	63.7	66	*	70 - 130	9	30
4-Methyl-2-pentanone	ND	49.9	71.6	70		45.2	63.7	71		70 - 130	10	30
Acetone	16	101	71.6	119		82.9	63.7	105		50 - 150	20	30
Benzene	ND	53.5	71.6	75		50.2	63.7	79		70 - 130	6	30
Bromobenzene	ND	52.8	71.6	74		48.3	63.7	76		70 - 130	9	30
Bromochloromethane	ND	66.9	71.6	93		63.0	63.7	99		70 - 130	6	30
Bromodichloromethane	ND	60.1	71.6	84		54.9	63.7	86		70 - 130	9	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905524
Date Collected: 9/28/09
Date Received: 9/29/09
Date Analyzed: 10/ 7/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA29-40B
Lab Code: R0905524-006

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909580-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0909580-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	56.0	71.6	78		51.9	63.7	81		70 - 130	8	30
Bromomethane	ND	62.0	71.6	87		57.4	63.7	90		50 - 150	8	30
Carbon Tetrachloride	ND	64.8	71.6	90		61.7	63.7	97		70 - 130	5	30
Chlorobenzene	ND	55.0	71.6	77		51.4	63.7	81		70 - 130	7	30
Chloroethane	ND	61.8	71.6	86		59.5	63.7	93		70 - 130	4	30
Chloroform	1.2	71.2	71.6	98		66.5	63.7	102		70 - 130	7	30
Chloromethane	ND	58.3	71.6	81		54.9	63.7	86		70 - 130	6	30
Dibromochloromethane	ND	63.0	71.6	88		58.2	63.7	91		70 - 130	8	30
Dibromomethane	ND	56.2	71.6	79		52.7	63.7	83		70 - 130	7	30
Dichlorodifluoromethane (CFC 12)	ND	52.0	71.6	73		49.1	63.7	77		70 - 130	6	30
Dichloromethane	ND	66.4	71.6	93		61.9	63.7	97		70 - 130	7	30
Diisopropyl Ether	ND	72.4	71.6	101		68.2	63.7	107		70 - 130	6	30
Ethyl tert-Butyl Ether	ND	70.6	71.6	99		66.7	63.7	105		70 - 130	6	30
Ethylbenzene	ND	54.4	71.6	76		51.0	63.7	80		70 - 130	6	30
Hexachlorobutadiene	ND	41.1	71.6	57	*	36.8	63.7	58	*	70 - 130	11	30
Isopropylbenzene (Cumene)	ND	50.4	71.6	70		47.1	63.7	74		70 - 130	7	30
Methyl tert-Butyl Ether	ND	63.0	71.6	88		58.5	63.7	92		70 - 130	7	30
Naphthalene	ND	49.4	71.6	69		44.3	63.7	70		50 - 150	11	30
Styrene	ND	58.3	71.6	81		52.9	63.7	83		70 - 130	10	30
Tetrachloroethene (PCE)	ND	58.1	71.6	81		53.4	63.7	84		70 - 130	8	30
Toluene	0.46	53.4	71.6	74		51.1	63.7	79		70 - 130	4	30
Trichloroethene (TCE)	0.74	56.8	71.6	78		54.9	63.7	85		70 - 130	3	30
Trichlorofluoromethane (CFC 11)	ND	72.1	71.6	101		70.7	63.7	111		70 - 130	2	30
Vinyl Chloride	ND	62.0	71.6	87		59.9	63.7	94		70 - 130	3	30
cis-1,2-Dichloroethene	ND	64.0	71.6	89		60.1	63.7	94		70 - 130	6	30
cis-1,3-Dichloropropene	ND	53.4	71.6	75		49.2	63.7	77		70 - 130	8	30
m,p-Xylenes	ND	110	143	77		103	127	80		70 - 130	7	30
n-Butylbenzene	ND	42.1	71.6	59	*	36.8	63.7	58	*	70 - 130	13	30
n-Propylbenzene	ND	46.4	71.6	65	*	42.4	63.7	67	*	70 - 130	9	30
o-Xylene	ND	53.8	71.6	75		49.7	63.7	78		70 - 130	8	30
sec-Butylbenzene	ND	45.7	71.6	64	*	42.5	63.7	67	*	70 - 130	7	30
tert-Amyl Methyl Ether	ND	63.1	71.6	88		60.0	63.7	94		70 - 130	5	30
tert-Butylbenzene	ND	49.4	71.6	69	*	45.0	63.7	71		70 - 130	9	30
trans-1,2-Dichloroethene	ND	62.0	71.6	87		58.9	63.7	92		70 - 130	5	30

Comments:

LDC #: 22109D1
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Was a LCS required?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		173528-LCS	NNNN	140 (75-125)	( )	( )	3-5, 7-9, 11, 12,	No qual (MS/MSD in)
			F	132 ( )	( )	( )	14-17, 173528-MB	
				( )	( )	( )		
				( )	( )	( )		
		173738-LCS	NNNN	145 ( )	( )	( )	6, 10, 13, 18-21,	J+ (all) dets/P
			F	140 ( )	( )	( )	173738-MB	
				( )	( )	( )		
				( )	( )	( )		
		174059-LCS	A	74 ( )	( )	( )	22-25, 174059-MB	J-/NJ/P
			JJ	67 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		174383-LCS	E	74 (✓)	( )	( )	1, 2, 17 4383-MB	J-/NJ/P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109D)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: JVC
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
3&7		5	PFB	104975 (147200 - 589038)		J/UJ/A (i)
			4DCB	115449 (126309 - 505236)		
		6	PFB	124572 (153716 - 614862)		
			4DCB	119348 (127236 - 508944)		(see TCL for associated cpds)

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 22109D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y/N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		6	IS outside limits	confirmation	X /A (G)

Comments: _____

LDC #: 22109b1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Compound	Concentration (ug/kg) 13	14	RPD	Parent only
M	10 U	1.6	8.4 (≤10D)	-
F	11	11	0 (≤21D)	-
E	0.45	5.3 U	485 (≤5.3D)	-
CC	0.70	0.89	0.19 ↓	-

Compound	Concentration (ug/kg) 18	19	RPD	
F	6.0	17*	11 (≤28D)	-
CC	4.8 U	0.88	3.9x (≤4.8D)	-

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

EB092909-SO1A4
EB092909-SO2A4
SA213-0.5B
SA213-14B
SA213-30B
SA213-44B
SA110-0.5B
SA110-10B
SA110-25B
SA110-37B
SA110009-37B
SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B
SA193-0.5B
SA193-10B
SA193009-10B
SA193-25B
SA193-42B
SA193-2.5B
TB092909-SO2
TB092909-SO4
SA213-14BMS
SA213-14BMSD

Introduction

This data review covers 22 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/09	2-Methyl-2-propanol	0.017 (≤0.05)	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4 174059-MB	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/8/09	Acetone	33.5	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B 173845-MB	J+ (all detects)	A
10/8/09	Hexachlorobutadiene	32.3	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B 173845-MB	J- (all detects) UJ (all non-detects)	A
10/9/09	Chloromethane	27.8	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4 174059-MB	J- (all detects) UJ (all non-detects)	A
10/12/09	2-Methyl-2-propanol	36.3	TB092909-SO2 174383-MB	J+ (all detects)	A
10/12/09	2-Butanone	26.0	TB092909-SO2 174383-MB	J- (all detects) UJ (all non-detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
10/9/09	2-Methyl-2-propanol	0.018 (≥0.05)	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4 174059-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
174059-MB	10/9/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	0.41 ug/L 0.27 ug/L	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4

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

Samples TB092909-SO2 and TB092909-SO4 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB092909-SO2	9/29/09	Chloromethane	0.22 ug/L	EB092909-SO2A4 SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B
TB092909-SO4	9/29/09	Acetone	3.4 ug/L	EB092909-SO2A4 SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
EB092909-SO2A4	Acetone	5.8 ug/L	5.8U ug/L
SA193009-10B	Acetone	2.6 ug/Kg	2.6U ug/Kg
SA193-25B	Acetone	6.0 ug/Kg	6.0U ug/Kg

Samples EB092909-SO1A4 and EB092909-SO2A4 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092909-SO1A4	9/29/09	Acetone	6.7 ug/L	All soil samples in SDG R0905539
EB092909-SO2A4	9/29/09	Acetone Bromoform	5.8 ug/L 0.57 ug/L	All soil samples in SDG R0905539

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA213-30B	Acetone	7.4 ug/Kg	7.4U ug/Kg
SA110-0.5B	Acetone	4.9 ug/Kg	4.9U ug/Kg
SA110-37B	Acetone	13 ug/Kg	13U ug/Kg
SA110009-37B	Acetone	4.6 ug/Kg	4.6U ug/Kg
SA191-25B	Acetone	7.5 ug/Kg	7.5U ug/Kg
SA191009-40B	Acetone	9.4 ug/Kg	9.4U ug/Kg
SA193-10B	Acetone	9.3 ug/Kg	9.3U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA193009-10B	Acetone	2.6 ug/Kg	2.6U ug/Kg
SA193-25B	Acetone	6.0 ug/Kg	6.0U ug/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	All soil samples in SDG R0905539

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA213-0.5B	Toluene	0.52 ug/Kg	0.52U ug/Kg
SA110-25B	Toluene	0.51 ug/Kg	0.51U ug/Kg
SA191-0.5B	Toluene	0.43 ug/Kg	0.43U ug/Kg
SA191-25B	Toluene	0.36 ug/Kg	0.36U ug/Kg
SA191-40B	Toluene	0.46 ug/Kg	0.46U ug/Kg
SA193-10B	Toluene	0.45 ug/Kg	0.45U ug/Kg
SA193009-10B	Acetone	2.6 ug/Kg	2.6U ug/Kg
SA193-42B	Toluene	0.44 ug/Kg	0.44U ug/Kg
SA193-2.5B	Toluene	0.45 ug/Kg	0.45U ug/Kg

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) and relative percent differences (RPD) were not within QC limits for several compounds, the MS, MSD, or LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
173845-LCS	1,1,1,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene	73 (75-125) 72 (75-125) 65 (75-125) 74 (75-125)	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B 173845-MB	J- (all detects) UJ (all non-detects)	P
174059-LCS	Chloromethane Dichlorodifluoromethane	74 (75-125) 67 (75-125)	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4 174059-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
174383-LCS	Dichloromethane	74 (75-125)	TB092909-SO2 174383-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905539	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples SA110-37B and SA110009-37B, samples SA191-40B and SA191009-40B, and samples SA193-10B and SA193009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA110-37B	SA110009-37B				
1,1-Dichloroethene	0.85	1.2	-	0.35 (≤7.5)	-	-
2-Butanone	1.7	1.3	-	0.4 (≤15)	-	-
Acetone	13	4.6	-	8.4 (≤30)	-	-
Chloroform	44	54	20 (≤50)	-	-	-
Trichlorofluoromethane	4.7	6.6	-	1.9 (≤7.5)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
1,1-Dichloroethene	1.6	4.2	-	2.6 (≤5.5)	-	-
2-Butanone	1.3	1.0	-	0.3 (≤11)	-	-
Acetone	32	9.4	-	22.6 (≤22)	J (all detects)	A
Chloroform	4.0	4.1	-	0.1 (≤5.5)	-	-
Toluene	0.46	5.5U	-	5.04 (≤5.5)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
2-Butanone	1.0	1.1	-	0.1 (≤11)	-	-
Acetone	9.3	2.6	-	6.7 (≤21)	-	-
Toluene	0.45	4.7U	-	4.25 (≤4.7)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905539	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905539	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905539	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905539	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4	Chloromethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905539	TB092909-SO2	2-Methyl-2-propanol	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905539	TB092909-SO2	2-Butanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905539	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905539	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	1,1,1,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905539	EB092909-SO1A4 EB092909-SO2A4 TB092909-SO4	Chloromethane Dichlorodifluoromethane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905539	TB092909-SO2	Dichloromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B TB092909-SO2 TB092909-SO4	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905539	SA191-40B SA191009-40B	Acetone	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905539	EB092909-SO2A4	Acetone	5.8U ug/L	A	bt
R0905539	SA193009-10B	Acetone	2.6U ug/Kg	A	bt
R0905539	SA193-25B	Acetone	6.0U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905539	SA213-30B	Acetone	7.4U ug/Kg	A	be
R0905539	SA110-0.5B	Acetone	4.9U ug/Kg	A	be
R0905539	SA110-37B	Acetone	13U ug/Kg	A	be
R0905539	SA110009-37B	Acetone	4.6U ug/Kg	A	be
R0905539	SA191-25B	Acetone	7.5U ug/Kg	A	be
R0905539	SA191009-40B	Acetone	9.4U ug/Kg	A	be
R0905539	SA193-10B	Acetone	9.3U ug/Kg	A	be
R0905539	SA193009-10B	Acetone	2.6U ug/Kg	A	be
R0905539	SA193-25B	Acetone	6.0U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905539	SA213-0.5B	Toluene	0.52U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905539	SA110-25B	Toluene	0.51U ug/Kg	A	bf
R0905539	SA191-0.5B	Toluene	0.43U ug/Kg	A	bf
R0905539	SA191-25B	Toluene	0.36U ug/Kg	A	bf
R0905539	SA191-40B	Toluene	0.46U ug/Kg	A	bf
R0905539	SA193-10B	Toluene	0.45U ug/Kg	A	bf
R0905539	SA193009-10B	Acetone	2.6U ug/Kg	A	bf
R0905539	SA193-42B	Toluene	0.44U ug/Kg	A	bf
R0905539	SA193-2.5B	Toluene	0.45U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E1
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12/04/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [signature]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/29/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD ≤ 25%
IV.	Continuing calibration ~~/ICV~~	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 10, 11 D_2 = 15, 16 D_3 = 18, 19
XVII.	Field blanks	SW	FB = 1, 2 TB = 23, 24 FB = FB080309-SO (R0904279)

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

Validated Samples: Water + Soil

+ 1	EB092909-SO1A4	W	11	SA110009-37B	D_1	S	21	SA193-42B	S	+ 31	174059-MB
+ 2	EB092909-SO2A4		12	SA191-0.5B			22	SA193-2.5B		- 32	173617-
3	SA213-0.5B	S	13	SA191-10B			+ 23	TB092909-SO2	W	- 33	173845-
4	SA213-14B		14	SA191-25B			+ 24	TB092909-SO4		* 34	174383-
5	SA213-30B		15	SA191-40B	D_2		25	SA213-14BMS	S	35	
6	SA213-44B		16	SA191009-40B	D_2		26	SA213-14BMSD		36	
7	SA110-0.5B		17	SA193-0.5B			27			37	
8	SA110-10B		18	SA193-10B	D_3		28			38	
9	SA110-25B		19	SA193009-10B	D_3		29			39	
10	SA110-37B	D_1	20	SA193-25B			30			40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
(Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$
(Y) N N/A Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/17/09	ICAL	NNNN		0.017	1, 2, 24, 174059-MB	J/UJ/A (C)

INICAL.1SB

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

~~Y~~ N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/08/09	H1465	F (+)	33.5		10-22, 173845-MB	J+ dets/A (C)
			LLL (-)	32.3		↓	J-/UJ/A
	10/09/09	F3142	A (-)	27.8		1, 2, 24, 174059-MB	J-/UJ/A
			NNNN		0.018	↓	J/UJ/A
	10/12/09	X4881	NNNN (+)	36.3		23, 174383-MB	J+ dets/A
			M (-)	26.0		↓	J-/UJ/A

LDC #: 22109E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/09/09
Conc. units: ug/L
Associated Samples: 1, 2, 24 (ND)

Compound	Blank ID	Sample Identification								
	174059-MB									
NNN	0.41									
KKK	0.27									

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22109 E1
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All soils (be)

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/29/09 →		5	7	10	11	14	16	18	19
F	6.7	5.8	7.4 /4	4.9 /4	13/4	4.6 /4	7.5/4	9.4 /4	9.3/4	2.6/4
X		0.57								
			(All others either ND or > EB)							

13.4

Blank units: _____ **Associated sample units:** Same as above (be)
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/29/09		20							
F	6.7	5.8	6.0 /4							
X		0.57								

LDC #: 22109E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 4
Reviewer: JVI
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** ug/L ; ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 2, 12-22 (bt)

Compound	Blank ID 23	Blank ID 24	Sample Identification							
Sampling Date	9/29/09	→	2	19	20					
6.8 F	~~3.4~~	3.4	5.8/4	2.6/4	6.0/4					
A	0.22									
			(All others either ND or > TB)							

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: All soils (bf)

Compound	Blank ID FB080309-50	Blank ID	Sample Identification							
Sampling Date	8/03/09	3	9	12	14	15	18	19	21	22
4.2 F	2.1							2.6/4	0.=	
0.60 CC	0.30	0.52/4	0.51/4	0.43/4	0.36/4	0.46/4	0.45/4		0.44/4	0.45/4
		(All others either ND or > FB)								

LDC #: 22109 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		25/26	Several compounds	have %R and %RPD	( )	( )	4	No qual
			outside (limits)	( )	( )	( )		(either MS/MSD/LCS in)
			(See attached	summary)	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905539
Date Collected: 9/29/09
Date Received: 9/30/09
Date Analyzed: 10/ 7/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA213-14B
Lab Code: R0905539-004

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909616-03 Result	Matrix Spike Amount	% Rec		Duplicate Matrix Spike RQ0909616-04 Result	Duplicate Matrix Spike Amount	% Rec		% Rec Limits	RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	40.8	55.7	73		46.2	62.2	74		70 - 130	13		30
1,1,1-Trichloroethane (TCA)	ND	50.8	55.7	91		60.0	62.2	96		70 - 130	17		30
1,1,2,2-Tetrachloroethane	ND	18.2	55.7	33	*	21.0	62.2	34	*	70 - 130	14		30
1,1,2-Trichloroethane	ND	41.6	55.7	75		48.8	62.2	78		70 - 130	16		30
1,1-Dichloroethane (1,1-DCA)	ND	46.6	55.7	84		57.1	62.2	92		70 - 130	20		30
1,1-Dichloroethene (1,1-DCE)	ND	42.3	55.7	76		52.8	62.2	85		70 - 130	22		30
1,1-Dichloropropene	ND	43.9	55.7	79		50.3	62.2	81		70 - 130	14		30
1,2,3-Trichlorobenzene	ND	29.6	55.7	53	*	33.3	62.2	54	*	70 - 130	12		30
1,2,3-Trichloropropane	ND	37.1	55.7	67	*	45.2	62.2	73		70 - 130	20		30
1,2,4-Trichlorobenzene	ND	31.8	55.7	57	*	32.6	62.2	52	*	70 - 130	3		30
1,2,4-Trimethylbenzene	ND	36.6	55.7	66	*	38.2	62.2	61	*	70 - 130	4		30
1,2-Dibromo-3-chloropropane (DBC	ND	34.8	55.7	62		42.1	62.2	68		50 - 150	19		30
1,2-Dibromoethane	ND	40.5	55.7	73		47.2	62.2	76		70 - 130	15		30
1,2-Dichlorobenzene	ND	36.7	55.7	66	*	41.5	62.2	67	*	70 - 130	12		30
1,2-Dichloroethane	ND	46.0	55.7	83		52.0	62.2	84		70 - 130	12		30
1,2-Dichloropropane	ND	45.6	55.7	82		53.0	62.2	85		70 - 130	15		30
1,3,5-Trimethylbenzene	ND	37.3	55.7	67	*	39.4	62.2	63	*	70 - 130	5		30
1,3-Dichlorobenzene	ND	38.6	55.7	69	*	41.4	62.2	67	*	70 - 130	7		30
1,3-Dichloropropane	ND	41.1	55.7	74		46.3	62.2	74		70 - 130	12		30
1,4-Dichlorobenzene	ND	38.1	55.7	68	*	40.2	62.2	65	*	70 - 130	5		30
2,2-Dichloropropane	ND	49.2	55.7	88		57.7	62.2	93		70 - 130	16		30
2-Butanone (MEK)	ND	46.4	55.7	83		57.4	62.2	92		50 - 150	21		30
2-Chlorotoluene	ND	37.4	55.7	67	*	39.4	62.2	63	*	70 - 130	5		30
2-Hexanone	ND	33.4	55.7	60	*	41.9	62.2	67	*	70 - 130	23		30
2-Methyl-2-propanol	ND	931	1110	84		1220	1240	98		50 - 150	27		30
4-Chlorotoluene	ND	39.7	55.7	71		41.0	62.2	66	*	70 - 130	3		30
4-Isopropyltoluene	ND	37.9	55.7	68	*	38.8	62.2	62	*	70 - 130	2		30
4-Methyl-2-pentanone	ND	40.7	55.7	73		49.6	62.2	80		70 - 130	20		30
Acetone	ND	55.7	55.7	100		85.8	62.2	138		50 - 150	43	*	30
Benzene	ND	42.4	55.7	76		49.0	62.2	79		70 - 130	14		30
Bromobenzene	ND	38.6	55.7	69	*	41.2	62.2	66	*	70 - 130	6		30
Bromochloromethane	ND	40.5	55.7	73		51.5	62.2	83		70 - 130	24		30
Bromodichloromethane	ND	44.8	55.7	80		52.5	62.2	84		70 - 130	16		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905539
Date Collected: 9/29/09
Date Received: 9/30/09
Date Analyzed: 10/ 7/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA213-14B
Lab Code: R0905539-004

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909616-03 Result	Matrix Spike Amount	% Rec		Duplicate Matrix Spike RQ0909616-04 Result	Duplicate Matrix Spike Amount	% Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	42.4	55.7	76		49.5	62.2	80		70 - 130	16	30
Bromomethane	ND	29.0	55.7	52		38.9	62.2	63		50 - 150	29	30
Carbon Tetrachloride	ND	49.6	55.7	89		56.5	62.2	91		70 - 130	13	30
Chlorobenzene	ND	40.2	55.7	72		45.4	62.2	73		70 - 130	12	30
Chloroethane	ND	37.1	55.7	67	*	49.1	62.2	79		70 - 130	28	30
Chloroform	7.8	60.7	55.7	95		71.4	62.2	102		70 - 130	16	30
Chloromethane	ND	39.9	55.7	72		48.6	62.2	78		70 - 130	20	30
Dibromochloromethane	ND	42.7	55.7	77		48.9	62.2	79		70 - 130	13	30
Dibromomethane	ND	42.1	55.7	76		49.7	62.2	80		70 - 130	16	30
Dichlorodifluoromethane (CFC 12)	ND	31.0	55.7	56	*	41.7	62.2	67	*	70 - 130	29	30
Dichloromethane	ND	42.9	55.7	77		54.2	62.2	87		70 - 130	23	30
Diisopropyl Ether	ND	51.2	55.7	92		61.9	62.2	100		70 - 130	19	30
Ethyl tert-Butyl Ether	ND	51.0	55.7	92		63.4	62.2	102		70 - 130	22	30
Ethylbenzene	ND	42.8	55.7	77		46.6	62.2	75		70 - 130	8	30
Hexachlorobutadiene	ND	31.2	55.7	56	*	29.8	62.2	48	*	70 - 130	5	30
Isopropylbenzene (Cumene)	ND	44.8	55.7	81		47.4	62.2	76		70 - 130	6	30
Methyl tert-Butyl Ether	ND	45.4	55.7	82		56.3	62.2	91		70 - 130	21	30
Naphthalene	ND	34.1	55.7	61		43.6	62.2	70		50 - 150	25	30
Styrene	ND	44.2	55.7	79		48.2	62.2	77		70 - 130	8	30
Tetrachloroethene (PCE)	ND	42.8	55.7	77		45.2	62.2	73		70 - 130	6	30
Toluene	ND	40.2	55.7	72		46.5	62.2	75		70 - 130	15	30
Trichloroethene (TCE)	ND	63.2	55.7	114		73.2	62.2	118		70 - 130	15	30
Trichlorofluoromethane (CFC 11)	ND	45.7	55.7	82		57.2	62.2	92		70 - 130	22	30
Vinyl Chloride	ND	38.0	55.7	68	*	44.5	62.2	72		70 - 130	16	30
cis-1,2-Dichloroethene	ND	42.8	55.7	77		53.5	62.2	86		70 - 130	22	30
cis-1,3-Dichloropropene	ND	44.9	55.7	81		52.6	62.2	85		70 - 130	16	30
m,p-Xylenes	ND	84.9	111	76		88.6	124	71		70 - 130	4	30
n-Butylbenzene	ND	37.6	55.7	67	*	37.7	62.2	61	*	70 - 130	0	30
n-Propylbenzene	ND	39.8	55.7	72		41.9	62.2	67	*	70 - 130	5	30
o-Xylene	ND	41.0	55.7	74		44.8	62.2	72		70 - 130	9	30
sec-Butylbenzene	ND	39.6	55.7	71		41.6	62.2	67	*	70 - 130	5	30
tert-Amyl Methyl Ether	ND	47.8	55.7	86		60.3	62.2	97		70 - 130	23	30
tert-Butylbenzene	ND	37.4	55.7	67	*	40.8	62.2	66	*	70 - 130	9	30
trans-1,2-Dichloroethene	ND	41.9	55.7	75		49.9	62.2	80		70 - 130	17	30

Comments:

LDC #: 22109E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Was a LCS required?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		173845-LCS	UU	73 (75-125)	( )	( )	10-22, 173845-MB	J-/UJ/P (1)
			MM	72 ( )	( )	( )		
			LLL	65 ( )	( )	( )		
			CCC	74 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		174059-LCS	A	74 ( )	( )	( )	1, 2, 24, 174059-MB	
			JJ	67 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		174383-LCS	E	74 ( )	( )	( )	23, 174383-MB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Compound	Concentration (ug/kg) 10	11	RPD	Parent only
H	0.85	1.2	0.35 (≤ 7.5 D)	-
M	1.7	1.3	0.4 (≤ 15 D)	-
F	13	4.6	8.4 (≤ 30 D)	-
K	44	54	20 (≤ 50% RPD)	-
KK	4.7	6.6	1.9 (≤ 7.5 D)	-

Compound	Concentration (ug/kg) 15	16	RPD	Parent only
H	1.6	4.2	2.6 (≤ 5.5 D)	-
M	1.3	1.0	0.3 (≤ 11 D)	-
F	32	9.4	22.6 (≤ 22 D)	J dets/A (fd)
K	4.0	4.1	0.1 (≤ 5.5 D)	-
CC	0.46	5.5 U	5.04	-

Compound	Concentration (ug/kg) 18	19	RPD	Parent only
M	1.0	1.1	0.1 (≤ 11 D)	-
F	9.3	2.6	6.7 (≤ 21 D)	-
CC	0.45	4.7 U	4.25 (≤ 4.7 D)	-

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

EB093009-SO1A4
RSAQ3-0.5B
RSAQ3009-0.5B
RSAQ3-10B
RSAQ3-25B
RSAQ3-41B
SA190-0.5B
SA190-10B
SA190-25B
SA190-38B
RSAR4-0.5B
RSAR4-10B
RSAR4009-10B
RSAR4-25B
RSAR4-25BRE
RSAR4-37B
TB093009-SO1
TB093009-SO3
RSAR3-0.5B
RSAR3-10B
RSAR3-25B
RSAR3-35B
RSAR3-38B
TB100109-SO1
SA190-38BMS
SA190-38BMSD

Introduction

This data review covers 22 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) 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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

All of the continuing calibration RRF values were within method and validation criteria.

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
174093-MB	10/9/09	2-Methyl-2-propanol 1,2,3-Trichlorobenzene Hexachlorobutadiene	89 ug/L 0.29 ug/L 0.41 ug/L	EB093009-SO1A4 TB093009-SO1 TB093009-SO3 TB100109-SO1
173956-MB	10/8/09	Acetone	1.6 ug/Kg	RSAQ3-0.5B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
173738-MB	10/7/09	Acetone	2.7 ug/Kg	RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-10B RSAR4009-10B RSAR4-25BRE

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
RSAQ3-25B	Acetone	4.3 ug/Kg	4.3U ug/Kg
RSAQ3-41B	Acetone	2.7 ug/Kg	2.7U ug/Kg
RSAR4009-10B	Acetone	2.3 ug/Kg	2.3U ug/Kg

Samples TB093009-SO1, TB093009-SO3, and TB100109-SO1 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB093009-SO1	9/30/09	Acetone Bromodichloromethane Bromoform Dibromochloromethane	1.8 ug/L 0.27 ug/L 3.1 ug/L 3.1 ug/L	EB093009-SO1A4 RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-25BRE RSAR4-37B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAQ3-41B	Acetone	2.7 ug/Kg	2.7U ug/Kg
SA190-25B	Acetone	3.4 ug/Kg	3.4U ug/Kg
RSAR4009-10B	Acetone	2.3 ug/Kg	2.3U ug/Kg

Sample EB093009-SO1A4 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB093009-SO1A4	9/30/09	Acetone	4.4 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-25BRE RSAR4-37B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAQ3-10B	Acetone	6.4 ug/Kg	6.4U ug/Kg
RSAQ3-25B	Acetone	4.3 ug/Kg	4.3U ug/Kg
RSAQ3-41B	Acetone	2.7 ug/Kg	2.7U ug/Kg
SA190-25B	Acetone	3.4 ug/Kg	3.4U ug/Kg
RSAR4009-10B	Acetone	2.3 ug/Kg	2.3U ug/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	All soil samples in SDG R0905567

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAQ3-10B	Toluene	0.37 ug/Kg	0.37U ug/Kg
RSAQ3-25B	Toluene	0.41 ug/Kg	0.41U ug/Kg
RSAQ3-41B	Acetone	2.7 ug/Kg	2.7U ug/Kg
SA190-10B	Toluene	0.44 ug/Kg	0.44U ug/Kg
SA190-25B	Acetone	3.4 ug/Kg	3.4U ug/Kg
RSAR4009-10B	Acetone	2.3 ug/Kg	2.3U ug/Kg
RSAR3-0.5B	Toluene	0.45 ug/Kg	0.45U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAR3-10B	Toluene	0.57 ug/Kg	0.57U ug/Kg

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) and relative percent differences (RPD) were not within QC limits for several compounds, the MS, MSD, or LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
173738-LCS (1st set) (RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-10B RSAR4009-10B RSAR4-25BRE 173738-MB)	2-Methyl-2-propanol Acetone	145 (75-125) 140 (75-125)	- -	- -	J+ (all detects) J+ (all detects)	P
173738-LCS (2nd set) (RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-10B RSAR4009-10B RSAR4-25BRE 173738-MB)	2-Methyl-2-propanol Acetone	129 (75-125) 143 (75-125)	139 (75-125) 138 (75-125)	- -	J+ (all detects) J+ (all detects)	P
174093-LCS/D (All water samples in SDG R0905567)	Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether	0 (75-125) 0 (75-125) 0 (75-125)	0 (75-125) 0 (75-125) 0 (75-125)	-	J- (all detects) R (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAR4-25B	Pentafluorobenzene	120694 (148672-594688)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A
RSAR4-25BRE	Pentafluorobenzene	111016 (153716-614862)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905567	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
RSAR4-25BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B and samples RSAR4-10B and RSAR4009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
2-Butanone	1.1	11U	-	9.9 (≤11)	-	-
Acetone	11	14	-	3 (≤22)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Acetone	21	2.3	-	18.7 (≤26)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-10B RSAR4009-10B RSAR4-25BRE	2-Methyl-2-propanol Acetone	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905567	EB093009-SO1A4 TB093009-SO1 TB093009-SO3 TB100109-SO1	Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether	J- (all detects) R (all non-detects)	P	Laboratory control samples (%R) (l)
R0905567	RSAR4-25B RSAR4-25BRE	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	EB093009-SO1A4 RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-25BRE RSAR4-37B TB093009-SO1 TB093009-SO3 RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B TB100109-SO1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905567	RSAR4-25BRE	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-25B	Acetone	4.3U ug/Kg	A	bl
R0905567	RSAQ3-41B	Acetone	2.7U ug/Kg	A	bl
R0905567	RSAR4009-10B	Acetone	2.3U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-41B	Acetone	2.7U ug/Kg	A	bt
R0905567	SA190-25B	Acetone	3.4U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905567	RSAR4009-10B	Acetone	2.3U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R905567	RSAQ3-10B	Acetone	6.4U ug/Kg	A	be
R905567	RSAQ3-25B	Acetone	4.3U ug/Kg	A	be
R905567	RSAQ3-41B	Acetone	2.7U ug/Kg	A	be
R905567	SA190-25B	Acetone	3.4U ug/Kg	A	be
R905567	RSAR4009-10B	Acetone	2.3U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-10B	Toluene	0.37U ug/Kg	A	bf
R0905567	RSAQ3-25B	Toluene	0.41U ug/Kg	A	bf
R0905567	RSAQ3-41B	Acetone	2.7U ug/Kg	A	bf
R0905567	SA190-10B	Toluene	0.44U ug/Kg	A	bf
R0905567	SA190-25B	Acetone	3.4U ug/Kg	A	bf
R0905567	RSAR4009-10B	Acetone	2.3U ug/Kg	A	bf
R0905567	RSAR3-0.5B	Toluene	0.45U ug/Kg	A	bf
R0905567	RSAR3-10B	Toluene	0.57U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F1
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: V

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 9/30 - 10/01/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
IV.	Continuing calibration ~~ICV~~	A	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 2, 3 D_2 = 12, 13
XVII.	Field blanks	SW	EB = 1 TB = 17, 18, 24 FB = FB080309-SO (R0904279)

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

Validated Samples: Water + Soil

1	EB093009-SO1A4	W	11	RSAR4-0.5B	S	21	RSAR3-25B	S	31	174093-MB	
2	RSAQ3-0.5B	D_1 S	12	RSAR4-10B	D_2	22	RSAR3-35B		32	173956-	
3	RSAQ3009-0.5B	D_1	13	RSAR4009-10B	D_2	23	RSAR3-38B		33	173738-	
4	RSAQ3-10B		14	RSAR4-25B		24	TB100109-SO1	W	34		
5	RSAQ3-25B		15	RSAR4-25B~~DL~~ RE		25	SA190-38BMS	S	35		
6	RSAQ3-41B		16	RSAR4-37B		26	SA190-38BMSD		36		
7	SA190-0.5B		17	TB093009-SO1	W	27			37		
8	SA190-10B		18	TB093009-SO3		28			38		
9	SA190-25B		19	RSAR3-0.5B	S	29			39		
10	SA190-38B		20	RSAR3-10B		30			40		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl chorlde**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 2
Reviewer: VG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/09/09 (All water)
Conc. units: ug/L Associated Samples: 1, 17, 18, 24 (ND)

Compound	Blank ID	Sample Identification								
	174093-MB									
NNNN	89									
NNN	0.29									
LLL	0.41									

Blank analysis date: 10/08/09
Conc. units: ug/kg Associated Samples: 2, 7-11, 14, 16, 19-23

Compound	Blank ID	Sample Identification								
	173956-MB		(All results either ND or > MB)							
3,2 F	1.6									

LDC #: 22109 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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 associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 10/07/09 (bl)
Conc. units: ug/Kg Associated Samples: 3-6, 12, 13, 15

Compound	Blank ID	Sample Identification								
	173738-MB	5	6	13						
5.4 F	2.7	4.3/U	2.7/U	2.3/U						
		CAN	others	either	ND or	> MB)				

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
Reviewer: JVB
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

Blank units: ug/L **Associated sample units:** ug/kg

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 2-16 (6e)

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	9/30/09	4	5	6	9	13				
8.8 F	4.4	6.4/U	4.3/U	2.7/U	3.4/U	2.3/U				
		CAll	others	either	ND	or > EB)				

Blank units: ug/L **Associated sample units:** ug/L ; ug/kg

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-16 (6t)

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	9/30/09	6	9	13						
F	1.8	2.7/U	3.4/U	2.3/U						
P	0.27									
X	3.1									
T	3.1									

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: All soils (bf)

Compound	Blank ID: FB080309-50	Blank ID:	Sample Identification							
Sampling Date	8/03/09	4	5	6	8	9	13	19	20	
F	2.1			2.7/4		3.4/4	2.3/4			
CC	0.30	0.37/4	0.41/4		0.44/4			0.45/4	0.57/4	
			(All others either ND or > FB)							

9.2
0.10

Blank units: _____ **Associated sample units:** _____

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 22109 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		25/26	several compounds	have %R	and %RPD		10	No qual
			outside limits	( )	( )	( )		(either MS/MSD/LCS)
			(see attached summary)	( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905567
Date Collected: 9/30/09
Date Received: 10/1/09
Date Analyzed: 10/ 9/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA190-38B
Lab Code: R0905567-010

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909698-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0909698-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	78.2	91.8	85		91.1	97.9	93		70 - 130	15		30
1,1,1-Trichloroethane (TCA)	ND	104	91.8	113		105	97.9	107		70 - 130	1		30
1,1,2,2-Tetrachloroethane	ND	66.9	91.8	73		69.7	97.9	71		70 - 130	4		30
1,1,2-Trichloroethane	ND	71.4	91.8	78		75.9	97.9	78		70 - 130	6		30
1,1-Dichloroethane (1,1-DCA)	ND	94.3	91.8	103		92.1	97.9	94		70 - 130	2		30
1,1-Dichloroethene (1,1-DCE)	0.62	97.7	91.8	106		101	97.9	102		70 - 130	3		30
1,1-Dichloropropene	ND	69.4	91.8	76		80.5	97.9	82		70 - 130	15		30
1,2,3-Trichlorobenzene	ND	46.3	91.8	50	*	62.9	97.9	64	*	70 - 130	30		30
1,2,3-Trichloropropane	ND	67.0	91.8	73		69.1	97.9	71		70 - 130	3		30
1,2,4-Trichlorobenzene	ND	42.2	91.8	46	*	62.0	97.9	63	*	70 - 130	38	*	30
1,2,4-Trimethylbenzene	ND	58.3	91.8	63	*	79.7	97.9	81		70 - 130	31	*	30
1,2-Dibromo-3-chloropropane (DBC	ND	61.7	91.8	67		64.0	97.9	65		50 - 150	4		30
1,2-Dibromoethane	ND	67.8	91.8	74		73.0	97.9	75		70 - 130	7		30
1,2-Dichlorobenzene	ND	64.0	91.8	70		81.8	97.9	84		70 - 130	24		30
1,2-Dichloroethane	ND	75.7	91.8	82		83.1	97.9	85		70 - 130	9		30
1,2-Dichloropropane	ND	70.1	91.8	76		78.8	97.9	81		70 - 130	12		30
1,3,5-Trimethylbenzene	ND	59.9	91.8	65	*	81.4	97.9	83		70 - 130	30		30
1,3-Dichlorobenzene	ND	59.8	91.8	65	*	79.5	97.9	81		70 - 130	28		30
1,3-Dichloropropane	ND	67.3	91.8	73		74.9	97.9	77		70 - 130	11		30
1,4-Dichlorobenzene	ND	61.1	91.8	67	*	81.5	97.9	83		70 - 130	29		30
2,2-Dichloropropane	ND	97.1	91.8	106		98.1	97.9	100		70 - 130	1		30
2-Butanone (MEK)	ND	81.8	91.8	89		75.8	97.9	77		50 - 150	8		30
2-Chlorotoluene	ND	59.0	91.8	64	*	79.6	97.9	81		70 - 130	30		30
2-Hexanone	ND	41.4	91.8	45	*	47.8	97.9	49	*	70 - 130	14		30
2-Methyl-2-propanol	ND	1880	1840	102		1630	1960	83		50 - 150	14		30
4-Chlorotoluene	ND	60.2	91.8	66	*	80.0	97.9	82		70 - 130	28		30
4-Isopropyltoluene	ND	58.3	91.8	64	*	84.1	97.9	86		70 - 130	36	*	30
4-Methyl-2-pentanone	ND	60.9	91.8	66	*	60.1	97.9	61	*	70 - 130	1		30
Acetone	20	129	91.8	119		102	97.9	85		50 - 150	23		30
Benzene	ND	68.7	91.8	75		78.6	97.9	80		70 - 130	14		30
Bromobenzene	ND	65.3	91.8	71		82.6	97.9	84		70 - 130	24		30
Bromochloromethane	ND	93.1	91.8	101		91.0	97.9	93		70 - 130	2		30
Bromodichloromethane	ND	79.1	91.8	86		87.0	97.9	89		70 - 130	9		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905567
Date Collected: 9/30/09
Date Received: 10/1/09
Date Analyzed: 10/ 9/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA190-38B
Lab Code: R0905567-010

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909698-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0909698-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD		RPD Limit
Bromoform	ND	72.9	91.8	79		82.0	97.9	84		70 - 130	12		30
Bromomethane	ND	88.8	91.8	97		86.4	97.9	88		50 - 150	3		30
Carbon Tetrachloride	ND	86.8	91.8	95		98.7	97.9	101		70 - 130	13		30
Chlorobenzene	ND	70.2	91.8	76		86.6	97.9	89		70 - 130	21		30
Chloroethane	ND	84.1	91.8	92		90.2	97.9	92		70 - 130	7		30
Chloroform	48	138	91.8	98		135	97.9	89		70 - 130	2		30
Chloromethane	ND	81.3	91.8	89		80.3	97.9	82		70 - 130	1		30
Dibromochloromethane	ND	79.7	91.8	87		88.3	97.9	90		70 - 130	10		30
Dibromomethane	ND	70.5	91.8	77		78.7	97.9	80		70 - 130	11		30
Dichlorodifluoromethane (CFC 12)	ND	73.0	91.8	80		70.5	97.9	72		70 - 130	4		30
Dichloromethane	ND	90.3	91.8	98		91.0	97.9	93		70 - 130	1		30
Diisopropyl Ether	ND	100	91.8	109		98.1	97.9	100		70 - 130	2		30
Ethyl tert-Butyl Ether	ND	96.7	91.8	105		92.6	97.9	95		70 - 130	4		30
Ethylbenzene	ND	67.0	91.8	73		88.8	97.9	91		70 - 130	28		30
Hexachlorobutadiene	ND	55.0	91.8	60	*	92.1	97.9	94		70 - 130	50	*	30
Isopropylbenzene (Cumene)	ND	62.4	91.8	68	*	83.2	97.9	85		70 - 130	29		30
Methyl tert-Butyl Ether	ND	84.1	91.8	92		79.5	97.9	81		70 - 130	6		30
Naphthalene	ND	58.7	91.8	64		68.7	97.9	70		50 - 150	16		30
Styrene	ND	72.7	91.8	79		93.1	97.9	95		70 - 130	25		30
Tetrachloroethene (PCE)	ND	75.3	91.8	82		92.9	97.9	95		70 - 130	21		30
Toluene	ND	70.2	91.8	76		83.2	97.9	85		70 - 130	17		30
Trichloroethene (TCE)	ND	74.8	91.8	82		88.3	97.9	90		70 - 130	17		30
Trichlorofluoromethane (CFC 11)	ND	108	91.8	117		109	97.9	112		70 - 130	2		30
Vinyl Chloride	ND	90.3	91.8	98		90.0	97.9	92		70 - 130	0		30
cis-1,2-Dichloroethene	ND	88.3	91.8	96		91.5	97.9	93		70 - 130	3		30
cis-1,3-Dichloropropene	ND	66.1	91.8	72		75.3	97.9	77		70 - 130	13		30
m,p-Xylenes	ND	139	184	76		181	196	93		70 - 130	26		30
n-Butylbenzene	ND	52.3	91.8	57	*	78.9	97.9	81		70 - 130	41	*	30
n-Propylbenzene	ND	58.2	91.8	63	*	79.9	97.9	82		70 - 130	31	*	30
o-Xylene	ND	67.0	91.8	73		84.2	97.9	86		70 - 130	23		30
sec-Butylbenzene	ND	57.7	91.8	63	*	81.0	97.9	83		70 - 130	34	*	30
tert-Amyl Methyl Ether	ND	84.7	91.8	92		84.7	97.9	87		70 - 130	0		30
tert-Butylbenzene	ND	62.7	91.8	68	*	84.7	97.9	87		70 - 130	30		30
trans-1,2-Dichloroethene	ND	87.5	91.8	95		88.2	97.9	90		70 - 130	1		30

Comments:

LDC #: 22109 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVB
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Was a LCS required?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	(1st set)	173738-LCS	NNNN	145 (75-125)	( )	( )	3-6, ~~7~~, 12, 15, 173738-MB	J+ dets/P (l)
			F	140 (↓)	( )	( )	↓	↓ ↓
				( )	( )	( )		
	(2nd set)	173738-LCS/P	several	compounds have %R outside limits in the LCS/P				No qual
			(See	attached summary)	( )	( )		(either 1st LCS in
				( )	( )	( )		or LCSD in)
			NNNN	129 (75-125)	139 (75-125)	( )		J+ dets/P (l)
			F	143 (↓)	138 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
		173956-LCS	NNNN	133 ( )	( )	( )	2, 7-10, 11, 14, 16,	No qual (MS/MSD in)
			F	136 ( )	( )	( )	19-23, 173956-MB	↓ ↓
			O	130 ( )	( )	( )	↓	
			KK	127 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		174093-LCS/D	B	( )	128 (75-125)	( )	1, 17, 18, 24, 174093-MB	No qual (LCS in)
			XXX	0 ( )	0 (↓)	( )	↓	J-/R/P (l)
			~~AAAA~~	0 ( )	0 ( )	( )		↓ ↓
			~~BBBB~~	0 (↓)	0 (↓)	( )	↓	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905567
Date Analyzed: 10/ 7/09

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260B

Units: µg/Kg
Basis: Dry

Analysis Lot: 173738

	Lab Control Sample RQ0909637-03				Duplicate Lab Control Sample RQ0909637-04				% Rec		RPD
Analyte Name	**Result**	**Expected**	**% Rec**		**Result**	**Expected**	**% Rec**		**Limits**	**RPD**	**Limit**
1,1,1,2-Tetrachloroethane	63.6	50.0	127	*	62.4	50.0	125		75 - 125	2	30
1,1,1-Trichloroethane (TCA)	64.2	50.0	128	*	58.5	50.0	117		75 - 125	9	30
1,1,2,2-Tetrachloroethane	54.3	50.0	109		55.9	50.0	112		75 - 125	3	30
1,1,2-Trichloroethane	60.1	50.0	120		58.0	50.0	116		75 - 125	3	30
1,1-Dichloroethane (1,1-DCA)	58.3	50.0	117		53.0	50.0	106		75 - 125	10	30
1,1-Dichloroethene (1,1-DCE)	66.9	50.0	134	*	59.8	50.0	120		75 - 125	11	30
1,1-Dichloropropene	60.3	50.0	121		56.5	50.0	113		75 - 125	6	30
1,2,3-Trichlorobenzene	59.3	50.0	119		58.3	50.0	117		75 - 125	2	30
1,2,3-Trichloropropane	54.9	50.0	110		58.9	50.0	118		75 - 125	7	30
1,2,4-Trichlorobenzene	57.9	50.0	116		54.9	50.0	110		75 - 125	5	30
1,2,4-Trimethylbenzene	54.0	50.0	108		52.5	50.0	105		75 - 125	3	30
1,2-Dibromo-3-chloropropane (DBCP)	57.5	50.0	115		60.0	50.0	120		75 - 125	4	30
1,2-Dibromoethane	60.8	50.0	122		60.5	50.0	121		75 - 125	0	30
1,2-Dichlorobenzene	57.8	50.0	116		57.0	50.0	114		75 - 125	1	30
1,2-Dichloroethane	65.7	50.0	131	*	62.1	50.0	124		75 - 125	6	30
1,2-Dichloropropane	59.5	50.0	119		55.3	50.0	111		75 - 125	7	30
1,3,5-Trimethylbenzene	54.3	50.0	109		51.9	50.0	104		75 - 125	5	30
1,3-Dichlorobenzene	54.3	50.0	109		52.1	50.0	104		75 - 125	4	30
1,3-Dichloropropane	58.0	50.0	116		55.7	50.0	111		75 - 125	4	30
1,4-Dichlorobenzene	56.9	50.0	114		55.5	50.0	111		75 - 125	3	30
2,2-Dichloropropane	60.3	50.0	121		57.6	50.0	115		75 - 125	5	30
2-Butanone (MEK)	58.6	50.0	117		59.8	50.0	120		75 - 125	2	30
2-Chlorotoluene	52.1	50.0	104		50.5	50.0	101		75 - 125	3	30
2-Hexanone	57.8	50.0	116		61.0	50.0	122		75 - 125	5	30
2-Methyl-2-propanol	1290	1000	129	*	1390	1000	139	*	75 - 125	8	30
4-Chlorotoluene	54.3	50.0	109		53.0	50.0	106		75 - 125	2	30
4-Isopropyltoluene	54.6	50.0	109		52.6	50.0	105		75 - 125	4	30
4-Methyl-2-pentanone	59.1	50.0	118		61.4	50.0	123		75 - 125	4	30
Acetone	71.5	50.0	143	*	69.0	50.0	138	*	75 - 125	3	30
Benzene	57.9	50.0	116		54.0	50.0	108		75 - 125	7	30
Bromobenzene	55.2	50.0	110		54.4	50.0	109		75 - 125	2	30
Bromochloromethane	63.1	50.0	126	*	58.5	50.0	117		75 - 125	7	30
Bromodichloromethane	64.7	50.0	129	*	60.0	50.0	120		75 - 125	7	30
Bromoform	60.7	50.0	121		60.8	50.0	122		75 - 125	0	30
Bromomethane	65.7	50.0	131	*	56.5	50.0	113		75 - 125	15	30
Carbon Tetrachloride	67.7	50.0	135	*	65.0	50.0	130	*	75 - 125	4	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905567
Date Analyzed: 10/ 7/09

Lab Control Sample Summary
Volatile Organic Compounds by GC/MS

Analytical Method: 8260B

Units: µg/Kg
Basis: Dry

Analysis Lot: 173738

Analyte Name	Lab Control Sample RQ0909637-03 Result	Expected	% Rec		Duplicate Lab Control Sample RQ0909637-04 Result	Expected	% Rec		% Rec Limits	RPD	RPD Limit
Chlorobenzene	59.9	50.0	120		56.6	50.0	113		75 - 125	6	30
Chloroethane	65.3	50.0	131	*	59.8	50.0	120		75 - 125	9	30
Chloroform	60.8	50.0	122		56.3	50.0	113		75 - 125	8	30
Chloromethane	65.8	50.0	132	*	60.7	50.0	121		75 - 125	8	30
Dibromochloromethane	68.2	50.0	136	*	66.1	50.0	132	*	75 - 125	3	30
Dibromomethane	62.8	50.0	126	*	59.4	50.0	119		75 - 125	6	30
Dichlorodifluoromethane (CFC 12)	58.2	50.0	116		51.9	50.0	104		75 - 125	12	30
Dichloromethane	58.8	50.0	118		55.7	50.0	111		75 - 125	5	30
Diisopropyl Ether	51.2	50.0	102		49.3	50.0	99		75 - 125	4	30
Ethyl tert-Butyl Ether	51.3	50.0	103		49.6	50.0	99		75 - 125	3	30
Ethylbenzene	59.7	50.0	119		57.4	50.0	115		75 - 125	4	30
Hexachlorobutadiene	56.9	50.0	114		53.4	50.0	107		75 - 125	6	30
Isopropylbenzene (Cumene)	55.0	50.0	110		53.0	50.0	106		75 - 125	4	30
Methyl tert-Butyl Ether	57.2	50.0	114		55.6	50.0	111		75 - 125	3	30
Naphthalene	59.1	50.0	118		61.8	50.0	124		75 - 125	5	30
Styrene	65.2	50.0	130	*	62.7	50.0	125		75 - 125	4	30
Tetrachloroethene (PCE)	65.0	50.0	130	*	62.2	50.0	124		75 - 125	4	30
Toluene	58.9	50.0	118		55.7	50.0	111		75 - 125	5	30
Trichloroethene (TCE)	62.0	50.0	124		57.8	50.0	116		75 - 125	7	30
Trichlorofluoromethane (CFC 11)	70.9	50.0	142	*	64.1	50.0	128	*	75 - 125	10	30
Vinyl Chloride	66.3	50.0	133	*	62.2	50.0	124		75 - 125	6	30
cis-1,2-Dichloroethene	56.1	50.0	112		52.4	50.0	105		75 - 125	7	30
cis-1,3-Dichloropropene	58.3	50.0	117		56.5	50.0	113		75 - 125	3	30
m,p-Xylenes	125	100	125		119	100	119		75 - 125	5	30
n-Butylbenzene	52.1	50.0	104		49.4	50.0	99		75 - 125	5	30
n-Propylbenzene	52.3	50.0	105		50.3	50.0	101		75 - 125	4	30
o-Xylene	60.5	50.0	121		57.2	50.0	114		75 - 125	6	30
sec-Butylbenzene	53.3	50.0	107		51.1	50.0	102		75 - 125	4	30
tert-Amyl Methyl Ether	46.4	50.0	93		45.7	50.0	91		75 - 125	1	30
tert-Butylbenzene	55.5	50.0	111		53.3	50.0	107		75 - 125	4	30
trans-1,2-Dichloroethene	58.4	50.0	117		53.5	50.0	107		75 - 125	9	30
trans-1,3-Dichloropropene	61.2	50.0	122		59.9	50.0	120		75 - 125	2	30

Comments:

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y (N) N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
41		14	PFB	120694 (148672 - 594688)		J/UJ/A (i)
36		15		111016 (153716 - 614862)		
						(see TCL for associated cpds)

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		15	IS outside limits confirmation		X / A (o)

Comments: _____

LDC #: 22109F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: SVC
2nd reviewer: ✓

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	2	3	
M	1.1	11 U	9.9 (≤11 D)
F	11	14	3 (≤22D)

Compound	Concentration (ug/kg)		RPD
	12	13	
F	21	2.3	18.7 (≤26 D)

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	October 1 through October 5, 2009
LDC Report Date:	December 16, 2009
Matrix:	Soil
Parameters:	Volatiles
Validation Level:	Stage 4
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626

Sample Identification

RSAR3-0.5BSPLP3
RSAR3-35BSPLP3
RSAQ4-10BSPLP3
RSAQ4-32BSPLP3

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 8260B for Volatiles.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	All samples in SDG R0905626	J (all detects) UJ (all non-detects)	A

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/20/09	Dichlorodifluoromethane	26.8	All samples in SDG R0905626	J+ (all detects)	A

All of the continuing calibration RRF values were within method and validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
10/20/09	2-Methyl-2-propanol	0.026 (≥0.05)	All samples in SDG R0905626	J (all detects) UJ (all non-detects)	A

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905626

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905626	RSAR3-0.5BSPLP3 RSAR3-35BSPLP3 RSAQ4-10BSPLP3 RSAQ4-32BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905626	RSAR3-0.5BSPLP3 RSAR3-35BSPLP3 RSAQ4-10BSPLP3 RSAQ4-32BSPLP3	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905626	RSAR3-0.5BSPLP3 RSAR3-35BSPLP3 RSAQ4-10BSPLP3 RSAQ4-32BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905626	RSAR3-0.5BSPLP3 RSAR3-35BSPLP3 RSAQ4-10BSPLP3 RSAQ4-32BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109G1
SDG #: R0905626
Laboratory: Columbia Analytical Services

Stage ~~2B~~ 4

Date: 12/15/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer: A

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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: 10/01-05/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD (no r²)
IV.	Continuing calibration/~~ICV~~	SW	CAV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	RSAR3-0.5BSPLP3	11	175551-MB	21		31	
2	RSAR3-35BSPLP3	12	SPLP-Blk	22		32	
3	RSAQ4-10BSPLP3	13		23		33	
4	RSAQ4-32BSPLP3	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 #: 22109G1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: IC

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of > 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?		✓		
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) > 0.05?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours 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 the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 22109G1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. 2-Methyl-2-propanol
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

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

LDC #: >>109G1
SDG #: Cu Cmy

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

(Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
(Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y (N) N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? NA
Y N (N/A) Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/18/09	ICAL	NNNN		0.028	All + Blks	J/UJ/A (CC)

INICAL.1SB

LDC #: 221096J
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JW
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	10/20/09	C1584	JJ (7)	26.8		All + blks	J+ dets/A (c)
			NNNN		0.026	↓	J/UJ/A ↕
		«					

LDC #: 22109G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVB
2nd Reviewer: LL

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/18/09	C (1st internal standard)	0.523	0.523	0.521	0.521	7.7	7.7
			S (2nd internal standard)	0.250	0.250	0.275	0.275	6.6	6.6
	MS 10		~~EE~~ (3rd internal standard)	0.395	0.395	0.415	0.411	6.0	6.6
2			BB (1st internal standard)	0.543	0.543	0.547	0.547	3.5	3.5
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

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

LDC #: J2109G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	C1584	10/20/09	G (1st internal standard)	0.521	0.587	0.587	11.7	11.7
			S (2nd internal standard)	0.275	0.309	0.309	12.4	12.4
			EE (3rd internal standard)	0.415	0.477	0.477	13.7	13.7
2			BB (1st internal standard)	0.547	0.534	0.534	2.4	2.4
			(2nd internal standard)					
			(3rd internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					

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

LDC #: 22109G1a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	55.68	111	111	0
Bromofluorobenzene		54.72	109	109	
1,2-Dichloroethane-d4					
Dibromofluoromethane		52.13	104	104	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8					
Bromofluorobenzene					
1,2-Dichloroethane-d4					
Dibromofluoromethane					

LDC #: 22109G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JM
2nd Reviewer: LC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

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

LCS ID: 175551 LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration ug/L		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	20.0	NA	21.3	NA	106	106				
Trichloroethene			19.8		99	99				
Benzene			18.9		94	94				
Toluene			20.3		102	102				
Chlorobenzene			20.0		100	100				

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

LDC #: 29096J
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

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

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

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

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. # 3 , E :

Conc. = $\frac{(5955)(50)(\quad)(\quad)}{(~~23490~~\ 754207)(0.445)(\quad)(\quad)}$

= 0.89 ug/L

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

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Semivolatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

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 RRF values were greater than or equal to 0.05 .

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
SPLP2-BLK	8/12/09	Bis(2-ethylhexyl)phthalate	0.89 ug/L	RSAU5-0.5BSPLP2
SPLP3-BLK	8/13/09	Butylbenzylphthalate	0.19 ug/L	RSAU5-0.5BSPLP3

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
93644-LCS/D (All samples in SDG R0904370)	Pyridine	31 (50-120)	32 (50-120)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	Pyridine	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A2a
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/06/09
Page: 1 of 1
Reviewer: JM
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
I.	Technical holding times	A	Sampling dates: 8/05/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD rr
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

Soil

1	RSAU5-0.5BSPLP2	11		21		31	
2	RSAU5-0.5BSPLP3	12		22		32	
3	93644-MB	13		23		33	
4	SPLP2-Blk	14		24		34	
5	SPLP3- ↓	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 8270C)

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

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

LDC #: 22109 A2g
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

SPLP **Blank extraction date:** 8/12/09 **Blank analysis date:** 8/17/09
Conc. units: ug/L Associated Samples: 1 (ND)

Compound	Blank ID	Sample Identification								
	SPLP2-BLK									
EEE	0.89									

SPLP **Blank extraction date:** 8/13/09 **Blank analysis date:** 8/17/09
Conc. units: ug/L Associated Samples: 7 (ND)

Compound	Blank ID	Sample Identification								
	SPLP3-BLK									
AAA	0.19									

5x Phthalates
2x all others

LDC #: 22109A29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVG
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 LCS required?
Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		93644 LCS/D	RRR	31 (50-120)	32 (50-120)	( )	All + Blks	J-/UJ/P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-30B
SA203-46B
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-30B
SA148-35B
SA148-45B
RSAT7-44BMS
RSAT7-44BMSD

Introduction

This data review covers 20 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/6/09	Di-n-octylphthalate	25.9	SA148-10B SA148-30B SA148-35B SA148-45B	J+ (all detects)	A

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 RRF values were greater than or equal to 0.05 .

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
96998-MB	9/28/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate	0.30 ug/L 0.46 ug/L 3.6 ug/L 0.27 ug/L	All water samples in SDG R0905402
96857-MB	9/25/09	Di-n-butylphthalate	36 ug/Kg	All soil samples in SDG R0905402

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
EB092309-SO1A4	Bis(2-ethylhexyl)phthalate	0.24 ug/L	0.24U ug/L
RSAT7-0.5B	Di-n-butylphthalate	53 ug/Kg	53U ug/Kg
RSAT7-10B	Di-n-butylphthalate	70 ug/Kg	70U ug/Kg
RSAT7-25B	Di-n-butylphthalate	83 ug/Kg	83U ug/Kg
RSAT8-0.5B	Di-n-butylphthalate	48 ug/Kg	48U ug/Kg
SA203-0.5B	Di-n-butylphthalate	43 ug/Kg	43U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA203-10B	Di-n-butylphthalate	45 ug/Kg	45U ug/Kg
SA148-10B	Di-n-butylphthalate	41 ug/Kg	41U ug/Kg
SA148-30B	Di-n-butylphthalate	47 ug/Kg	47U ug/Kg

Samples EB092309-SO1A4 were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092309-SO1A4	9/23/09	Bis(2-ethylhexyl)phthalate	0.24 ug/L	SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B

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

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Diethylphthalate	2.0 ug/L 0.14 ug/L 0.36 ug/L	All soil samples in SDG R0905402

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
96998-LCS/D (All water samples in SDG R0905402)	Di-n-butylphthalate	137 (50-120)	139 (50-120)	-	J+ (all detects)	P
96998-LCS/D (All water samples in SDG R0905402)	Pyridine	38 (50-120)	33 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	48 (50-120)	47 (50-120)	-	J- (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905402	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAT8-25B	RSAT8009-25B				
Bis(2-ethylhexyl)phthalate	220	200	-	20 (≤200)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	SA148-10B SA148-30B SA148-35B SA148-45B	Di-n-octylphthalate	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905402	EB092309-SO1A4	Di-n-butylphthalate	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905402	EB092309-SO1A4	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B EB092309-SO1A4 SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905402	EB092309-SO1A4	Bis(2-ethylhexyl)phthalate	0.24U ug/L	A	bl
R0905402	RSAT7-0.5B	Di-n-butylphthalate	53U ug/Kg	A	bl
R0905402	RSAT7-10B	Di-n-butylphthalate	70U ug/Kg	A	bl
R0905402	RSAT7-25B	Di-n-butylphthalate	83U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905402	RSAT8-0.5B	Di-n-butylphthalate	48U ug/Kg	A	bl
R0905402	SA203-0.5B	Di-n-butylphthalate	43U ug/Kg	A	bl
R0905402	SA203-10B	Di-n-butylphthalate	45U ug/Kg	A	bl
R0905402	SA148-10B	Di-n-butylphthalate	41U ug/Kg	A	bl
R0905402	SA148-30B	Di-n-butylphthalate	47U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Equipment Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B2a
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: [signature]

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: 9/22 - 23/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ≤ 15
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 7,8
XVII.	Field blanks	SW	EB = 14 FB = 080309-S0 (R0904279)

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil + Water

1	RSAT7-0.5B S	11	SA203-10B S	21	RSAT7-44BMSD S	31	96998-MB
2	RSAT7-10B	12	SA203-30B	22		32	96857-1
3	RSAT7-25B	13	SA203-46B	23		33	
4	RSAT7-44B	14	EB092309-SO1A4 W	24		34	
5	RSAT8-0.5B	15	SA148-0.5B S	25		35	
6	RSAT8-10B	16	SA148-10B	26		36	
7	RSAT8-25B D	17	SA148-30B	27		37	
8	RSAT8009-25B D	18	SA148-35B	28		38	
9	RSAT8-44B	19	SA148-45B	29		39	
10	SA203-0.5B	20	RSAT7-44BMS	30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22109B29

SDG #: Sec Cover

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

Reviewer: JVG

2nd Reviewer: L

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/06/09	DB855	FFF (+)	25.9		16 - 19	J+ dets/A (c)

CONCAL.2S

LDC #: 22109 B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

Blank extraction date: 9/28/09 **Blank analysis date:** 9/30/09 (bl)
Conc. units: ug/L Associated Samples: 14

Compound	Blank ID	Sample Identification								
	96998-MB	14								
EEE	0.30	0.24/U								
AAA	0.46									
XX	3.6									
LL	0.27									

Blank extraction date: 9/25/09 **Blank analysis date:** 10/02/09 (bl)
Conc. units: ug/kg Associated Samples: All soils

Compound	Blank ID	Sample Identification								
	96857-MB	1	2	3	5	10	11	16	17	
XX	36	53/U	70/U	83/U	48/U	43/U	45/U	41/U	47/U	

5x Phthalates
2x all others

LDC #: 22109B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SVG
2nd Reviewer: LA

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

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

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 9/23/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 15-19 (ND)

Compound	Blank ID	Sample Identification								
	14									
EEE	0.24	~~All results~~								
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 8/03/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All soils

Compound	Blank ID	Sample Identification								
	FB080309-SO									
EEE	2.0	(All results either ND or > FB)								
AAA	0.14									
LL	0.36									
CRQL										

LDC #: 22109B2a
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: SVG
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 LCS required?

Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		96998-LCS/D	XX	137 (50-120)	139 (50-120)	( )	14, 96998-MB	J+ dets/P (l)
			RRR	38 ( )	33 ( )	( )		J-/UJ/P
			TTT	48 ( )	47 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109 B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	7	8	
EEE	220	200	20 (≤ 200 D) –

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	September 23, 2009
LDC Report Date:	December 9, 2009
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434

Sample Identification

SA148-10BSPLP2
SA148-10BSPLP3
SA148-35BSPLP2
SA148-35BSPLP3

Samples in this SDG underwent SPLP extraction

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) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/6/09	Di-n-octylphthalate	25.9	SA148-10BSPLP3 97552-MB	J+ (all detects)	A

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 RRF values were greater than or equal to 0.05 .

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
SPLP-BLK1	9/28/09	Butylbenzylphthalate	0.22 ug/L	SA148-10BSPLP2 SA148-35BSPLP2
97552-MB	10/5/09	Bis(2-ethylhexyl)phthalate	0.25 ug/L	SA148-10BSPLP3 SA148-35BSPLP3
SPLP-BLK2	9/30/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate	1.9 ug/L 0.25 ug/L 1.2 ug/L 0.24 ug/L	SA148-10BSPLP3 SA148-35BSPLP3

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
SA148-10BSPLP2	Butylbenzylphthalate	0.11 ug/L	0.11U ug/L
SA148-35BSPLP2	Butylbenzylphthalate	0.17 ug/L	0.17U ug/L
SA148-10BSPLP3	Butylbenzylphthalate Di-n-butylphthalate	0.12 ug/L 1.8 ug/L	0.12U ug/L 1.8U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
97226-LCS/D (SA148-10BSPLP2 SA148-35BSPLP2 97226-MB SPLP-BLK1)	Pyridine	24 (50-120)	41 (50-120)	53 (≤30)	J (all detects) UJ (all non-detects)	P
97226-LCS/D (SA148-10BSPLP2 SA148-35BSPLP2 97226-MB SPLP-BLK1)	1,4-Dioxane	45 (50-120)	45 (50-120)	-	J- (all detects) UJ (all non-detects)	P
97552-LCS/D (SA148-10BSPLP3 SA148-35BSPLP3 97552-MB SPLP-BLK2)	Pyridine 1,4-Dioxane	21 (50-120) 33 (50-120)	24 (50-120) 33 (50-120)	- -	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905434	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905434

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905434	SA148-10BSPLP3	Di-n-octylphthalate	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905434	SA148-10BSPLP2 SA148-35BSPLP2	Pyridine	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0905434	SA148-10BSPLP2 SA148-35BSPLP2	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905434	SA148-10BSPLP3 SA148-35BSPLP3	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905434	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP2 SA148-35BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905434

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905434	SA148-10BSPLP2	Butylbenzylphthalate	0.11U ug/L	A	bl
R0905434	SA148-35BSPLP2	Butylbenzylphthalate	0.17U ug/L	A	bl
R0905434	SA148-10BSPLP3	Butylbenzylphthalate Di-n-butylphthalate	0.12U ug/L 1.8U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109C2a
SDG #: R0905434
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JV6
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: 9/22/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r²
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples:

Soil

1	SA148-10BSPLP2	11	97226 - MB	21		31	
2	SA148-10BSPLP3	12	97552 - MB	22		32	
3	SA148-35BSPLP2	13	SPLP - BK1	23		33	
4	SA148-35BSPLP3	14	SPLP - BLK	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 8270C)

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

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

LDC #: 22109C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/06/09	DB855	FFF (+)	25.9		2, 97552-MB	J +dets/A (c)

LDC #: 22109 C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: L

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

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

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

SPLP **Blank extraction date:** 9/28/09 **Blank analysis date:** 10/02/09 (bl)
Conc. units: Associated Samples: 1, 3

Compound	Blank ID	Sample Identification								
	SPLP-Blk1	1	x3							
AAA	0.22	0.11/U	0.17/U							

SPLP extraction date: 9/30/09 SPLP Blk analysis date: 10/07/09
Blank extraction date: 10/05/09 **Blank analysis date:** 10/06/09 (bl)
Conc. units: Associated Samples: 2, 4

Compound	Blank ID	Sample Identification								
	97552-MB	SPLP-Blk2	2							
EEE	0.25	1.9								
AAA		0.25	0.12/U							
XX		1.2	1.8/U							
LL		0.24								

5x Phthalates
2x all others

LDC #: 22109 C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVG
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 LCS required?

Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		97226-LCS/D	RRR	24 (50-120)	41 (50-120)	53 (30)	1, 3, 97226-MB,	J/UJ/P (l, ld)
			TTT	45 ( )	45 ( )	( )	SPLP-Blk1	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		97552-LCS/D	RRR	21 ( )	24 ( )	( )	2, 4, 97552-MB,	J-/UJ/P
			TTT	33 ( )	33 ( )	( )	SPLP-Blk2	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO1A4
EB092809-SO2A4
SA29-0.5B
SA29-10B
SA29-25B
SA29-40B
SA120-0.5B
SA120-10B
SA120-25B
SA120-43B
SA209-0.5B
SA209-10B
SA209009-10B
SA209-25B
SA209-35B
SA212-0.5B
SA212-13B
SA212009-13B
SA212-30B
SA212-44B
SA29-40BMS
SA29-40BMSD

Introduction

This data review covers 20 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/9/09	1,4-Dioxane	25.1	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA29-40BMS SA29-40BMSD 97330-MB	J+ (all detects)	A

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 RRF values were greater than or equal to 0.05 .

V. Blanks

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

Samples EB092809-SO1A4 and EB092809-SO2A4 were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092809-SO1A4	9/28/09	Bis(2-ethylhexyl)phthalate Diethylphthalate	0.24 ug/L 0.28 ug/L	All soil samples in SDG R0905524
EB092809-SO2A4	9/28/09	Bis(2-ethylhexyl)phthalate	1.4 ug/L	All soil samples in SDG R0905524

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

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Diethylphthalate	2.0 ug/L 0.14 ug/L 0.36 ug/L	All soil samples in SDG R0905524

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) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
97225-LCS/D (All water samples in SDG R0905524)	Pyridine	24 (50-120)	41 (50-120)	53 (≤30)	J (all detects) UJ (all non-detects)	P
97225-LCS/D (All water samples in SDG R0905524)	1,4-Dioxane	45 (50-120)	45 (50-120)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905524	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SA209-10B and SA209009-10B and samples SA212-13B and SA212009-13B were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Di-n-butylphthalate	81	180U	-	99 (≤180)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Di-n-butylphthalate	39	38	-	1 (≤180)	-	-
Hexachlorobenzene	110	140	24 (≤50)	-	-	-
Octachlorostyrene	71	110	43 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B	1,4-Dioxane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905524	EB092809-SO1A4 EB092809-SO2A4	Pyridine	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0905524	EB092809-SO1A4 EB092809-SO2A4	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905524	EB092809-SO1A4 EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Equipment Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D2a
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r²
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25 2
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 12, 13 D_2 = 17, 18
XVII.	Field blanks	SW	FB = 1, 2 ~~FB~~ = FB080309-50 (R0904279)

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

Validated Samples: Water + Soil

+ 1	EB092809-SO1A4	W	11	SA209-0.5B	S	21	SA29-40BMS	S	31	97225-MB
+ 2	EB092809-SO2A4		12	SA209-10B	D_1	22	SA29-40BMSD		32	97330-MB
3	SA29-0.5B	S	13	SA209009-10B	D_1	23			33	
4	SA29-10B		14	SA209-25B		24			34	
5	SA29-25B		15	SA209-35B		25			35	
6	SA29-40B		16	SA212-0.5B		26			36	
7	SA120-0.5B		17	SA212-13B	D_2	27			37	
8	SA120-10B		18	SA212009-13B	D_2	28			38	
9	SA120-25B		19	SA212-30B		29			39	
10	SA120-43B		20	SA212-44B		30			40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22109D2a

SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Reviewer: JVG

2nd Reviewer: [illegible]

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

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

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

(Y) N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y (N) N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	10/09/09	AV513	TTT (4)	25.1		3-8, 21, 22, G7330-MB	J+ dets /A (c)

CONCAL.2S

LDC #: 22109 D29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer:

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

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

Blank units: ug/L **Associated sample units:** ug/Kg
Sampling date: 9/28/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: #11 Soils (ND)

Compound	Blank ID	Blk ID	Sample Identification							
	1	2								
EEE	0.24	1.4								
LL	0.28									
CRQL										

Blank units: ug/L **Associated sample units:** ug/Kg
Sampling date: 8/03/09
Field blank type: (circle one) (Field Blank) / Rinsate / Other: Associated Samples: All Soils (ND)

Compound	Blank ID	Sample Identification								
	FB080309-SO									
EEE	2.0									
AAA	0.14									
LL	0.36									
CRQL										

LDC #: 22169 D2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: SV6
2nd Reviewer: [illegible]

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

Y N N/A Were 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.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		21/22	XX	( )	41 (50-150)	( )	6	ND no qual (MS on
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 22109 D2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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 LCS required?

Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		97225-LCS/D	RRR	24 (50-120)	41 (50-120)	53 (30)	1,2, 97225-MB	J/UJ/P (l, ld)
			TTT	45 (↓)	45 (↓)	( )	↓	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109 D2g
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD
	12	13	Parent only
XX	81	180 U	99 (≤ 180 D) -

Compound	Concentration (ug/kg)		RPD
	17	18	Parent only
XX	39	38	1 (≤ 180 D) -
SS	110	140	24 (≤ 50 % RPD) -
UUU	71	110	43 -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

EB092909-SO1A4
EB092909-SO2A4
SA213-0.5B
SA213-14B
SA213-30B
SA213-44B
SA110-0.5B
SA110-10B
SA110-25B
SA110-37B
SA110009-37B
SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B
SA193-0.5B
SA193-10B
SA193009-10B
SA193-25B
SA193-42B
SA193-2.5B
SA213-14BMS
SA213-14BMSD

Introduction

This data review covers 22 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/6/09	Di-n-octylphthalate	25.9	All water samples in SDG R0905539	J+ (all detects)	A
10/8/09	Di-n-octylphthalate	26.8	SA213-30B SA110-0.5B SA110-25B SA110-37B SA110009-37B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B	J+ (all detects)	A

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 RRF values were greater than or equal to 0.05 .

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
97551-MB	10/5/09	Bis(2-ethylhexyl)phthalate	0.25 ug/L	All water samples in SDG R0905539
97340-MB	10/1/09	Di-n-butylphthalate	38 ug/Kg	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B

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
EB092909-SO1A4	Bis(2-ethylhexyl)phthalate	0.31 ug/L	0.31U ug/L
EB092909-SO2A4	Bis(2-ethylhexyl)phthalate	1.2 ug/L	1.2U ug/L
SA213-14B	Di-n-butylphthalate	41 ug/Kg	41U ug/Kg
SA213-44B	Di-n-butylphthalate	86 ug/Kg	86U ug/Kg
SA110-10B	Di-n-butylphthalate	47 ug/Kg	47U ug/Kg
SA110-25B	Di-n-butylphthalate	48 ug/Kg	48U ug/Kg
SA110009-37B	Di-n-butylphthalate	52 ug/Kg	52U ug/Kg
SA191-0.5B	Di-n-butylphthalate	40 ug/Kg	40U ug/Kg
SA191-10B	Di-n-butylphthalate	65 ug/Kg	65U ug/Kg
SA191-25B	Di-n-butylphthalate	38 ug/Kg	38U ug/Kg
SA193-25B	Di-n-butylphthalate	49 ug/Kg	49U ug/Kg
SA193-42B	Di-n-butylphthalate	68 ug/Kg	68U ug/Kg

Samples EB092909-SO1A4 and EB092909-SO2A4 were identified as equipment blanks. No semivolatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092909-SO1A4	9/29/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	0.31 ug/L 0.18 ug/L	All soil samples in SDG R0905539
EB092909-SO2A4	9/29/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	1.2 ug/L 0.16 ug/L	All soil samples in SDG R0905539

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

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Diethylphthalate	2.0 ug/L 0.14 ug/L 0.36 ug/L	All soil samples in SDG R0905539

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
97551-LCS/D (All water samples in SDG R0905539)	Pyridine	21 (50-120)	24 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	33 (50-120)	33 (50-120)	-	J- (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905539	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples SA110-37B and SA110009-37B, samples SA191-40B and SA191009-40B, and samples SA193-10B and SA193009-10B were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA11-37B	SA110009-37B				
Acenaphthylene	10U	2.0	-	8 (≤10)	-	-
Benzo(a)anthracene	11	15	-	4 (≤10)	-	-
Benzo(a)pyrene	9.1	13	-	3.9 (≤10)	-	-
Benzo(b)fluoranthene	13	16	-	3 (≤10)	-	-
Benzo(g,h,i)perylene	10	16	-	6 (≤10)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA11-37B	SA110009-37B				
Benzo(k)fluoranthene	10	17	-	7 (≤10)	-	-
Chrysene	16	21	-	5 (≤10)	-	-
Di-n-butylphthalate	260U	52	-	208 (≤260)	-	-
Fluoranthene	21	34	-	13 (≤10)	J (all detects)	A
Hexachlorobenzene	8.6	8.9	-	0.3 (≤10)	-	-
Indeno(1,2,3-cd)-pyrene	8.6	11	-	2.4 (≤10)	-	-
Phenanthrene	11	19	-	8 (≤10)	-	-
Pyrene	22	32	-	10 (≤10)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Benzo(a)anthracene	2.9	2.5	-	0.4 (≤8.3)	-	-
Benzo(a)pyrene	8.2U	2.5	-	5.7 (≤8.2)	-	-
Benzo(b)fluoranthene	3.3	2.5	-	0.8 (≤8.3)	-	-
Benzo(k)fluoranthene	8.2U	2.1	-	6.1 (≤8.2)	-	-
Chrysene	3.3	3.4	-	0.1 (≤8.3)	-	-
Fluoranthene	2.9	4.6	-	1.7 (≤8.3)	-	-
Phenanthrene	2.9	2.5	-	0.4 (≤8.3)	-	-
Pyrene	3.3	4.2	-	0.9 (≤8.3)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
Benzo(a)anthracene	3.6	2.1	-	1.5 (≤7.1)	-	-
Benzo(b)fluoranthene	5.7	7.1U	-	1.4 (≤7.1)	-	-
Benzo(k)fluoranthene	5.0	7.1U	-	2.1 (≤7.1)	-	-
Chrysene	5.7	2.9	-	2.8 (≤7.1)	-	-
Fluoranthene	6.8	3.2	-	3.6 (≤7.1)	-	-
Pyrene	5.4	3.6	-	1.8 (≤7.1)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-30B SA110-0.5B SA110-25B SA110-37B SA110009-37B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B	Di-n-octylphthalate	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905539	EB092909-SO1A4 EB092909-SO2A4	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905539	SA110-37B SA110009-37B	Fluoranthene	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905539	EB092909-SO1A4	Bis(2-ethylhexyl)phthalate	0.31U ug/L	A	bl
R0905539	EB092909-SO2A4	Bis(2-ethylhexyl)phthalate	1.2U ug/L	A	bl
R0905539	SA213-14B	Di-n-butylphthalate	41U ug/Kg	A	bl
R0905539	SA213-44B	Di-n-butylphthalate	86U ug/Kg	A	bl
R0905539	SA110-10B	Di-n-butylphthalate	47U ug/Kg	A	bl
R0905539	SA110-25B	Di-n-butylphthalate	48U ug/Kg	A	bl
R0905539	SA110009-37B	Di-n-butylphthalate	52U ug/Kg	A	bl
R0905539	SA191-0.5B	Di-n-butylphthalate	40U ug/Kg	A	bl
R0905539	SA191-10B	Di-n-butylphthalate	65U ug/Kg	A	bl
R0905539	SA191-25B	Di-n-butylphthalate	38U ug/Kg	A	bl
R0905539	SA193-25B	Di-n-butylphthalate	49U ug/Kg	A	bl
R0905539	SA193-42B	Di-n-butylphthalate	68U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Equipment Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E2a
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12/04/09
Page: 1 of 1
Reviewer: JVG
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: 9/29/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ≤ 25
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 10, 11 D_2 = 15, 16 D_3 = 18, 19
XVII.	Field blanks	SW	EB = 1, 2 FB = FB080309-SO (R0904279)

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

Validated Samples: Water + Soil

+ 1	1	EB092909-SO1A4	W	11	SA110009-37B	D_1	S	21	SA193-42B	S	31	+ 1	97551-MB
+ 2	1	EB092909-SO2A4	↓	12	SA191-0.5B			22	3 SA193-2.5B		32	+ 2	97340- ↓
3		SA213-0.5B	S	13	SA191-10B			23	SA213-14BMS		33	− 3	97534- ↓
4		SA213-14B		14	SA191-25B			24	SA213-14BMSD	✓	34		
5		SA213-30B		15	SA191-40B	D_2		25			35		
6		SA213-44B		16	SA191009-40B	D_4		26			36		
7		SA110-0.5B		17	SA193-0.5B			27			37		
8		SA110-10B		18	SA193-10B	D_3		28			38		
9		SA110-25B		19	SA193009-10B	D_3		29			39		
10		SA110-37B	D_1 ↓	20	SA193-25B		✓	30			40		

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22109 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JV6
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 continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	10/06/09	DB855	FFF (7)	25.9		1, 2, 97551-MB	J+ A+TS /A (C)
	10/08/09	DB920	FFF (7)	26.8		5, 7, 9-11, 13-21	

LDC #: 22109 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank extraction date: 10/05/09 **Blank analysis date:** 10/06/09
Conc. units: ug/L Associated Samples: 1, 2 (bl)

Compound	Blank ID	Sample Identification								
	97551-MB	1	2							
1.5 EEE	0.25	0.31 /U	1.2 /U							

Blank extraction date: 10/01/09 **Blank analysis date:** 10/07/09
Conc. units: ug/kg Associated Samples: 3 - 21 (bl)

Compound	Blank ID	Sample Identification									
	97340-MB	4	6	8	9	11	12	13	14	20	21
190 XX	38	41 /U	86 /U	47 /U	48 /U	52 /U	40 /U	65 /U	38 /U	49 /U	68 /U

5x Phthalates
2x all others

LDC #: 22109E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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

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

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 9/29/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All soils (ND)

Compound	Blank ID	Blk ID	Sample Identification							
	1	2								
EEE	0.31	1.2								
AAA	0.18	0.16								
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 8/03/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All soils (ND)

Compound	Blank ID	Sample Identification								
	FB080309-SO									
EEE	2.0									
AAA	0.14									
LL	0.36									
CRQL										

10
0.7
1.8

LDC #: 22109 E2q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: VG
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 LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		97340 LCS/D	EEE	123 (50-120)	122 (50-120)	( )	3-21, 23, 24, 97340-MB	No qual (LCS/LCSD in)
			XX	135 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		97551 LCS/D	RRR	21 ( )	24 ( )	( )	1, 2, 97551-MB	J-/UJ/P (L)
			TTT	33 ( )	33 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		97534 LCS/D	EEE	~~12~~ ( )	124 ( )	( )	22, 97534-MB	No qual (LCS in)
			XX	( )	125 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC#: 22109E2a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	10	11				
Acenaphthylene	10U	2.0		8	≤10	
Benzo(a)anthracene	11	15		4	≤10	
Benzo(a)pyrene	9.1	13		3.9	≤10	
Benzo(b)fluoranthene	13	16		3	≤10	
Benzo(g,h,i)perylene	10	16		6	≤10	
Benzo(k)fluoranthene	10	17		7	≤10	
Chrysene	16	21		5	≤10	
Di-n-butylphthalate	260U	52		208	≤260	
Fluoranthene	21	34		13	≤10	J dets /A (fd)
Hexachlorobenzene	8.6	8.9		0.3	≤10	
Indeno(1,2,3-cd)-pyrene	8.6	11		2.4	≤10	
Phenanthrene	11	19		8	≤10	
Pyrene	22	32		10	≤10	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	15	16				
Benzo(a)anthracene	2.9	2.5		0.4	≤8.3	
Benzo(a)pyrene	8.2U	2.5		5.7	≤8.2	
Benzo(b)fluoranthene	3.3	2.5		0.8	≤8.3	
Benzo(k)fluoranthene	8.2U	2.1		6.1	≤8.2	
Chrysene	3.3	3.4		0.1	≤8.3	
Fluoranthene	2.9	4.6		1.7	≤8.3	
Phenanthrene	2.9	2.5		0.4	≤8.3	
Pyrene	3.3	4.2		0.9	≤8.3	

LDC#: 22109E2a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	18	19				
Benzo(a)anthracene	3.6	2.1		1.5	≤7.1	
Benzo(b)fluoranthene	5.7	7.1U		1.4	≤7.1	
Benzo(k)fluoranthene	5.0	7.1U		2.1	≤7.1	
Chrysene	5.7	2.9		2.8	≤7.1	
Fluoranthene	6.8	3.2		3.6	≤7.1	
Pyrene	5.4	3.6		1.8	≤7.1	

V:\FIELD DUPLICATES\22109E2a.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

EB093009-SO1A4
RSAQ3-0.5B
RSAQ3009-0.5B
RSAQ3-10B
RSAQ3-25B
RSAQ3-41B
SA190-0.5B
SA190-10B
SA190-25B
SA190-38B
RSAR4-0.5B
RSAR4-10B
RSAR4009-10B
RSAR4-25B
RSAR4-37B
RSAR3-0.5B
RSAR3-10B
RSAR3-25B
RSAR3-35B
RSAR3-38B
SA190-38BMS
SA190-38BMSD

Introduction

This data review covers 21 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/6/09	Di-n-octylphthalate	25.9	All water samples in SDG R0905567	J+ (all detects)	A
10/13/09	Di-n-octylphthalate	29.4	RSAQ3009-0.5B	J+ (all detects)	A

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 RRF values were greater than or equal to 0.05 .

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
97551-MB	10/5/09	Bis(2-ethylhexyl)phthalate	0.25 ug/L	EB093009-SO1A4

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
EB093009-SO1A4	Bis(2-ethylhexyl)phthalate	0.44 ug/L	0.44U ug/L

Sample EB093009-SO1A4 was identified as an equipment blank. No semivolatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB093009-SO1A4	9/30/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate	0.44 ug/L 0.22 ug/L 1.0 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B

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

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Diethylphthalate	2.0 ug/L 0.14 ug/L 0.36 ug/L	All soil samples in SDG R0905567

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. Surrogate recoveries (%R) were not within QC limits for RSAQ3-0.5B and RSAQ3009-0.5B. Since the sample was 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 within QC limits.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
97551-LCS/D (All water samples in SDG R0905567)	Pyridine	21 (50-120)	24 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	33 (50-120)	33 (50-120)	-	J- (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905567	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment

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

XVI. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B and samples RSAR4-10B and RSAR4009-10B were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
2-Methylnaphthalene	380	210U	-	170 (≤210)	-	-
Acenaphthylene	360	350	-	10 (≤210)	-	-
Anthracene	290	280	-	10 (≤210)	-	-
Benzo(a)anthracene	2200	2500	13 (≤50)	-	-	-
Benzo(a)pyrene	2500	3000	18 (≤50)	-	-	-
Benzo(b)fluoranthene	3600	4100	13 (≤50)	-	-	-
Benzo(g,h,i)perylene	3200	3500	9 (≤50)	-	-	-
Benzo(k)fluoranthene	2600	3300	24 (≤50)	-	-	-
Chrysene	4100	4800	16 (≤50)	-	-	-
Dibenz(a,h)anthracene	770	750	-	20 (≤210)	-	-
Fluoranthene	5100	5900	15 (≤50)	-	-	-
Hexachlorobenzene	790	890	-	100 (≤210)	-	-
Indeno(1,2,3-cd)-pyrene	2700	2900	7 (≤50)	-	-	
NAphthalene	64	210U	-	146 (≤210)	-	
Phenanthrene	1600	1900	17 (≤50)	-	-	
Pyrene	4700	5700	19 (≤50)	-	-	
Octachlorostyrene	430	480	-	50 (≤210)	-	

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Di-n-butylphthalate	50	43	-	7 (≤180)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	EB093009-SO1A4 RSAQ3009-0.5B	Di-n-octylphthalate	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905567	EB093009-SO1A4	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905567	EB093009-SO1A4 RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905567	EB093009-SO1A4	Bis(2-ethylhexyl)phthalate	0.44U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Equipment Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F2a
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JV6
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: 9/30-10/01/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r✓
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 2, 3 D_2 = 12, 13
XVII.	Field blanks	SW	EB = 1 FB = FB080309-S0 (R0904279)

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

Validated Samples: Water + Soil

1	EB093009-SO1A4	W	11	RSAR4-0.5B	S	21	SA190-38BMS	S	31	97551-MB
2	RSAQ3-0.5B	D_1 S	12	RSAR4-10B	D_3	22	SA190-38BMSD		32	97534-
3	RSAQ3009-0.5B	D_1	13	RSAR4009-10B	D_4	23			33	
4	RSAQ3-10B		14	RSAR4-25B		24			34	
5	RSAQ3-25B		15	RSAR4-37B		25			35	
6	RSAQ3-41B		16	RSAR3-0.5B		26			36	
7	SA190-0.5B		17	RSAR3-10B		27			37	
8	SA190-10B		18	RSAR3-25B		28			38	
9	SA190-25B		19	RSAR3-35B		29			39	
10	SA190-38B		20	RSAR3-38B		30			40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22109F29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	10/06/09	DB855	FFF (+)	25.9		1, 97551-MB	J+ all Cts /A (c)
	10/13/09	DC023	FFF (+)	29.4		3	J+ all Cts /A

CONCAL.2S

LDC #: 22109 F2a
SDG #: Circ Conv

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
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?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 10/05/09 **Blank analysis date:** 10/06/09 (bl)
Conc. units: ug/L Associated Samples: 1

Compound	Blank ID	Sample Identification								
	97551-MB	1								
EEE	0.25	0.44 U								

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 22109 F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 9/30/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2-15

Compound	Blank ID	Sample Identification								
	1									
EEE	0.44		(All results either ND or > EB)							
AAA	0.22									
XX	1.0									
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 8/03/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All soils

Compound	Blank ID	Sample Identification								
	FB080309-SO									
EEE	2.0		(All results either ND or > FB)							
AAA	0.14									
LL	0.36									
CRQL										

LDC #: 22109F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

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

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

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?
Y (N) N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y (N) N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		2 (15x)	All	DO (45-135)	No qual
				( )	
		3 (30x)		( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

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

LDC #: 22109F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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 LCS required?
Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		97551-LCS/D	RRR	21 (50-120)	24 (50-120)	( )	1, 97551-MB	J-/UJ/P (L)
			TTT	33 (↓)	33 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		97534 LCS/D	EEE	( )	124 (50-120)	( )	All STl's, 97534-MB	No qual (ND/in)
			XX	( )	125 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC#: 22109F2a
SDG#: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVL
2nd Reviewer:

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

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

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	2	3				
2-Methylnaphthalene	380	210U		170	≤210	
Acenaphthylene	360	350		10	≤210	
Anthracene	290	280		10	≤210	
Benzo(a)anthracene	2200	2500	13			
Benzo(a)pyrene	2500	3000	18			
Benzo(b)fluoranthene	3600	4100	13			
Benzo(g,h,i)perylene	3200	3500	9			
Benzo(k)fluoranthene	2600	3300	24			
Chrysene	4100	4800	16			
Dibenz(a,h)anthracene	770	750		20	≤210	
Fluoranthene	5100	5900	15			
Hexachlrobenzene	790	890		100	≤210	
Indeno(1,2,3-cd)-pyrene	2700	2900	7			
NAphthalene	64	210U		146	≤210	
Phenanthrene	1600	1900	17			
Pyrene	4700	5700	19			
Octachlorostyrene	430	480		50	≤210	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Diff Limits	Quals (Parent Only)
	12	13				
Di-n-butylphthalate	50	43		7	≤180	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 1 through October 5, 2009

LDC Report Date: December 16, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626

Sample Identification

RSAR3-0.5BSPLP2
RSAR3-0.5BSPLP3
RSAR3-35BSPLP2
RSAR3-35BSPLP3
RSAQ4-10BSPLP2
RSAQ4-10BSPLP3
RSAQ4-32BSPLP2

Samples in this SDG underwent SPLP extraction

Introduction

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

This review follows the Standard Operating Procedures (SOP) 40, Data Review/Validation (BRC 2009), the Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada (June 2009), NDEP guidance (May 2006), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination (r^2) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

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).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

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 RRF values were greater than or equal to 0.05 .

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
98568-MB	10/19/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	0.42 ug/L 0.16 ug/L	All samples in SDG R0905626
SPLP-BLK2	10/12/09	Butylbenzylphthalate Di-n-butylphthalate	0.15 ug/L 1.9 ug/L	RSAR3-0.5BSPLP2 RSAR3-35BSPLP2 RSAQ4-10BSPLP2 RSAQ4-32BSPLP2

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
RSAR3-0.5BSPLP3	Butylbenzylphthalate	0.15 ug/L	0.15U ug/L
RSAR3-35BSPLP2	Butylbenzylphthalate Di-n-butylphthalate	0.12 ug/L 1.1 ug/L	0.12U ug/L 1.1U ug/L
RSAQ4-32BSPLP2	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate	0.27 ug/L 0.14 ug/L 1.1 ug/L	0.27U ug/L 0.14U ug/L 1.1U ug/L
RSAQ4-10BSPLP2	Di-n-butylphthalate	0.92 ug/L	0.92U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
98568-LCS/D (All samples in SDG R0905626)	Pyridine	21 (50-120)	18 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	38 (50-120)	35 (50-120)	-	J- (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0905626

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905626	RSAR3-0.5BSPLP2 RSAR3-0.5BSPLP3 RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-10BSPLP2 RSAQ4-10BSPLP3 RSAQ4-32BSPLP2	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905626	RSAR3-0.5BSPLP2 RSAR3-0.5BSPLP3 RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-10BSPLP2 RSAQ4-10BSPLP3 RSAQ4-32BSPLP2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R0905626

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905626	RSAR3-0.5BSPLP3	Butylbenzylphthalate	0.15U ug/L	A	bl
R0905626	RSAR3-35BSPLP2	Butylbenzylphthalate Di-n-butylphthalate	0.12U ug/L 1.1U ug/L	A	bl
R0905626	RSAQ4-32BSPLP2	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate	0.27U ug/L 0.14U ug/L 1.1U ug/L	A	bl
R0905626	RSAQ4-10BSPLP2	Di-n-butylphthalate	0.92U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109G2a
SDG #: R0905626
Laboratory: Columbia Analytical Services

Stage 2B 4

Date: 12/05/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: AV

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: 10/01 - 05/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	RSAR3-0.5BSPLP2	11	98568-MB	21		31		
2	RSAR3-0.5BSPLP3	12	SPLP2-Blk	22 (8500)		32		
3	RSAR3-35BSPLP2	13	SPLP3-Blk	23 (98561)		33		
4	RSAR3-35BSPLP3	14		24		34		
5	RSAQ4-10BSPLP2	15		25		35		
6	RSAQ4-10BSPLP3	16		26		36		
7	RSAQ4-32BSPLP2	17		27		37		
8		18		28		38		
9		19		29		39		
10		20		30		40		

LDC #: 22109G2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: VG
2nd Reviewer: MC

Method: Semivolatiles (EPA SW 846 Method 8270C)

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

LDC #: 22109 G2A
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: RC

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

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22109G2q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 12
Reviewer: JVC
2nd Reviewer: [illegible]

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

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

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

Blank extraction date: 10/19/09 **Blank analysis date:** 10/22/09
Conc. units: ug/L Associated Samples: All (bl)

Compound	Blank ID	Sample Identification								
	98568-MB	2	3	7						
EEE	0.47			0.27/U						
AAA	0.16	0.15/U	0.12/U	0.14/U						

SPLP **Blank extraction date:** 10/12/09 **Blank analysis date:** 10/23/09
Conc. units: ug/L Associated Samples: 1, 3, 5, 7 (bl)

Compound	Blank ID	Sample Identification								
	SPLP-Blk	3	5	7						
AAA	0.15	0.17/U		0.14/U						
XX	1.9	1.1/U	0.92/U	1.1/U						

5x Phthalates
2x all others

LDC #: 22109G29
SDG #: Cu

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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 LCS required?
Y [✓ N] N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		98568-LCS/D	RRR	21 (50-120)	18 (50-120)	( )	All + Blks	J-/UJ/P (Cl)
			TTT	38 (↓)	35 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 27109G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVB
2nd Reviewer: [illegible]

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10.0 std)	Recalculated RRF (10.0 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/28/09	RRR Phenol (1st internal standard)	NR	1.389	1.325	1.325	9.25	9.24
			Naphthalene (2nd internal standard)		0.943	1.049	1.049	5.03	5.02
			Fluorene (3rd internal standard)		1.192	1.192	1.192	11.04	11.04
			UU Pentachlorophenol (4th internal standard)		0.940	1.161	1.161	8.15	8.15
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.690	0.840	0.840	9.03	9.05
			Benzo(a)pyrene (6th internal standard)		1.387	1.274	1.274	10.74	10.74
2	ICAL	10/16/09	RRR Phenol (1st internal standard)		1.246	1.151	1.151	14.60	14.59
			Naphthalene (2nd internal standard)		1.036	1.044	1.044	3.38	3.36
			Fluorene (3rd internal standard)		1.297	1.286	1.286	5.32	5.31
			UU Pentachlorophenol (4th internal standard)		1.051	1.105	1.105	4.67	4.67
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.753	0.787	0.787	8.49	8.46
			Benzo(a)pyrene (6th internal standard)		1.340	1.243	1.243	7.28	7.28
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

9/28/09

	4.0	5.0	10.0
Pyridine	1.333	1.427	1.389
Naphthalene	1.063	1.018	0.943
Fluorene	1.364	1.355	1.192
Phenanthrene	1.198	1.127	0.940
Bis(2-eh) phthalate	1.725/2 = 0.863	1.737/2 = 0.869	1.380/2 = 0.690
Benzo(a) pyrene	1.338	1.402	1.387

10/16/09

4.0	5.0	10.0
1.142	1.229	1.246
1.022	1.063	1.036
1.256	1.340	1.297
1.106	1.094	1.051
0.829	0.901	0.753
1.290	1.290	1.340

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

LDC #: 22109G2A
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: MG
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (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
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	DC161	10/22/09	~~Phenol~~ RRR (1st internal standard)	1.151	1.236	1.236	7.4	7.4
			Naphthalene (2nd internal standard)	1.044	1.036	1.036	0.8	0.8
			Fluorene (3rd internal standard)	1.286	1.245	1.245	3.2	3.2
			~~Pentachlorophenol~~ HH (4th internal standard)	1.105	1.140	1.140	3.2	3.2
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.787	0.777	0.777	1.9	1.9
			Benzo(a)pyrene (6th internal standard)	1.243	1.313	1.313	5.6	5.6
2	DC186	10/23/09	~~Phenol~~ RRR (1st internal standard)		1.233	1.233	7.1	7.1
			Naphthalene (2nd internal standard)		1.043	1.043	0.1	0.1
			Fluorene (3rd internal standard)		1.338	1.338	4.0	4.0
			~~Pentachlorophenol~~ HH (4th internal standard)		1.126	1.126	1.9	1.9
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.813	0.813	3.3	3.4
			Benzo(a)pyrene (6th internal standard)		1.259	1.259	1.3	1.3
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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

LDC #: 22109G29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	2.00	1.56	78	78	0
2-Fluorobiphenyl	↓	1.71	86	86	↓
Terphenyl-d14	↓	1.97	99	99	↓
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					

LDC #: 22109G29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVB
2nd Reviewer: LC

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

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

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

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

LCS/LCSD samples: 98568 LCS/D

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	4.00	4.00	3.29	3.08	87	87	77	77	7	7
Pentachlorophenol										
Pyrene	4.00	4.00	3.23	3.06	81	81	77	77	5	5

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 #: 27109G29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

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

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

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

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

V_i = Volume of extract injected in microliters (ul)

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

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #1, SS:

Conc. = $\frac{(11430)(1.00)(1\ ml)(1000)(\quad)}{(323210)(0.265)(1000\ ml)(\quad)(\quad)}$

= 0.13 ug/L

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

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Chlorinated Pesticides

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

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 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP2-BLK	Not specified	Decachlorobiphenyl	29 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP3-BLK	Not specified	Decachlorobiphenyl	31 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
93765LCS/D (All samples in SDG R0904370)	Endrin aldehyde	19 (50-130)	20 (50-130)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	Endrin aldehyde	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A3a
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/06/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/05/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ccv/icv ≤20 %
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	RSAU5-0.5BSPLP2	11		21		31	
2	RSAU5-0.5BSPLP3	12		22		32	
3	93765-MB	13		23		33	
4	SPLP2-Blk	14		24		34	
5	SPLP3-↓	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: Pesticide/PCBs (EPASW 846 Method 8081/8082)

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

Notes:_____

_____

_____

LDC #: 22109 A39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: SVK
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".

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

Y (N) N/A Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		SPLP2-Blk	NS	13	29 (40-140)	J- (NJ/P) (CS)
		SPLP3-Blk	↓	↓	31 (↓)	↓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22109 A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples

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

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

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

[✓ Y] N N/A Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? ____________

Y [✓ N] N/A Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Level IV/D Only

Y N [✓ N/A] Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		93765 LCS/D	R	19 (50-130)	20 (50-130)	( )	All + Blks	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-10BRE
SA203-30B
SA203-46B
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-10BRE
SA148-30B
SA148-35B
SA148-45B
RSAT7-44BMS
RSAT7-44BMSD
SA148-0.5BMS
SA148-0.5BMSD

Introduction

This data review covers 24 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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 with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
10/13/09	FC810	STX-CLP1	Endosulfan I	23.3	SA203-10BRE SA148-10BRE 97629-MB	J+ (all detects)	A

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 EB092309-SO1A4 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SA203-10B	Not specified	Tetrachloro-m-xylene	22 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
SA148-10B	Not specified	Decachlorobiphenyl	146 (40-140)	All TCL compounds	J+ (all detects)	A
SA148-10BRE	Not specified	Tetrachloro-m-xylene	20 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) and relative percent differences (RPD) were not within QC limits for several compounds, the MS, MSD, LCS, or LCSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905402	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SA203-10B SA148-10BRE	All TCL compounds	X	A

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

XIV. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	SA203-10BRE SA148-10BRE	Endosulfan I	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R0905402	SA203-10B SA148-10BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905402	SA148-10B	All TCL compounds	J+ (all detects)	A	Surrogate spikes (%R) (s)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-10BRE SA203-30B SA203-46B EB092309-SO1A4 SA148-0.5B SA148-10B SA148-10BRE SA148-30B SA148-35B SA148-45B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905402	SA203-10B SA148-10BRE	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B3a
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/22-23/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	CW/ICW ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	ND	D = 7,8
XV.	Field blanks	ND	EB = 15 FB = FB080309-50 (CR090427A) RE

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

Validated Samples: Soil + Water

1	1	RSAT7-0.5B	S	11	2	SA203-10B	S	21	2	SA148-45B	S	31	1	97004-MB
2	1	RSAT7-10B		12	3	SA203-10BRE		22		RSAT7-44BMS		32	2	97030-
3	1	RSAT7-25B		13	2	SA203-30B		23		RSAT7-44BMSD		33	3	97629-
4	1	RSAT7-44B		14	2	SA203-46B		24		SA148-~~10B~~ 0.5B MS		34	4	96798-
5	1	RSAT8-0.5B		15	4	EB092309-SO1A4	W	25		SA148-~~10B~~ 0.5B MSD		35		
6	1	RSAT8-10B		16	2	SA148-0.5B	S	26				36		
7	1	RSAT8-25B	D	17	2	SA148-10B		27				37		
8	1	RSAT8009-25B	D	18	3	SA148-10BRE		28				38		
9	1	RSAT8-44B		19	2	SA148-30B		29				39		
10	1	SA203-0.5B		20	2	SA148-35B		30				40		

LDC #: 22109B3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Page: 1 of 1
Reviewer: SVG
2nd Reviewer:

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

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

What type or calibration verification calculation was performed? ___ %D or ___ RPD

[✓ Y] N N/A Were Evaluation mix standards run before initial calibration and before samples?

[✓ Y] N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?

[✓ Y] N N/A Was at least one standard run daily to verify the working curve?

Y [✓ N] N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤20.0%?

Level IV/D Only

Y N [✓ N/A] Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	Associated Samples	Qualifications
	10/13/09	FC810	STX-CLP1	# (F)	23.3	( )	12, 18, 57629-MB	J+ dets/A (C)
		(1W)				( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
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						( )		
						( )		
						( )		

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

LDC #: 22109B31
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [signature]

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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		11	NS	A	22 (40-140)	J-/UJ/A (CS)
					( )	
		17		B	146 ( )	J+ dets/A
					( )	
		18		A	20 ( )	J-/UJ/A
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22169 B39
SDG #: Cu Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: SVG
2nd Reviewer: L

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

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

[✓ Y] N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
[✓ Y] N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y [✓ N] N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		24/25	Several	compounds have	%R and	% RPD ( )	16	No qual
			outside	limits)	( )	( )		(either MS/MSD/LCS/D
			(see	attached summary)	)	( )		in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Northgate Environmental
Project: Tronox LLC Henderson/2027.001
Sample Matrix: Soil

Service Request: R0905402
Date Collected: 9/23/09
Date Received: 9/24/09
Date Analyzed: 10/ 5/09

Matrix Spike Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name: SA148-0.5B
Lab Code: R0905402-017

Units: µg/Kg
Basis: Dry

Analytical Method: 8081A
Prep Method: EPA 3541

Analyte Name	Sample Result	Matrix Spike RQ0909194-04 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909194-05 Result	Amount	% Rec		% Rec Limits		RPD		RPD Limit
4,4'-DDD	ND	9.09	7.10	128	*	10.4	7.10	146	*	58 - 121		13		30
4,4'-DDE	26	30.3	7.10	60		33.5	7.10	105		56 - 125		10		30
4,4'-DDT	24	32.2	7.10	111		37.7	7.10	188	*	9 - 149		16		30
Aldrin	ND	6.46	7.10	91		7.67	7.10	108		15 - 135		17		30
Dieldrin	ND	12.6	7.10	178	*	13.6	7.10	191	*	25 - 150		7		30
Endosulfan I	ND	8.38	7.10	118		8.73	7.10	123	*	56 - 119		4		30
Endosulfan II	ND	16.2	7.10	227	*	11.7	7.10	165	*	65 - 127		32	*	30
Endosulfan Sulfate	ND	13.5	7.10	190	*	15.0	7.10	211	*	37 - 122		10		30
Endrin	ND	9.02	7.10	127		9.76	7.10	137		28 - 143		8		30
Endrin Aldehyde	ND	11.1	7.10	156	*	13.2	7.10	186	*	18 - 135		18		30
Endrin Ketone	ND	9.05	7.10	127	*	10.4	7.10	147	*	57 - 123		14		30
Heptachlor	ND	6.99	7.10	98		8.56	7.10	120		35 - 127		20		30
Heptachlor Epoxide	ND	9.55	7.10	134	*	10.6	7.10	149	*	61 - 120		10		30
Hexachlorobenzene	100	84.2	17.7	-96	#	118	17.7	95	#	20 - 150		33	*	30
Methoxychlor	ND	46.6	35.5	131		56.7	35.5	160	*	38 - 149		20		30
alpha-BHC	ND	6.14	7.10	86		7.53	7.10	106		53 - 130		20		30
alpha-Chlordane	ND	8.45	7.10	119		9.37	7.10	132	*	27 - 130		10		30
beta-BHC	21	30.8	7.10	136		28.2	7.10	100		35 - 142		9		30
delta-BHC	ND	6.43	7.10	90		8.02	7.10	113		44 - 119		22		30
gamma-BHC (Lindane)	ND	6.11	7.10	86		6.64	7.10	93		37 - 124		8		30
gamma-Chlordane	ND	13.9	7.10	195	*	15.4	7.10	216	*	38 - 127		10		30

Comments:

LDC #: 22109 B39
SDG #: Su Cmr

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		11, ~~15~~ 18	Surr outside limits		X (A (o)

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434

Sample Identification

SA148-10BSPLP2
SA148-10BSPLP3
SA148-35BSPLP2
SA148-35BSPLP3

Samples in this SDG underwent SPLP extraction

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

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

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

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

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP-BLK2	Not specified	Decachlorobiphenyl	39 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905434	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0905434

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905434	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP2 SA148-35BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109C3a
SDG #: R0905434
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/22/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ∈ 20 %
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	SA148-10BSPLP2	11	97216-MB	21		31	
2	SA148-10BSPLP3	12	97674-L	22		32	
3	SA148-35BSPLP2	13	SPLP-BLK1	23		33	
4	SA148-35BSPLP3	14	SPLP-BLK2	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 #: 22109C39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		SPLP-Blk1	NS	B	39 (40-140)	J- (all detects) (P)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO2A4
SA29-0.5B
SA29-10B
SA29-25B
SA29-40B
SA209-0.5B
SA209-10B
SA209009-10B
SA209-25B
SA209-35B
SA29-40BMS
SA29-40BMSD

Introduction

This data review covers 11 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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 with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
10/13/09	FC810	STX-CLP1	Endosulfan I	23.3	All soil samples in SDG R0905524	J+ (all detects)	A

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 EB092809-SO2A4 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. 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) and MS/MSD relative percent difference (RPD) were 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) and relative percent differences (RPD) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905524	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA209-10B and SA209009-10B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
beta-BHC	1.7	1.6	-	0.1 (≤1.8)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B	Endosulfan I	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R0905524	EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-40B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Equipment Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D3a
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/28/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	ccv/icv ≤ 20 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 7 8
XV.	Field blanks	ND	EB = 1 FB = FB080309-SO (CR090427S) FB080309-SORE

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	EB092809-SO2A4	W	11	SA29-40BMS	S	21	97217-MB	31	
2	SA29-0.5B	S	12	SA29-40BMSD		22	97422-	32	
3	SA29-10B		13			23	97629-	33	
4	SA29-25B		14			24		34	
5	SA29-40B		15			25		35	
6	SA209-0.5B		16			26		36	
7	SA209-10B	D	17			27		37	
8	SA209009-10B	D	18			28		38	
9	SA209-25B		19			29		39	
10	SA209-35B		20			30		40	

VALIDATION FINDINGS WORKSHEET

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

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

Notes:_____

LDC #: 22109D3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)
Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A".

What type or calibration verification calculation was performed? ✓ %D or ___ RPD

[✓ Y] N N/A Were Evaluation mix standards run before initial calibration and before samples?
[✓ Y] N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?
[✓ Y] N N/A Was at least one standard run daily to verify the working curve?
Y [✓ N] N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤20.0%?

Level IV/D Only
Y N [✓ N/A] Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	Associated Samples	Qualifications
	10/13/09	FC810	STXCLP1	H (+)	23.3	( )	All Soils + 97432-MB,	J+ dets /A (c)
		(1W)				( )	97629-MB	
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
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						( )		
						( )		

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

LDC #: 22109 D34
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

[✓ Y] N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
[✓ Y] N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y [✓ N] N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		11/12	EE	( )	207 (20-150)	57 (30)	5	No qual (MS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22109D39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	7	8	
B	1.7	1.6	6.1 (≤1.8 D) —

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B

Introduction

This data review covers 5 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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 with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
10/13/09	FC810	STX-CLP1	Endosulfan I	23.3	All samples in SDG R0905539	J+ (all detects)	A

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

V. Blanks

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

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905539	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples SA191-40B and SA191009-40B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Hexachlorobenzene	2.7	1.6	-	1.1 (≤2.1)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905539	SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B	Endosulfan I	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R0905539	SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E3a
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12/04/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/29/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	ccv/icv ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 4,5
XV.	Field blanks	ND	FB = FB080309-50 -50RE (CR0904279)

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

Validated Samples: Soil

1	SA191-0.5B	11	97432-MB	21		31	
2	SA191-10B	12	97629-MB	22		32	
3	SA191-25B	13		23		33	
4	SA191-40B D	14		24		34	
5	SA191009-40B D	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: Pesticide/PCBs (EPASW 846 Method 8081/8082)

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

Notes: _____

LDC #: 22109E3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

What type or calibration verification calculation was performed? ___ %D or ___ RPD

[✓ Y] N N/A Were Evaluation mix standards run before initial calibration and before samples?

[✓ Y] N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?

[✓ Y] N N/A Was at least one standard run daily to verify the working curve?

Y [✓ N] N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤20.0%?

Level IV/D Only

Y N [✓ N/A] Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	Associated Samples	Qualifications
	10/13/09	FC810	STX-CLP1	H (+)	23.3	( )	All + Blks	J+ dets/A (c)
		(ICV)				( )		
						( )		
						( )		
						( )		
						( )		
						( )		
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						( )		
						( )		

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

LDC #: 22109 E39
SDG #: See Cvr

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 4	5	RPD Parent only
EE	2.7	1.6	1.1 (≤2.1D) -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

RSAQ3-0.5B
RSAQ3-0.5BDL
RSAQ3009-0.5B
RSAQ3009-0.5BDL
RSAQ3-10B
RSAQ3-25B
RSAQ3-41B
RSAR4-0.5B
RSAR4-10B
RSAR4009-10B
RSAR4-25B
RSAR4-37B
RSAR3-0.5B
RSAR3-10B
RSAR3-25B
RSAR3-35B
RSAR3-38B
RSAQ3-10BMS
RSAQ3-10BMSD

Introduction

This data review covers 19 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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

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

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

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 with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
10/13/09	FC810	STX-CLP1	Endosulfan I	23.3	RSAQ3-0.5B RSAQ3-0.5BDL RSAQ3009-0.5B RSAQ3009-0.5BDL RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B RSAQ3-10BMS RSAQ3-10BMSD 97629-MB	J+ (all detects)	A

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

V. Blanks

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

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No chlorinated pesticide contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
RSAQ3-0.5B RSAQ3009-0.5B	4,4'-DDE Hexachlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905567	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
RSAQ3-0.5B RSAQ3009-0.5B	4,4'-DDE Hexachlorobenzene	X X	A
RSAQ3-0.5BDL RSAQ3009-0.5BDL	All TCL compounds except 4,4'-DDE Hexachlorobenzene	X	A

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

XIV. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B, samples RSAQ3-0.5BDL and RSAQ3009-0.5BDL, and samples RSAR4-10B and RSAR4009-10B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
4,4'-DDE	880	880	0 (≤50)	-	-	-
4,4'-DDT	190	210	10 (≤50)	-	-	-
Hexachlorobenzene	660	620	6 (≤50)	-	-	-
beta-BHC	150	140	7 (≤50)	-	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5BDL	RSAQ3009-0.5BDL				
4,4'-DDE	1100	1100	-	0 (≤350)	-	-
4,4'-DDT	200	210	-	10 (≤350)	-	-
Hexachlorobenzene	790	760	-	30 (≤180)	-	-
beta-BHC	200	200	-	0 (≤180)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	RSAQ3-0.5B RSAQ3-0.5BDL RSAQ3009-0.5B RSAQ3009-0.5BDL RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	Endosulfan I	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B	4,4'-DDE Hexachlorobenzene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R0905567	RSAQ3-0.5B RSAQ3-0.5BDL RSAQ3009-0.5B RSAQ3009-0.5BDL RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B	4,4'-DDE Hexachlorobenzene	X X	A	Overall assessment of data (o)
R0905567	RSAQ3-0.5BDL RSAQ3009-0.5BDL	All TCL compounds except 4,4'-DDE Hexachlorobenzene	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F3a
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/30 - 10/01/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	SW	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	SW	D_1 = 1,3 D_2 = 2,4 D_3 = 9,10 *
XV.	Field blanks	ND	FB = FB080309-SO (R0904279) FB080309-SORE ↓

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

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

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil

1	RSAQ3-0.5B D_1	11	RSAR4-25B	21	97629-MB	31	
2	RSAQ3-0.5BDL D_1	12	RSAR4-37B	22 *	97755-1	32	
3	RSAQ3009-0.5B D_1	13 *	RSAR3-0.5B	23		33	
4	RSAQ3009-0.5BDL D_1	14	RSAR3-10B	24		34	
5	RSAQ3-10B	15	RSAR3-25B	25		35	
6	RSAQ3-25B	16	RSAR3-35B	26		36	
7	RSAQ3-41B	17	RSAR3-38B	27		37	
8	RSAR4-0.5B	18	RSAQ3-10BMS	28		38	
9	RSAR4-10B D_3	19	RSAQ3-10BMSD	29		39	
10	RSAR4009-10B D_3	20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

Notes:_____

LDC #: 22109F3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

What type or calibration verification calculation was performed? ✓ %D or ___ RPD

[✓ Y] N N/A Were Evaluation mix standards run before initial calibration and before samples?
[✓ Y] N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?
[✓ Y] N N/A Was at least one standard run daily to verify the working curve?
Y [✓ N] N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤20.0%?

Level ~~IV/D~~ Only

Y N [✓ N/A] Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 20.0)	RT (Limits)	Associated Samples	Qualifications
	10/13/09	FC810	STX-CLP1	H (+)	23.3	( )	All + 97629-MB	J+dets/A (c)
		(ICV)				( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
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						( )		
						( )		
						( )		

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

(Blk2 - diff ICAL)

LDC #: 22109 F3q
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVG
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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		1 (10X)	Not Spec.	B	144 (40-140)	No qual.
					( )	
					( )	
		2. (100X)		A, B	DO ( )	
					( )	
		3 (10X)		B	1317 ( )	
					( )	
		4 (100X)	✓	A, B	DO (✓)	✓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22109 #39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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

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

Level IV/D Only

Y N (N/A) Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N (N/A) Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	J, EE	> Cal range	1, 3	J (all detects) (e)

Comments: See sample calculation verification worksheet for recalculations

COMQUANewPest.wpd

LDC #: 22109 F3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 3	J, EE > cal range		X/A (Co)
		2, 4	All except J, EE	dil	

Comments: _____

LDC #: 22109 F3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 1	3	RPD	Parent only
J	880	880	0 (≤50% RPD)	-
O	190	210	10	-
EE	660	620	6	-
B	150	140	7	-

Compound	Concentration (ug/kg) 2	4	RPD	Parent only
J	1100	1100	0 (≤350D)	-
O	200	210	10	-
EE	790	760	30 (≤180D)	-
B	200	200	0	-

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 1 through October 5, 2009

LDC Report Date: December 16, 2009

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626

Sample Identification

RSAR3-0.5BSPLP2
RSAR3-0.5BSPLP3
RSAR3-35BSPLP2
RSAR3-35BSPLP3
RSAQ4-10BSPLP2
RSAQ4-10BSPLP3
RSAQ4-32BSPLP2
RSAQ4-32BSPLP3

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 8 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) as there are no current guidelines for the method stated above.

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.

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 all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

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.

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

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAQ4-10BSPLP2	Not specified	Decachlorobiphenyl	38 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP2-BLK	Not specified	Decachlorobiphenyl	19 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP3-BLK	Not specified	Decachlorobiphenyl Tetrachloro-m-xylene	20 (40-140) 37 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626	All compounds reported below the PQL.	J (all detects)	A

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, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG R0905626

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905626	RSAQ4-10BSPLP2	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Surrogate spikes (%R) (s)
R0905626	RSAR3-0.5BSPLP2 RSAR3-0.5BSPLP3 RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-10BSPLP2 RSAQ4-10BSPLP3 RSAQ4-32BSPLP2 RSAQ4-32BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109G3a
SDG #: R0905626
Laboratory: Columbia Analytical Services

Stage ~~2B~~ 4

Date: 12/05/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 10/01 - 05/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ccv/icv ≤20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	A	LCSD
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	RSAR3-0.5BSPLP2	11	98499-MB	21		31	
2	RSAR3-0.5BSPLP3	12	SPLP2 - Blk	22		32	
3	RSAR3-35BSPLP2	13	SPLP3 - Blk	23		33	
4	RSAR3-35BSPLP3	14		24		34	
5	RSAQ4-10BSPLP2	15		25		35	
6	RSAQ4-10BSPLP3	16		26		36	
7	RSAQ4-32BSPLP2	17		27		37	
8	RSAQ4-32BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22109 G39
SDG #: Sw Conv

VALIDATION FINDINGS CHECKLIST

Page: 1 of Y
Reviewer: JM
2nd Reviewer: A

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or ____%R	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15%.0 for individual breakdown in the Evaluation mix standards?	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~15%.0~~ 20 or percent recoveries ~~85-115%~~ 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 #: 22109G39
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVL
2nd Reviewer: [illegible]

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

LDC #: 22109 G39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		5	NS	B	38 (40-140)	J- /NJ /P (S)
					( )	
		SPLP2-BLK		B	19 ( )	
					( )	
		SPLP3-BLK		B	20 ( )	
				A	37 ( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22109 63q
SDG #: Sil Cur ✓

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVB
2nd Reviewer: M

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

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (10^{10} std)	Recalculated CF (10^{10} std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/27/09	H (STX-CLP1)	2.283 e7	2.283 e7	2.440 e7	2.440 e7	5.78	5.79
			P 1	1.055	1055	1.088	1.088	3.07	3.06
			H 2	5.828	5.828	5.984	5.984	3.92 ✓	3.92
			P 2	2.287	2.286	2.327	2.327	3.50	3.50
2									
3									
4									

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

LDC #: 22109 G3q
SDG #: Sc Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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

The continuing calibration percent difference (%D) values were recalculated for _____ using the following calculation:

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

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
CCV8A	10/30/09	H (STX-CLP1)	24.403 e6	25.288 e6	25.290 e6	3.6	3.6
		P 1	10.883	11.654	11.654	7.1	7.1
		H 2	59.836	65.979	65.98	10.3	10.3
		P 2	23.273	25.242	25.243	8.5	8.5
CCV98	10/30/09	H 1		25.519	25.52	4.6	4.6
		P 1		11.668	11.668	7.2	7.2
		H 2		65.596	65.59	9.6	9.6
		P 2		25.166	25.167	8.1	8.1

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

LDC #: 22109 G39
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	STX-CLP1	100	75.952	76	76	0
Decachlorobiphenyl	↓	↓	63.743	64	64	↓
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 #: 22109G2a
SDG #: Sy Cmw

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: SVG
2nd Reviewer: AR

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

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

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

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

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

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

LCS/LCSD samples: 98499 LCS/D

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	0.200	0.200	0.169	0.193	85	85	97	97	13	13
4,4'-DDT	↓	↓	0.173	0.209	87	87	104	104	19	19
Aroclor 1260										

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

LDC #: 22109G34
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

Example:

Sample I.D. #1 EE:

Conc. = $\frac{(947.7 e 6)\ (10 ml)}{(9,332 e 7)\ (1060 ml)}$

= 0.0958

≈ 0.096 ug/L

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

Note: _____

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Polychlorinated Biphenyls

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

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 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

Initial calibration of multicompound compounds were performed for the primary (quantitation) column as required by the method.

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

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.

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP2-BLK	Not specified	Decachlorobiphenyl	39 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP3-BLK	Not specified	Decachlorobiphenyl	35 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A3b
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/06/09
Page: 1 of 1
Reviewer: JG
2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 8/05/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤20 %
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	RSAU5-0.5BSPLP2	11		21		31	
2	RSAU5-0.5BSPLP3	12		22		32	
3	93765-MB	13		23		33	
4	SPLP2-Blk	14		24		34	
5	SPLP3- ↓	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22109 A 36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: SVG
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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		SPLP2-Blk	NS	B	39 (40-140)	J-/NJ/P (S)
			↓	↓	( )	↓
		SPLP3-Blk	↓	↓	35 ( )	↓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-44B
RSAT8-0.5B
RSAT8-44B
EB092309-SO1A4
SA148-10B
SA148-35B
RSAT7-44BMS
RSAT7-44BMSD
SA148-10BMS
SA148-10BMSD

Introduction

This data review covers 10 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

Initial calibration of multicompound compounds were performed for the primary (quantitation) column as required by the method.

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

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.

V. Blanks

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

Sample EB092309-SO1A4 was identified as an equipment blank. No polychlorinated biphenyl contaminants were found in this blank.

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No polychlorinated biphenyl contaminants were found in these blanks.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SA148-10B	Not specified	Tetrachloro-m-xylene	26 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905402	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	SA148-10B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905402	RSAT7-0.5B RSAT7-44B RSAT8-0.5B RSAT8-44B EB092309-SO1A4 SA148-10B SA148-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Equipment Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B3b
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 9/22-23/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ∈ 202
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	EB = 5 FB = FB080309-SO (R0904279 RE)

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

Validated Samples: Soil + Water

1	RSAT7-0.5B S	11	SA148-10BMSD S	21	97004-MB	31	
2	RSAT7-44B	12		22	96798-	32	
3	RSAT8-0.5B	13		23	97030-	33	
4	RSAT8-44B	14		24		34	
5	EB092309-SO1A4 W	15		25		35	
6	SA148-10B S	16		26		36	
7	SA148-35B	17		27		37	
8	RSAT7-44BMS	18		28		38	
9	RSAT7-44BMSD	19		29		39	
10	SA148-10BMS	20		30		40	

LDC #: 22109b3b
SDG #: Fu Creek

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: SVG
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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		6	NS	A	26 (40-140)	J/NJ/A (S)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	September 23, 2009
LDC Report Date:	December 9, 2009
Matrix:	Soil
Parameters:	Polychlorinated Biphenyls
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434

Sample Identification

SA148-10BSPLP2
SA148-10BSPLP3
SA148-35BSPLP2
SA148-35BSPLP3

Samples in this SDG underwent SPLP extraction

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 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

Initial calibration of multicompound compounds were performed for the primary (quantitation) column as required by the method.

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

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.

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP-BLK2	Not specified	Decachlorobiphenyl	36 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905434	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905434

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905434	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP2 SA148-35BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109C3b
SDG #: R0905434
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 9/23/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec.
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	SA148-10BSPLP2	11	97216-MB	21		31	
2	SA148-10BSPLP3	12	97674-MB	22		32	
3	SA148-35BSPLP2	13	SPLP-Blk1	23		33	
4	SA148-35BSPLP3	14	1-Blk	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 #: 22109C29
SDG #: Ice Cream

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: DVS
2nd Reviewer: LA

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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		SPLP-Blk2	NS	B	36 (40-140)	J-/UJ/P (S)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

SA209-0.5B
SA209-35B

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 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

Initial calibration of multicompound compounds were performed for the primary (quantitation) column as required by the method.

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

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.

V. Blanks

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

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No polychlorinated biphenyl contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905524	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	SA209-0.5B SA209-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Equipment Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	SA209-0.5B SA209-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D3b
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer:

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 9/28/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CW/ICV ≤20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB080309-SO (R0904279) RE

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

Validated Samples: Soil

1	SA209-0.5B	11		21		31	
2	SA209-35B	12		22		32	
3	97432-MB	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	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 1, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

RSAR3-0.5B
RSAR3-35B

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 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

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

III. Initial Calibration

Initial calibration of multicompound compounds were performed for the primary (quantitation) column as required by the method.

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

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.

V. Blanks

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

Samples FB080309-SO (from SDG R0904279) and FB080309-SORE (from SDG R0904279) were identified as field blanks. No polychlorinated biphenyl contaminants were found in these blanks.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905567	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	RSAR3-0.5B RSAR3-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F3b
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: LA

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 10/01/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ccv/icv ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB080309-SO (R0904279) RE

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

Validated Samples: Soil

1	RSAR3-0.5B	11		21		31	
2	RSAR3-35B	12		22		32	
3	97755 MB	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	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 1 through October 5, 2009

LDC Report Date: December 18, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626

Sample Identification

RSAR3-0.5BSPLP2
RSAR3-0.5BSPLP3
RSAR3-35BSPLP2
RSAR3-35BSPLP3
RSAQ4-10BSPLP2
RSAQ4-10BSPLP3
RSAQ4-32BSPLP2
RSAQ4-32BSPLP3

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

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) as there are no current guidelines for the method stated above.

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.

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 multicompound compounds were performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) 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.

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.

V. Blanks

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

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
SPLP2-BLK	Not specified	Decachlorobiphenyl	20 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP3-BLK	Not specified	Decachlorobiphenyl	23 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

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

b. GPC Calibration

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

XI. Target Compound Identification

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626	All compounds reported below the PQL.	J (all detects)	A

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, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0905626

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905626	RSAR3-0.5BSPLP2 RSAR3-0.5BSPLP3 RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-10BSPLP2 RSAQ4-10BSPLP3 RSAQ4-32BSPLP2 RSAQ4-32BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109G3b
SDG #: R0905626
Laboratory: Columbia Analytical Services

Stage ~~2B~~ 4

Date: 12/05/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: ~~N~~

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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: 10/01/09 – 10/05/09
II.	GC/ECD Instrument Performance Check	~~N~~	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples: Soil

1	RSAR3-0.5BSPLP2	11	98499-MB	21		31	
2	RSAR3-0.5BSPLP3	12	SPLP2-Blk	22		32	
3	RSAR3-35BSPLP2	13	SPLP3-Blk	23		33	
4	RSAR3-35BSPLP3	14		24		34	
5	RSAQ4-10BSPLP2	15		25		35	
6	RSAQ4-10BSPLP3	16		26		36	
7	RSAQ4-32BSPLP2	17		27		37	
8	RSAQ4-32BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22109 635
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MV
2nd Reviewer: L

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?			✓	
Were endrin and 4,4'-DDT breakdowns ≤ 15%.0 for individual breakdown in the Evaluation mix standards?			✓	
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ ~~15%~~ 20.0 or percent recoveries ~~85-115%~~ 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 #: 22109G35
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer: [illegible]

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.	W	✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XV. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

LDC #: 22109 G36
SDG #: Sea Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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".

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		SPLP2-Blk	NS	B	20 (40-140)	J-/UJ/P (S)
			↓	↓	( )	↑
		SPLP3-Blk	↓	↓	23 (↓)	↓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22109G3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [illegible]

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

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (500 std)	Recalculated CF (500 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/07/09	1260-1 (DB-1701)	4.369e2	436.928	4.537e2	4.537e2	10.65	10.65
			↓ (DB-17)	4.165 ↓	416.46	4.325 ↓	4.325 ↓	3.57	13.5
2									
3									
4									

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

LDC #: 22109G3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: [illegible]

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

The continuing calibration percent difference (%D) values were recalculated for _____ using the following calculation:

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

Where: N = __ Initial Calibration Factor or __ Nominal Amount (ng)
C = __ Calibration Factor from Continuing Calibration Standard or __ Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
CCV 14	10/22/09	1260-1 (DB-1701)	453.733	466.227	466.228	2.8	2.8
		(DB-17)	432.530	409.052	409.052	5.4	5.4
CCV 15	10/22/09	(DB-1701)		448.827	448.827	1.1	1.1
		(DB-17)		382.172	382.172	11.6	11.6

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

LDC #: 22109G3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	DB-1701	100	87.568	88	88	0
Decachlorobiphenyl	↓	↓	66.598	67	67	↓
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 #: 22109G3b
SDG #: See Cover

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

Reviewer: JVG
2nd Reviewer: CC

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

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

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

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

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

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

LCS/LCSD samples: 98499 LCSD

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC										
4,4'-DDT										
Aroclor ~~1260~~ 1242	5.00	5.00	5.64	5.03	113	113	101	101	11	11

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 #: 22109 G2b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVB
2nd reviewer:

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

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

Example:

Sample I.D. _____ ND :

Conc. = (_____)
( )

=

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

Note: _____

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Polychlorinated Biphenyls as Congeners

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls as Congeners

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 2 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668A for Polychlorinated Biphenyls as Congeners.

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 Polychlorinated Dioxins/Dibenzofurans Data Review (September 2005) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency and all criteria were met.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 30.0% for unlabeled compounds and less than or equal to 50.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900415-04	10/9/09	PCB-1 PCB-2 PCB-3 PCB-6 PCB-8 PCB-11 PCB-15 PCB-19 PCB-18+30 PCB-17	7.17 pg/L 5.56 pg/L 9.33 pg/L 19.1 pg/L 87.4 pg/L 832 pg/L 26.2 pg/L 9.58 pg/L 83.7 pg/L 42.5 pg/L	All samples in SDG R0904370

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900415-04 (continued)	10/9/09	PCB-27	5.52 pg/L	All samples in SDG R0904370
		PCB-24	2.08 pg/L	
		PCB-16	42.0 pg/L	
		PCB-32	21.9 pg/L	
		PCB-26+29	13.2 pg/L	
		PCB-25	4.42 pg/L	
		PCB-31	76.8 pg/L	
		PCB-20+28	93.2 pg/L	
		PCB-21+33	51.9 pg/L	
		PCB-22	28.7 pg/L	
		PCB-37	10.8 pg/L	
		PCB-50+53	8.46 pg/L	
		PCB-45+51	15.1 pg/L	
		PCB-46	3.83 pg/L	
		PCB-52	105 pg/L	
		PCB-49+69	32.4 pg/L	
		PCB-48	12.0 pg/L	
		PCB-44+47+65	97.8 pg/L	
		PCB-42	11.5 pg/L	
		PCB-41+71+40	20.6 pg/L	
		PCB-64	19.8 pg/L	
		PCB-68	7.49 pg/L	
		PCB-70+61+74+76	78.4 pg/L	
		PCB-66	30.2 pg/L	
		PCB-56	15.2 pg/L	
		PCB-60	7.11 pg/L	
		PCB-95	137 pg/L	
		PCB-88+91	20.4 pg/L	
		PCB-84	51.4 pg/L	
		PCB-92	26.5 pg/L	
		PCB-90+101+113	162 pg/L	
		PCB-83+99	82.0 pg/L	
		PCB-86+87+97+109+119+125	113 pg/L	
		PCB-117	3.49 pg/L	
		PCB-85+116	22.0 pg/L	
		PCB-110+115	181 pg/L	
		PCB-82	19.8 pg/L	
		PCB-108+124	6.69 pg/L	
		PCB-107	8.84 pg/L	
		PCB-118	139 pg/L	
		PCB-114	2.93 pg/L	
		PCB-105	56.6 pg/L	
		PCB-136	16.8 pg/L	
		PCB-135+151	41.9 pg/L	
		PCB-144	6.94 pg/L	
		PCB-147+149	103 pg/L	
		PCB-134	11.8 pg/L	
		PCB-139+140	3.26 pg/L	
		PCB-132	62.1 pg/L	
		PCB-146	15.7 pg/L	
		PCB-153+168	114 pg/L	
		PCB-141	25.3 pg/L	
		PCB-130	12.5 pg/L	
		PCB-137	13.9 pg/L	
		PCB-164	9.62 pg/L	
		PCB-129+138+163	196 pg/L	
		PCB-158	19.7 pg/L	
		PCB-128+166	37.9 pg/L	
		PCB-167	8.09 pg/L	
		PCB-156+157	29.1 pg/L	
		PCB-179	4.27 pg/L	
		PCB-187	14.3 pg/L	
		PCB-183	5.01 pg/L	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900415-04 (continued)	10/9/09	PCB-174	12.1 pg/L	All samples in SDG R0904370
		PCB-177	8.12 pg/L	
		PCB-171+173	5.90 pg/L	
		PCB-180+193	25.8 pg/L	
		PCB-170	17.4 pg/L	
		PCB-202	3.68 pg/L	
		PCB-198+199	12.0 pg/L	
		PCB-203	5.87 pg/L	
		PCB-194	4.50 pg/L	
		PCB-208	10.1 pg/L	
		PCB-206	26.5 pg/L	
		PCB-209	9.48 pg/L	
		Total MonoCB	22.1 pg/L	
		Total DiCB	964 pg/L	
		Total TriCB	486 pg/L	
		Total TetraCB	465 pg/L	
		Total PentaCB	913 pg/L	
		Total HexaCB	728 pg/L	
		Total HeptaCB	93.1 pg/L	
		Total OctaCB	26.1 pg/L	
		Total NonaCB	36.6 pg/L	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAU5-0.5BSPLP2	PCB-1	27.1 pg/L	27.1U pg/L
	PCB-2	16.8 pg/L	16.8U pg/L
	PCB-3	46.9 pg/L	46.9U pg/L
	PCB-6	82.1 pg/L	82.1U pg/L
	PCB-8	353 pg/L	353U pg/L
	PCB-11	2480 pg/L	2480U pg/L
	PCB-24	8.42 pg/L	8.42U pg/L
	PCB-95	520 pg/L	520U pg/L
	PCB-92	88.4 pg/L	88.4U pg/L
	PCB-90+101+113	524 pg/L	524U pg/L
	PCB-83+99	354 pg/L	354U pg/L
	PCB-86+87+97+109+119+125	550 pg/L	550U pg/L
	PCB-117	14.8 pg/L	14.8U pg/L
	PCB-110+115	745 pg/L	745U pg/L
	PCB-108+124	14.7 pg/L	14.7U pg/L
	PCB-107	25.6 pg/L	25.6U pg/L
	PCB-118	353 pg/L	353U pg/L
	PCB-114	14.6 pg/L	14.6U pg/L
	PCB-105	223 pg/L	223U pg/L
	PCB-136	23.0 pg/L	23.0U pg/L
	PCB-135+151	59.1 pg/L	59.1U pg/L
	PCB-144	9.52 pg/L	9.52U pg/L
	PCB-147+149	133 pg/L	133U pg/L
	PCB-134	11.0 pg/L	11.0U pg/L
	PCB-139+140	6.75 pg/L	6.75U pg/L
	PCB-132	84.4 pg/L	84.4U pg/L
	PCB-146	23.3 pg/L	23.3U pg/L
	PCB-153+168	145 pg/L	145U pg/L
	PCB-141	37.2 pg/L	37.2U pg/L
	PCB-130	12.3 pg/L	12.3U pg/L
	PCB-137	15.3 pg/L	15.3U pg/L
	PCB-164	11.7 pg/L	11.7U pg/L
	PCB-129+138+163	225 pg/L	225U pg/L
	PCB-158	21.4 pg/L	21.4U pg/L
	PCB-128+166	40.8 pg/L	40.8U pg/L
	PCB-167	4.88 pg/L	4.88U pg/L
	PCB-156+157	27.6 pg/L	27.6U pg/L
	PCB-179	6.51 pg/L	6.51U pg/L
	PCB-187	19.3 pg/L	19.3U pg/L
	PCB-183	12.1 pg/L	12.1U pg/L
	PCB-174	13.7 pg/L	13.7U pg/L
	PCB-177	8.15 pg/L	8.15U pg/L
	PCB-171+173	5.14 pg/L	5.14U pg/L
	PCB-180+193	25.6 pg/L	25.6U pg/L
	PCB-170	17.0 pg/L	17.0U pg/L
	PCB-202	4.18 pg/L	4.18U pg/L
	PCB-198+199	21.8 pg/L	21.8U pg/L
	PCB-203	14.8 pg/L	14.8U pg/L
	PCB-194	11.9 pg/L	11.9U pg/L
	PCB-208	16.5 pg/L	16.5U pg/L
	PCB-206	45.0 pg/L	45.0U pg/L
	PCB-209	38.3 pg/L	38.3U pg/L
	Total MonoCB	90.8 pg/L	90.8U pg/L
	Total DiCB	3390 pg/L	3390U pg/L
	Total PentaCB	3690 pg/L	3690U pg/L
	Total HexaCB	891 pg/L	891U pg/L
	Total HeptaCB	108 pg/L	108U pg/L
	Total OctaCB	59.5 pg/L	59.5U pg/L
	Total NonaCB	61.5 pg/L	61.5U pg/L

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAU5-0.5BSPLP3	PCB-2	24.6 pg/L	24.6U pg/L
	PCB-11	3320 pg/L	3320U pg/L
	PCB-24	10.4 pg/L	10.4U pg/L
	PCB-68	10.6 pg/L	10.6U pg/L
	PCB-95	341 pg/L	341U pg/L
	PCB-88+91	60.6 pg/L	60.6U pg/L
	PCB-84	127 pg/L	127U pg/L
	PCB-92	58.5 pg/L	58.5U pg/L
	PCB-90+101+113	388 pg/L	388U pg/L
	PCB-83+99	207 pg/L	207U pg/L
	PCB-86+87+97+109+119+125	345 pg/L	345U pg/L
	PCB-117	11.0 pg/L	11.0U pg/L
	PCB-85+116	71.7 pg/L	71.7U pg/L
	PCB-110+115	451 pg/L	451U pg/L
	PCB-82	63.0 pg/L	63.0U pg/L
	PCB-108+124	13.0 pg/L	13.0U pg/L
	PCB-107	16.9 pg/L	16.9U pg/L
	PCB-118	251 pg/L	251U pg/L
	PCB-114	8.81 pg/L	8.81U pg/L
	PCB-105	119 pg/L	119U pg/L
	PCB-136	32.2 pg/L	32.2U pg/L
	PCB-135+151	77.7 pg/L	77.7U pg/L
	PCB-144	13.6 pg/L	13.6U pg/L
	PCB-147+149	193 pg/L	193U pg/L
	PCB-134	17.1 pg/L	17.1U pg/L
	PCB-139+140	6.27 pg/L	6.27U pg/L
	PCB-132	101 pg/L	101U pg/L
	PCB-146	26.9 pg/L	26.9U pg/L
	PCB-153+168	190 pg/L	190U pg/L
	PCB-141	46.3 pg/L	46.3U pg/L
	PCB-130	20.3 pg/L	20.3U pg/L
	PCB-137	16.8 pg/L	16.8U pg/L
	PCB-164	15.5 pg/L	15.5U pg/L
	PCB-129+138+163	282 pg/L	282U pg/L
	PCB-158	31.3 pg/L	31.3U pg/L
	PCB-128+166	49.4 pg/L	49.4U pg/L
	PCB-167	10.6 pg/L	10.6U pg/L
	PCB-156+157	41.6 pg/L	41.6U pg/L
	PCB-179	19.1 pg/L	19.1U pg/L
	PCB-187	59.7 pg/L	59.7U pg/L
	PCB-183	16.6 pg/L	16.6U pg/L
	PCB-174	30.8 pg/L	30.8U pg/L
	PCB-177	14.1 pg/L	14.1U pg/L
	PCB-171+173	7.71 pg/L	7.71U pg/L
	PCB-180+193	46.9 pg/L	46.9U pg/L
	PCB-170	26.1 pg/L	26.1U pg/L
	PCB-208	37.3 pg/L	37.3U pg/L
	PCB-206	76.3 pg/L	76.3U pg/L
	PCB-209	24.0 pg/L	24.0U pg/L
	Total PentaCB	2190 pg/L	2190U pg/L
	Total HexaCB	1180 pg/L	1180U pg/L
	Total HeptaCB	246 pg/L	246U pg/L
	Total NonaCB	120 pg/L	120U pg/L

No field blanks were identified in this SDG.

VI. 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.

VII. Laboratory Control Samples (LCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
RSAU5-0.5BSPLP2	^{13}C-PCB-1 ^{13}C-PCB-3	21 (25-150) 23 (25-150)	PCB-1 thru 3	J (all detects) UJ (all non-detects)	P

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

XII. System Performance

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, 2009 Phase B Investigation, Henderson, Nevada Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2	PCB-1 thru 3	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP2	PCB-1	27.1U pg/L	A	bl
		PCB-2	16.8U pg/L		
		PCB-3	46.9U pg/L		
		PCB-6	82.1U pg/L		
		PCB-8	353U pg/L		
		PCB-11	2480U pg/L		
		PCB-24	8.42U pg/L		
		PCB-95	520U pg/L		
		PCB-92	88.4U pg/L		
		PCB-90+101+113	524U pg/L		
		PCB-83+99	354U pg/L		
		PCB-86+87+97+109+119+125	550U pg/L		
		PCB-117	14.8U pg/L		
		PCB-110+115	745U pg/L		
		PCB-108+124	14.7U pg/L		
		PCB-107	25.6U pg/L		
		PCB-118	353U pg/L		
		PCB-114	14.6U pg/L		
		PCB-105	223U pg/L		
		PCB-136	23.0U pg/L		
		PCB-135+151	59.1U pg/L		
		PCB-144	9.52U pg/L		
		PCB-147+149	133U pg/L		
		PCB-134	11.0U pg/L		
		PCB-139+140	6.75U pg/L		
		PCB-132	84.4U pg/L		
		PCB-146	23.3U pg/L		
		PCB-153+168	145U pg/L		
		PCB-141	37.2U pg/L		
		PCB-130	12.3U pg/L		
		PCB-137	15.3U pg/L		
		PCB-164	11.7U pg/L		
		PCB-129+138+163	225U pg/L		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP2 (continued)	PCB-158	21.4U pg/L	A	bl
		PCB-128+166	40.8U pg/L		
		PCB-167	4.88U pg/L		
		PCB-156+157	27.6U pg/L		
		PCB-179	6.51U pg/L		
		PCB-187	19.3U pg/L		
		PCB-183	12.1U pg/L		
		PCB-174	13.7U pg/L		
		PCB-177	8.15U pg/L		
		PCB-171+173	5.14U pg/L		
		PCB-180+193	25.6U pg/L		
		PCB-170	17.0U pg/L		
		PCB-202	4.18U pg/L		
		PCB-198+199	21.8U pg/L		
		PCB-203	14.8U pg/L		
		PCB-194	11.9U pg/L		
		PCB-208	16.5U pg/L		
		PCB-206	45.0U pg/L		
		PCB-209	38.3U pg/L		
		Total MonoCB	90.8U pg/L		
		Total DiCB	3390U pg/L		
		Total PentaCB	3690U pg/L		
		Total HexaCB	891U pg/L		
		Total HeptaCB	108U pg/L		
		Total OctaCB	59.5U pg/L		
		Total NonaCB	61.5U pg/L		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP3	PCB-2	24.6U pg/L	A	bl
		PCB-11	3320U pg/L		
		PCB-24	10.4U pg/L		
		PCB-68	10.6U pg/L		
		PCB-95	341U pg/L		
		PCB-88+91	60.6U pg/L		
		PCB-84	127U pg/L		
		PCB-92	58.5U pg/L		
		PCB-90+101+113	388U pg/L		
		PCB-83+99	207U pg/L		
		PCB-86+87+97+109+119+125	345U pg/L		
		PCB-117	11.0U pg/L		
		PCB-85+116	71.7U pg/L		
		PCB-110+115	451U pg/L		
		PCB-82	63.0U pg/L		
		PCB-108+124	13.0U pg/L		
		PCB-107	16.9U pg/L		
		PCB-118	251U pg/L		
		PCB-114	8.81U pg/L		
		PCB-105	119U pg/L		
		PCB-136	32.2U pg/L		
		PCB-135+151	77.7U pg/L		
		PCB-144	13.6U pg/L		
		PCB-147+149	193U pg/L		
		PCB-134	17.1U pg/L		
		PCB-139+140	6.27U pg/L		
		PCB-132	101U pg/L		
		PCB-146	26.9U pg/L		
		PCB-153+168	190U pg/L		
		PCB-141	46.3U pg/L		
		PCB-130	20.3U pg/L		
		PCB-137	16.8U pg/L		
		PCB-164	15.5U pg/L		
		PCB-129+138+163	282U pg/L		
		PCB-158	31.3U pg/L		
		PCB-128+166	49.4U pg/L		
		PCB-167	10.6U pg/L		
		PCB-156+157	41.6U pg/L		
		PCB-179	19.1U pg/L		
		PCB-187	59.7U pg/L		
		PCB-183	16.6U pg/L		
		PCB-174	30.8U pg/L		
		PCB-177	14.1U pg/L		
		PCB-171+173	7.71U pg/L		
		PCB-180+193	46.9U pg/L		
		PCB-170	26.1U pg/L		
		PCB-208	37.3U pg/L		
		PCB-206	76.3U pg/L		
		PCB-209	24.0U pg/L		
		Total PentaCB	2190U pg/L		
		Total HexaCB	1180U pg/L		
		Total HeptaCB	246U pg/L		
		Total NonaCB	120U pg/L		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A3c
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/8/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668A)

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: 8/5/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ICV	A	
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client specified
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW N	All 2MPC - vk (k)
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

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

Validated Samples:

1	RSAU5-0.5BSPLP2 S	11	ZR900415-04	21	413525A	31	
2	RSAU5-0.5BSPLP3	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22109A3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1a

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668)

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

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated? If yes, please see qualification below.

Blank extraction date: 10/9/09 **Blank analysis date:** 10/20/09
Conc. units: pg/L **A/sociated samples:** All (bl)

Compound	Blank ID	Sample Identification								
	EQ0900415-04	5X	1	2						
PCB 1	7.17	35.85	27.1/U			all > 5x				
PCB 2	5.56	27.8	16.8/U	24.6/U						
PCB 3	9.33	46.65	46.9/U							
PCB 6	19.1	95.5	82.1/U							
PCB 8	87.4	437	353/U							
PCB 11	832	4160	2480/U	3320/U						
PCB 15	26.2	131								
PCB 19	9.58	47.9								
PCBs 18+30	83.7	418.5								
PCB 17	42.5	212.5								
PCB 27	5.52	27.6								
PCB 24	2.08	10.4	8.42/U	10.4/U						
PCB 16	42.0	210								
PCB 32	21.9	109.5								
PCBs 26+29	13.2	66								
PCB 25	4.42	22.1								
PCB 31	76.8	384								
PCBs 20+28	93.2	466								
PCBs 21+33	51.9	259.5								
PCB 22	28.7	143.5								
PCB 37	10.8	54								

PCBs 50+53	8.46	42.3								
PCBs 45+51	15.1	75.5								
PCB 46	3.83	19.15								
PCB 52	105	525								
PCBs 49+69	32.4	162								
PCB 48	12.0	60								
PCBs 44+47+65	97.8	489								
PCB 42	11.5	57.5								
PCBs 41+71+40	20.6	103								
PCB 64	19.8	99								
PCB 68	7.49	37.45		10.6/U						
PCBs 70+61+74+76	78.4	392								
PCB 66	30.2	151								
PCB 56	15.2	76								
PCB 60	7.11	35.55								
PCB 95	137	685	520/U	341/U						
PCBs 88+91	20.4	102		60.6/U						
PCB 84	51.4	257		127/U						
PCB 92	26.5	132.5	88.4/U	58.5/U						
PCBs 90+101+113	162	810	524/U	388/U						
PCBs 83+99	82.0	410	354/U	207/U						
PCBs 86+87+97+109+119+125	113	565	550/U	345/U						
PCB 117	3.49	17.45	14.8/U	11.0/U						
PCBs 85+116	22.0	110		71.7/U						
PCBs 110+115	181	905	745/U	451/U						
PCB 82	19.8	99		63.0/U						
PCBs 108+124	6.69	33.45	14.7/U	13.0/U						
PCB 107	8.84	44.2	25.6/U	16.9/U						
PCB 118	139	695	353/U	251/U						
PCB 114	2.93	14.65	14.6/U	8.81/U						
PCB 105	56.6	283	223/U	119/U						

PCB 136	16.8	84	23.0/U	32.2/U						
PCBs 135+151	41.9	209.5	59.1/U	77.7/U						
PCB 144	6.94	34.7	9.52/U	13.6/U						
PCBs 147+149	103	515	133/U	193/U						
PCB 134	11.8	59	11.0/U	17.1/U						
PCBs 139+140	3.26	16.3	6.75/U	6.27/U						
PCB 132	62.1	310.5	84.4/U	101/U						
PCB 146	15.7	78.5	23.3/U	26.9/U						
PCBs 153+168	114	570	145/U	190/U						
PCB 141	25.3	126.5	37.2/U	46.3/U						
PCB 130	12.5	62.5	12.3/U	20.3/U						
PCB 137	13.9	69.5	15.3/U	16.8/U						
PCB 164	9.62	48.1	11.7/U	15.5/U						
PCBs 129+138+163	196	980	225/U	282/U						
PCB 158	19.7	98.5	21.4/U	31.3/U						
PCBs 128+166	37.9	189.5	40.8/U	49.4/U						
PCB 167	8.09	40.45	4.88/U	10.6/U						
PCBs 156+157	29.1	145.5	27.6/U	41.6/U						
PCB 179	4.27	21.35	6.51/U	19.1/U						
PCB 187	14.3	71.5	19.3/U	59.7/U						
PCB 183	5.01	25.05	12.1/U	16.6/U						
PCB 174	12.1	60.5	13.7/U	30.8/U						
PCB 177	8.12	40.6	8.15/U	14.1/U						
PCBs 171+173	5.90	29.5	5.14/U	7.71/U						
PCBs 180+193	25.8	129	25.6/U	46.9/U						
PCB 170	17.4	87	17.0/U	26.1/U						
PCB 202	3.68	18.4	4.18/U							
PCBs 198+199	12.0	60	21.8/U							
PCB 203	5.87	29.35	14.8/U							
PCB 194	4.50	22.5	11.9/U							
PCB 208	10.1	50.5	16.5/U	37.3/U						

PCB 206	26.5	132.5	45.0/U	76.3/U						
PCB 209	9.48	47.4	38.3/U	24.0/U						
Total MonoCB	22.1	110.5	90.8/U							
Total DiCB	964	4820	3390/U							
Total TriCB	486	2430								
Total TetraCB	465	2325								
Total PentaCB	913	4565	3690/U	2190/U						
Total HexaCB	728	3640	891/U	1180/U						
Total HeptaCB	93.1	465.5	108/U	246/U						
Total OctaCB	26.1	130.5	59.5/U							
Total NonaCB	36.6	183	61.5/U	120/U						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentr/ation were qualified as not detected, "U".

LDC #: 22109A3c
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

METHOD: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668)

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

Y N N/A Are all internal standard recoveries were within the 25-150% criteria?

Y N N/A Was the S/N ratio all internal standard peaks ≥ 10?

#	Date	Lab ID/Reference	Compound	% Recovery (Limit: 25-150%)	Qualifications (I)
		1	13C-PCB 1	21 (25-150)	J/UJ/A (PCB 1-3)
			↓ 3	23 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Internal Standards		Recovery Standards
A.	^{13}C-PCB-77	K.	
B.	^{13}C-PCB-105	L.	
C.	^{13}C-PCB-118	M.	
D.	^{13}C-PCB-126	N.	
E.	^{13}C-PCB-156	O.	
F.	^{13}C-PCB-157	P.	
G.	^{13}C-PCB-169	Q.	
H.	^{13}C-PCB-180	R.	
I.		T.	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Metals

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 21, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3
RSAU5-0.5BSPLP2MS
RSAU5-0.5BSPLP2DUP
RSAU5-0.5BSPLP3MS
RSAU5-0.5BSPLP3DUP

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
SPLP PB (prep blank)	Barium Zinc	0.082 mg/L 0.041 mg/L	RSAU5-0.5BSPLP2
SPLP PB (prep blank)	Barium Boron Calcium Sodium Strontium Zinc	0.105 mg/L 0.07 mg/L 0.23 mg/L 1.66 mg/L 0.004 mg/L 0.012 mg/L	RSAU5-0.5BSPLP3

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAU5-0.5BSPLP2	Barium Zinc	0.035 mg/L 0.006 mg/L	0.035J+ mg/L 0.006J+ mg/L
RSAU5-0.5BSPLP3	Barium Zinc	0.039 mg/L 0.005 mg/L	0.039J+ mg/L 0.005J+ mg/L

No field blanks were identified 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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

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

Raw data were not reviewed for this SDG.

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 R0904370	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, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0904370

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0904370

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP2	Barium Zinc	0.035J+ mg/L 0.006J+ mg/L	A	bl
R0904370	RSAU5-0.5BSPLP3	Barium Zinc	0.039J+ mg/L 0.005J+ mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A4
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12-18-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: LA

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 8/5/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

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

Validated Samples: ~~SO~~ Soil

1	RSAU5-0.5BSPLP2	11	PBS	21		31	
2	RSAU5-0.5BSPLP3	12		22		32	
3	RSAU5-0.5BSPLP2MS	13		23		33	
4	RSAU5-0.5BSPLP2DUP	14		24		34	
5	RSAU5-0.5BSPLP3MS	15		25		35	
6	RSAU5-0.5BSPLP3DUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22109A4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer:
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2	S	[✓ Al], [✓ Sb], [✓ As], [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K], [✓ Se], [✓ Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
QC: 3-6		[✓ Al], [✓ Sb], [✓ As], [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt], [✓ K], [✓ Se], [✓ Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
~~4~~		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
~~5~~		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
~~6~~		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	[✓ Al], Sb, As, [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe], Pb, [✓ Mg, Mo, Mn], Hg, [✓ Ni], Pt, [✓ K], Se, [✓ Ag, Na, Sr], Tl, [✓ Sn, Ti], W, U, [✓ V, Zn]
ICP-MS		Al, [✓ Sb], As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, [✓ Pb], Mg, Mo, Mn, Hg, Ni, [✓ Pt], K, Se, Ag, Na, Sr, [✓ Tl], Sn, Ti, [✓ W, U], V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: [✓ Mercury by CVAA if performed]

LDC #: 22109A4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: mg/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: NA
Associated Samples: 1

Reason Code: bl

Reviewer: CR
2nd Reviewer:

Analyte	Extraction Blank[a] (mg/L)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
Ba	0.082			0.82	0.035 J+									
Zn	0.041			0.41	0.006 J+									

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 2

Analyte	Extraction Blank[a] (mg/L)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2									
Ba	0.105			1.05	0.039 J+									
B	0.07			0.7										
Ca	0.23			2.3										
Na	1.66			16.6										
Sr	0.004			0.04										
Zn	0.012			0.12	0.005 J+									

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-30B
SA203-46B
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-30B
SA148-35B
SA148-45B
RSAT7-0.5BMS
RSAT7-0.5BDUP
RSAT7-44BMS
RSAT7-44BDUP
EB092309-SO1A4MS
EB092309-SO1A4DUP

Introduction

This data review covers 22 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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

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I. Technical Holding Times

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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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Barium Boron Cobalt Lead Manganese Strontium Sodium Thallium Tungsten	0.050 ug/L 0.4 ug/L 5.5 ug/L 0.5 ug/L 0.007 ug/L 0.2 ug/L 0.1 ug/L 149 ug/L 0.006 ug/L 0.08 ug/L	All water samples in SDG R0905402
PB (prep blank)	Aluminum Chromium Iron Magnesium Manganese Tin Titanium	0.6 mg/Kg 0.06 mg/Kg 1.0 mg/Kg 0.9 mg/Kg 0.04 mg/Kg 4.0 mg/Kg 0.10 mg/Kg	All soil samples in SDG R0905402
ICB/CCB	Magnesium Strontium	2.0 ug/L 0.10 ug/L	All soil samples in SDG R0905402

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Barium Manganese	0.90 ug/L 0.30 ug/L	RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B
ICB/CCB	Barium Manganese	0.50 ug/L 0.20 ug/L	RSAT7-0.5B
ICB/CCB	Beryllium Tungsten	0.012 ug/L 0.116 ug/L	SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B
ICB/CCB	Beryllium	0.006 ug/L	RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B
ICB/CCB	Iron	5.0 ug/L	RSAT7-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Tungsten	0.135 ug/L	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092309-SO1A4	Boron Sodium	2.2 ug/L 233 ug/L	50.0U ug/L 300U ug/L
RSAT7-0.5B	Tin	3.1 mg/Kg	10.5U mg/Kg
RSAT7-10B	Tin	3.8 mg/Kg	10.8U mg/Kg
RSAT7-25B	Tin	3.6 mg/Kg	10.7U mg/Kg
RSAT7-44B	Tin	3.8 mg/Kg	10.8U mg/Kg
RSAT8-0.5B	Tin	3.6 mg/Kg	10.5U mg/Kg
RSAT8-10B	Tin	3.2 mg/Kg	10.5U mg/Kg
RSAT8-25B	Tin	4.0 mg/Kg	11.6U mg/Kg
RSAT8009-25B	Tin	4.0 mg/Kg	11.7U mg/Kg
RSAT8-44B	Tin	3.6 mg/Kg	10.7U mg/Kg
SA203-0.5B	Tin	3.9 mg/Kg	10.7U mg/Kg
SA203-10B	Tin	3.5 mg/Kg	10.9U mg/Kg
SA203-30B	Tin	3.8 mg/Kg	11.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA203-46B	Tin	4.7 mg/Kg	11.7U mg/Kg
SA148-0.5B	Tin	3.4 mg/Kg	10.6U mg/Kg
SA148-10B	Tin	3.4 mg/Kg	10.5U mg/Kg
SA148-30B	Tin	4.7 mg/Kg	11.4U mg/Kg
SA148-35B	Tin	3.8 mg/Kg	10.7U mg/Kg
SA148-45B	Tin	3.7 mg/Kg	10.9U mg/Kg

Sample EB092309-SO1A4 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
EB092309-SO1A4	9/23/09	Aluminum	10.3 ug/L	SA148-0.5B
		Boron	2.2 ug/L	SA148-10B
		Calcium	143 ug/L	SA148-30B
		Iron	40.2 ug/L	SA148-35B
		Lead	0.083 ug/L	SA148-45B
		Magnesium	34.3 ug/L	
		Manganese	6.2 ug/L	
		Sodium	233 ug/L	
		Strontium	1.3 ug/L	
		Uranium	0.003 ug/L	
		Zinc	1.1 ug/L	

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10B	Boron	9.1 mg/Kg	10.5U mg/Kg

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All soil samples in SDG R0905402

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) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
RSAT7-0.5BMS (All soil samples in SDG R0905402)	Antimony	56.0 (75-125)	J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
EB092309-SO1A4DUP (All water samples in SDG R0905402)	Lead	-	0.022 ug/L (≤0.020)	J (all detects) UJ (all non-detects)	A

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
RSAT7-0.5BDUP (All soil samples in SDG R0905402)	Chromium Copper Magnesium Thallium	20.6 (≤20) 40.2 (≤20) 25.5 (≤20) 20.5 (≤20)	- - - -	J (all detects) UJ (all non-detects)	A

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

Raw data were not reviewed for this SDG.

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 R0905402	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAT8-25B	RSAT8009-25B				
Aluminum	11300	11600	3 (≤50)	-	-	-
Antimony	0.7	0.9	-	0.2 (≤2.3)	-	-
Arsenic	9.33	8.12	14 (≤50)	-	-	-
Barium	187	217	15 (≤50)	-	-	-
Beryllium	0.541	0.491	10 (≤50)	-	-	-
Boron	14.4	15.2	-	0.8 (≤11.7)	-	-
Calcium	43100	57400	28 (≤50)	-	-	-
Chromium	17.7	17.3	2 (≤50)	-	-	-
Cobalt	7.3	7.1	-	0.2 (≤2.3)	-	-
Copper	18.8	17.7	6 (≤50)	-	-	-
Iron	16000	15500	3 (≤50)	-	-	-
Lead	8.1	7.6	-	0.5 (≤2.3)	-	-
Magnesium	19000	19200	1 (≤50)	-	-	-
Manganese	321	336	5 (≤50)	-	-	-
Mercury	0.009	0.013	-	0.004 (≤0.019)	-	-
Molybdenum	1.69	1.76	-	0.07 (≤0.35)	-	-
Nickel	14.3	13.8	4 (≤50)	-	-	-
Platinum	0.010	0.013	-	0.003 (≤0.12)	-	-
Potassium	2290	2350	3 (≤50)	-	-	-
Sodium	978	1040	6 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAT8-25B	RSAT8009-25B				
Strontium	1300	2240	53 (≤50)	-	J (all detects)	A
Thallium	0.134	0.118	13 (≤50)	-	-	-
Tin	4.0	4.0	-	0 (≤11.7)	-	-
Titanium	837	844	1 (≤50)	-	-	-
Tungsten	0.38	0.34	-	0.04 (≤0.12)	-	-
Uranium	4.12	4.16	1 (≤50)	-	-	-
Vanadium	49.8	48.7	2 (≤50)	-	-	-
Zinc	37.5	35.3	6 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905402	EB092309-SO1A4	Lead	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (Difference) (ld)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	Chromium Copper Magnesium Thallium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B EB092309-SO1A4 SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R0905402	RSAT8-25B RSAT8009-25B	Strontium	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	EB092309-SO1A4	Boron Sodium	50.0U ug/L 300U ug/L	A	bl
R0905402	RSAT7-0.5B	Tin	10.5U mg/Kg	A	bl
R0905402	RSAT7-10B	Tin	10.8U mg/Kg	A	bl
R0905402	RSAT7-25B	Tin	10.7U mg/Kg	A	bl
R0905402	RSAT7-44B	Tin	10.8U mg/Kg	A	bl
R0905402	RSAT8-0.5B	Tin	10.5U mg/Kg	A	bl
R0905402	RSAT8-10B	Tin	10.5U mg/Kg	A	bl
R0905402	RSAT8-25B	Tin	11.6U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	RSAT8009-25B	Tin	11.7U mg/Kg	A	bl
R0905402	RSAT8-44B	Tin	10.7U mg/Kg	A	bl
R0905402	SA203-0.5B	Tin	10.7U mg/Kg	A	bl
R0905402	SA203-10B	Tin	10.9U mg/Kg	A	bl
R0905402	SA203-30B	Tin	11.2U mg/Kg	A	bl
R0905402	SA203-46B	Tin	11.7U mg/Kg	A	bl
R0905402	SA148-0.5B	Tin	10.6U mg/Kg	A	bl
R0905402	SA148-10B	Tin	10.5U mg/Kg	A	bl
R0905402	SA148-30B	Tin	11.4U mg/Kg	A	bl
R0905402	SA148-35B	Tin	10.7U mg/Kg	A	bl
R0905402	SA148-45B	Tin	10.9U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	SA148-10B	Boron	10.5U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B4
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12-3-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: ✓

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 9/22/09 - 9/23/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	~~A~~N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(7,8)
XV	Field Blanks	SW	EB=14, FB=FB080309-SO (SO6W RG4127A)

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: All soil except 14, 24, 25 = water

1	RSAT7-0.5B	11	SA203-10B	21	RSAT7-0.5BDUP	31	PBW
2	RSAT7-10B	12	SA203-30B	22	RSAT7-44BMS	32	PBS
3	RSAT7-25B	13	SA203-46B	23	RSAT7-44BDUP	33	
4	RSAT7-44B	14	EB092309-SO1A4	24	EB092309-SO1A4MS	34	
5	RSAT8-0.5B	15	SA148-0.5B	25	EB092309-SO1A4DUP	35	
6	RSAT8-10B	16	SA148-10B	26		36	
7	RSAT8-25B	17	SA148-30B	27		37	
8	RSAT8009-25B	18	SA148-35B	28		38	
9	RSAT8-44B	19	SA148-45B	29		39	
10	SA203-0.5B	20	RSAT7-0.5BMS	30		40	

Notes: _____

LDC #: 2210934
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-13, 15A	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
14	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 20		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
21		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
22		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
23		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
24, 25		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Analysis Method
ICP	S/W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109B4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

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

Reason: 61

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	14									
Sb			0.050											
Ba			0.4											
B			5.5		2.2 / 50.0									
Co			0.5											
Pb			0.007											
Mn			0.2											
Sr			0.1											
Na			149		233 / 300									
Tl			0.006											
W			0.08											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19
Al	0.6																				
Cr	0.06																				
Fe	1.0																				
Mg	0.9	2.0																			
Mn	0.04																				
Sn	4.0			3.1 / 10.5	3.8 / 10.8	3.6 / 10.7	3.8 / 10.8	3.6 / 10.5	3.2 / 10.5	4.0 / 11.6	4.0 / 11.7	3.6 / 10.7	3.9 / 10.7	3.5 / 10.9	3.8 / 11.2	4.7 / 11.7	3.4 / 10.6	3.4 / 10.5	4.7 / 11.4	3.8 / 10.7	3.7 / 10.9
Ti	0.10																				
Sr		0.10																			

LDC #: 22109B4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 2xdil

(b1)

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-13, 15-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			0.90											
Mn			0.30											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			0.50											
Mn			0.20											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 12, 13, 15-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Be			0.012											
W			0.116											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Be			0.006											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1, 11-13, 15-19

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Fe			5.0											

LDC #: 22109B4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

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

(61)

Reviewer: SA
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 1-11

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
W			0.135											

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

LDC #: 22109B4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A 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: 9/23/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 15-19

Analyte	Blank ID	Sample Identification											
	14	Action Level	16										
Al	10.3												
B	2.2		9.1 / 10.5										
Ca	143	143											
Fe	40.2	40.2											
Pb	0.083	0.083											
Mg	34.3	34.3											
Mn	6.2	6.2											
Na	233												
Sr	1.3												
U	0.003												
Zn	1.1												

LDC #: 22109B4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A Were field blanks identified in this SDG?
Y (N) N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 100x
Field blank type: (circle one) (Field Blank) / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification										
	FB080309-SO (SDG# R0904279)	Action Level	No Qualifiers									
Al	18.6											
Ba	0.8											
Ca	113	113										
Fe	136	136										
Pb	0.042	0.042										
Mg	33.6	33.6										
Mn	7.5	7.5										
Na	66.0											
Sr	1.0											
Ti	1.5											
W	0.04											
Zn	0.8											

LDC #: 22109B4
SDG #: 22Ccer

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	20	Soil	Sb	56.0	All Soil	J-/UJ/A (m)

Comments:

LDC #: 22109B4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	25	Water	PD		0.022 (≤0.020)	All Water	J/UJ/A (1d)
	20-21	So:1	Cr	20.6		All So:1	J/UJ/A (1d)
			Cu	40.2			
			Mg	25.5			
			Fe	20.5			

Comments:

LDC 22109B4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
Y (N) NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	11300	11600	3			
Antimony	0.7	0.9		0.2	(≤2.3)	
Arsenic	9.33	8.12	14			
Barium	187	217	15			
Beryllium	0.541	0.491	10			
Boron	14.4	15.2		0.8	(≤11.7)	
Calcium	43100	57400	28			
Chromium	17.7	17.3	2			
Cobalt	7.3	7.1		0.2	(≤2.3)	
Copper	18.8	17.7	6			
Iron	16000	15500	3			
Lead	8.1	7.6		0.5	(≤2.3)	
Magnesium	19000	19200	1			
Manganese	321	336	5			
Mercury	0.009	0.013		0.004	(≤0.019)	
Molybdenum	1.69	1.76		0.07	(≤0.35)	
Nickel	14.3	13.8	4			
Platinum	0.010	0.013		0.003	(≤0.12)	
Potassium	2290	2350	3			

LDC#: 22109B4 **VALIDATION FINDINGS WORKSHEET**
SDG#: See Cover **Field Duplicates**

Reviewer: CR
2nd Reviewer: VC

METHOD: Metals (EPA Method 6020/6010/7000)

(Y)N NA Were field duplicate pairs identified in this SDG?
Y(N) NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Sodium	978	1040	6			
Strontium	1300	2240	53			Jdet/A (fd)
Thallium	0.134	0.118	13			
Tin	4.0	4.0		0	(≤11.7)	
Titanium	837	844	1			
Tungsten	0.38	0.34		0.04	(≤0.12)	
Uranium	4.12	4.16	1			
Vanadium	49.8	48.7	2			
Zinc	37.5	35.3	6			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 23, 2009

LDC Report Date: December 10, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434/K0909363

Sample Identification

SA148-10B-SPLP2
SA148-10B-SPLP3
SA148-35B-SPLP2
SA148-35B-SPLP3
SA148-10B-SPLP2MS
SA148-10B-SPLP2DUP
SA148-10B-SPLP3MS
SA148-10B-SPLP3DUP

Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Barium Strontium	0.029 mg/L 0.0008 mg/L	SA148-10B-SPLP2 SA148-35B-SPLP2
PB (prep blank)	Barium Boron Sodium Strontium Zinc	0.082 mg/L 0.02 mg/L 0.25 mg/L 0.0012 mg/L 0.057 mg/L	SA148-10B-SPLP3 SA148-35B-SPLP3

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10B-SPLP2	Barium	0.144 mg/L	0.144J+ mg/L
SA148-35B-SPLP2	Barium	0.186 mg/L	0.186J+ mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10B-SPLP3	Barium Boron Zinc	0.183 mg/L 0.09 mg/L 0.006 mg/L	0.183J+ mg/L 0.09J+ mg/L 0.006J+ mg/L
SA148-35B-SPLP3	Barium Zinc	0.173 mg/L 0.005 mg/L	0.173J+ mg/L 0.005J+ mg/L

No field blanks were identified 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) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results 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. Internal Standards

Raw data were not reviewed for this SDG.

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 R0905434/K0909363	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, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905434/K0909363

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905434/ K0909363	SA148-10B-SPLP2 SA148-10B-SPLP3 SA148-35B-SPLP2 SA148-35B-SPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905434/K0909363

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905434/ K0909363	SA148-10B-SPLP2	Barium	0.144J+ mg/L	A	bl
R0905434/ K0909363	SA148-35B-SPLP2	Barium	0.186J+ mg/L	A	bl
R0905434/ K0909363	SA148-10B-SPLP3	Barium Boron Zinc	0.183J+ mg/L 0.09J+ mg/L 0.006J+ mg/L	A	bl
R0905434/ K0909363	SA148-35B-SPLP3	Barium Zinc	0.173J+ mg/L 0.005J+ mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905434/K0909363

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109K4 (K4) C
SDG #: ~~K0909363~~ R0905434 / K0909363 Stage 2B
Laboratory: Columbia Analytical Services

Date: 12-4-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 9/23/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil

1	SA148-10B-SPLP2	11	PBW2	21		31	
2	SA148-10B-SPLP3	12	PBW3	22		32	
3	SA148-35B-SPLP2	13		23		33	
4	SA148-35B-SPLP3	14		24		34	
5	SA148-10B-SPLP2MS	15		25		35	
6	SA148-10B-SPLP2DUP	16		26		36	
7	SA148-10B-SPLP3MS	17		27		37	
8	SA148-10B-SPLP3DUP	18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 22109C4
SDG #: See Cover

Reviewer: CR
2nd reviewer: [signature]

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	Soil	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 5,6,7,8		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	1	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109C4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason: bl

Reviewer: CR
2nd Reviewer:

Soil preparation factor applied: 100x

Sample Concentration units, unless otherwise noted: ~~ug/L~~ mg/L Associated Samples: 1, 3

Analyte	Extraction PB[a] (mg/Kg)	Method PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	3								
Ba	0.029			0.29	0.144 J+	0.186 J+								
Sr	0.0008			0.008										

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2, 4

Analyte	Extraction PB[a] (mg/Kg)	Method PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2	4								
Ba	0.082			0.82	0.183 J+	0.173 J+								
B	0.02			0.2	0.09 J+									
Na	0.25			2.5										
Sr	0.0012			0.012										
Zn	0.057			0.57	0.006 J+	0.005 J+								

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

Introduction

This data review covers 8 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc. + Ag

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) as there are no current guidelines for the method stated above.

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.

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 21, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO1A4	EB092809-SO1A4MS
EB092809-SO2A4	EB092809-SO1A4DUP
SA29-0.5B	SA29-0.5BMS
SA29-10B	SA29-0.5BDUP
SA29-25B	SA29-40BMS
SA29-40B	SA29-40BDUP
SA120-0.5B	
SA120-10B	
SA120-25B	
SA120-43B	
SA209-0.5B	
SA209-10B	
SA209009-10B	
SA209-25B	
SA209-35B	
SA212-0.5B	
SA212-13B	
SA212009-13B	
SA212-30B	
SA212-44B	

Introduction

This data review covers 22 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Boron Chromium	2.4 ug/L 0.7 ug/L	All water samples in SDG R0905524
ICB/CCB	Calcium Magnesium Manganese Molybdenum Strontium Thallium Tungsten Uranium	9.1 ug/L 2.2 ug/L 0.5 ug/L 0.7 ug/L 0.1 ug/L 0.008 ug/L 0.08 ug/L 0.005 ug/L	All water samples in SDG R0905524
ICB/CCB	Aluminum Barium Boron	1.8 ug/L 0.8 ug/L 2.5 ug/L	EB092809-SO1A4
ICB/CCB	Aluminum Barium Boron	2.1 ug/L 1.3 ug/L 2.0 ug/L	EB092809-SO2A4

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Chromium Iron Manganese Tin Zinc	0.09 mg/Kg 0.8 mg/Kg 0.02 mg/Kg 3.3 mg/Kg 0.4 mg/Kg	All soil samples in SDG R0905524
ICB/CCB	Boron Manganese	2.0U ug/L 0.10U ug/L	All soil samples in SDG R0905524
ICB/CCB	Antimony Nickel Strontium Titanium	4.0 ug/L 0.50 ug/L 0.10 ug/L 0.3 ug/L	SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
ICB/CCB	Antimony	3.0 ug/L	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B
ICB/CCB	Barium Iron	1.00 ug/L 6.0 ug/L	SA212009-13B SA212-30B SA212-44B
ICB/CCB	Barium	0.70 ug/L	SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B
ICB/CCB	Thallium Tungsten	0.008 ug/L 0.070 ug/L	SA212-30B SA212-44B
ICB/CCB	Tungsten	0.067 ug/L	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Tungsten	0.047 ug/L	SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092809-SO1A4	Boron Chromium Aluminum Barium	3.4 ug/L 0.7 ug/L 20.9 ug/L 0.8 ug/L	50.0U ug/L 5.0U ug/L 50.0U ug/L 5.0U ug/L
EB092809-SO2A4	Boron Manganese Molybdenum Strontium Aluminum Barium	4.0 ug/L 4.7 ug/L 0.8 ug/L 1.6 ug/L 10.7 ug/L 0.8 ug/L	50.0U ug/L 5.0U ug/L 2.0U ug/L 10.0U ug/L 50.0U ug/L 5.0U ug/L
SA29-0.5B	Tin Antimony	3.7 mg/Kg 1.5 mg/Kg	10.2U mg/Kg 2.0U mg/Kg
SA29-10B	Boron Tin Antimony	8.7 mg/Kg 4.4 mg/Kg 1.1 mg/Kg	10.2U mg/Kg 10.2U mg/Kg 2.0U mg/Kg
SA29-25B	Tin Antimony	4.1 mg/Kg 1.1 mg/Kg	9.7U mg/Kg 1.9U mg/Kg
SA29-40B	Tin Antimony	4.3 mg/Kg 1.1 mg/Kg	10.7U mg/Kg 2.1U mg/Kg
SA120-0.5B	Tin Antimony	4.2 mg/Kg 1.4 mg/Kg	10.4U mg/Kg 2.1U mg/Kg
SA120-10B	Tin Antimony	4.2 mg/Kg 1.3 mg/Kg	9.7U mg/Kg 1.9U mg/Kg
SA120-25B	Tin Antimony	3.7 mg/Kg 1.3 mg/Kg	9.6U mg/Kg 1.9U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA120-43B	Tin Antimony	4.1 mg/Kg 1.1 mg/Kg	10.0U mg/Kg 2.0U mg/Kg
SA209-0.5B	Boron Tin Antimony	8.9 mg/Kg 3.8 mg/Kg 1.6 mg/Kg	10.4U mg/Kg 10.4U mg/Kg 2.1U mg/Kg
SA209-10B	Boron Tin Antimony	8.0 mg/Kg 4.0 mg/Kg 1.6 mg/Kg	10.3U mg/Kg 10.3U mg/Kg 2.1U mg/Kg
SA209009-10B	Boron Tin Antimony	8.2 mg/Kg 4.1 mg/Kg 1.7 mg/Kg	10.0U mg/Kg 10.0U mg/Kg 2.0U mg/Kg
SA209-25B	Tin Antimony	3.8 mg/Kg 1.6 mg/Kg	9.9U mg/Kg 2.0U mg/Kg
SA209-35B	Tin Antimony	5.0 mg/Kg 1.6 mg/Kg	11.1U mg/Kg 2.2U mg/Kg
SA212-0.5B	Boron Tin Antimony	5.9 mg/Kg 3.7 mg/Kg 1.1 mg/Kg	9.8U mg/Kg 9.8U mg/Kg 2.0U mg/Kg
SA212-13B	Boron Tin Antimony	7.4 mg/Kg 4.3 mg/Kg 1.3 mg/Kg	10.8U mg/Kg 10.8U mg/Kg 2.2U mg/Kg
SA212009-13B	Boron Tin Antimony	7.0 mg/Kg 4.2 mg/Kg 1.8 mg/Kg	10.9U mg/Kg 10.9U mg/Kg 2.2U mg/Kg
SA212-30B	Tin Antimony	4.8 mg/Kg 1.3 mg/Kg	11.3U mg/Kg 2.3U mg/Kg
SA212-44B	Tin Antimony	4.0 mg/Kg 1.6 mg/Kg	9.4U mg/Kg 1.9U mg/Kg

Samples EB092809-SO1A4 and EB092809-SO2A4 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
EB092809-SO1A4	9/28/09	Aluminum Barium Boron Calcium Chromium Iron Lead Magnesium Manganese Potassium Sodium Strontium Titanium Zinc	20.9 ug/L 0.8 ug/L 3.4 ug/L 172 ug/L 0.7 ug/L 72.7 ug/L 0.051 ug/L 41.7 ug/L 12.6 ug/L 73 ug/L 61.6 ug/L 1.3 ug/L 1.9 ug/L 2.3 ug/L	All soil samples in SDG R0905524
EB092809-SO2A4	9/28/09	Aluminum Barium Boron Calcium Iron Lead Magnesium Manganese Molybdenum Sodium Strontium Tin Titanium Zinc	10.7 ug/L 0.8 ug/L 4.0 ug/L 190 ug/L 58.7 ug/L 0.045 ug/L 33.3 ug/L 4.7 ug/L 0.8 ug/L 61.4 ug/L 1.6 ug/L 2.0 ug/L 1.0 ug/L 1.4 ug/L	All soil samples in SDG R0905524

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA29-0.5B	Tin	3.7 mg/Kg	10.2U mg/Kg
SA29-10B	Boron Tin	8.7 mg/Kg 4.4 mg/Kg	10.2U mg/Kg 10.2U mg/Kg
SA29-25B	Tin	4.1 mg/Kg	9.7U mg/Kg
SA29-40B	Tin	4.3 mg/Kg	10.7U mg/Kg
SA120-0.5B	Tin	4.2 mg/Kg	10.4U mg/Kg
SA120-10B	Tin	4.2 mg/Kg	9.7U mg/Kg
SA120-25B	Tin	3.7 mg/Kg	9.6U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA120-43B	Tin	4.1 mg/Kg	10.0U mg/Kg
SA209-0.5B	Boron Tin	8.9 mg/Kg 3.8 mg/Kg	10.4U mg/Kg 10.4U mg/Kg
SA209-10B	Boron Tin	8.0 mg/Kg 4.0 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA209009-10B	Boron Tin	8.2 mg/Kg 4.1 mg/Kg	10.0U mg/Kg 10.0U mg/Kg
SA209-25B	Tin	3.8 mg/Kg	9.9U mg/Kg
SA209-35B	Tin	5.0 mg/Kg	11.1U mg/Kg
SA212-0.5B	Boron Tin	5.9 mg/Kg 3.7 mg/Kg	9.8U mg/Kg 9.8U mg/Kg
SA212-13B	Boron Tin	7.4 mg/Kg 4.3 mg/Kg	10.8U mg/Kg 10.8U mg/Kg
SA212009-13B	Boron Tin	7.0 mg/Kg 4.2 mg/Kg	10.9U mg/Kg 10.9U mg/Kg
SA212-30B	Tin	4.8 mg/Kg	11.3U mg/Kg
SA212-44B	Tin	4.0 mg/Kg	9.4U mg/Kg

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All soil samples in SDG R0905524

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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA29-0.5BMS (All soil samples in SDG R0905524)	Antimony Lead Selenium Tungsten	43.3 (75-125) 73.1 (75-125) 73.7 (75-125) 69.3 (75-125)	J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA29-0.5BDUP (All soil samples in SDG R0905524)	Barium Lead Sodium	24.3 (≤20) 111.9 (≤20) 20.7 (≤20)	- - -	J (all detects) UJ (all non-detects)	A

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

Raw data were not reviewed for this SDG.

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 R0905524	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples SA209-10B and SA209009-10B and samples SA212-13B and SA212009-13B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Aluminum	7550	7980	6 (≤50)	-	-	-
Antimony	1.6	1.7	-	0.1 (≤2.1)	-	-
Arsenic	3.65	2.67	31 (≤50)	-	-	-
Barium	171	165	4 (≤50)	-	-	-
Beryllium	0.585	0.422	32 (≤50)	-	-	-
Boron	8	8.2	-	0.2 (≤10.3)	-	-
Cadmium	0.14	0.16	-	0.02 (≤0.10)	-	-
Calcium	33800	23200	37 (≤50)	-	-	-
Chromium	11.5	8.66	28 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Cobalt	7.2	7.5	-	0.3 (≤2.1)	-	-
Copper	19.5	18	8 (≤50)	-	-	-
Iron	13500	14000	4 (≤50)	-	-	-
Lead	8	7.8	-	0.2 (≤2.1)	-	-
Magnesium	9190	9840	7 (≤50)	-	-	-
Manganese	363	318	13 (≤50)	-	-	-
Mercury	0.013	0.011	-	0.002 (≤0.016)	-	-
Molybdenum	0.6	0.68	-	0.08 (≤0.31)	-	-
Nickel	15.2	15.5	2 (≤50)	-	-	-
Platinum	0.015	0.01	-	0.005 (≤0.098)	-	-
Potassium	1710	1810	6 (≤50)	-	-	-
Sodium	771	846	9 (≤50)	-	-	-
Strontium	211	210	0 (≤50)	-	-	-
Thallium	0.089	0.072	-	0.017 (≤0.020)	-	-
Tin	4	4.1	-	0.1 (≤10.3)	-	-
Titanium	636	676	6 (≤50)	-	-	-
Tungsten	0.23	0.17	-	0.06 (≤0.098)	-	-
Uranium	1.77	1.2	38 (≤50)	-	-	-
Vanadium	38.8	40.2	4 (≤50)	-	-	-
Zinc	31.4	34.1	8 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Aluminum	8560	8200	4 (≤50)	-	-	-
Antimony	1.3	1.8	-	0.5 (≤2.2)	-	-
Arsenic	2.58	2.9	12 (≤50)	-	-	-
Barium	190	192	1 (≤50)	-	-	-
Beryllium	0.471	0.514	9 (≤50)	-	-	-
Boron	7.4	7	-	0.4 (≤10.9)	-	-
Cadmium	0.13	0.13	-	0 (≤0.11)	-	-
Calcium	22500	20700	8 (≤50)	-	-	-
Chromium	7.09	8.24	15 (≤50)	-	-	-
Cobalt	7.4	7.8	-	0.4 (≤2.2)	-	-
Copper	17.3	18	4 (≤50)	-	-	-
Iron	14600	14600	0 (≤50)	-	-	-
Lead	9.1	10.5	-	1.4 (≤2.2)	-	-
Magnesium	8440	8270	2 (≤50)	-	-	-
Manganese	412	462	11 (≤50)	-	-	-
Mercury	0.015	0.018	-	0.003 (≤0.015)	-	-
Molybdenum	0.41	0.24	-	0.17 (≤0.33)	-	-
Nickel	17.7	16.6	6 (≤50)	-	-	-
Platinum	0.009	0.011	-	0.002 (≤0.11)	-	-
Potassium	2200	2090	5 (≤50)	-	-	-
Sodium	1150	1220	6 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Strontium	173	169	-	4 (≤43.5)	-	-
Thallium	0.091	0.114	22 (≤50)	-	-	-
Tin	4.3	4.2	-	0.1 (≤10.9)	-	-
Titanium	684	618	10 (≤50)	-	-	-
Tungsten	0.72	0.74	-	0.02 (≤0.11)	-	-
Uranium	0.996	1.14	13 (≤50)	-	-	-
Vanadium	40.2	38.7	4 (≤50)	-	-	-
Zinc	34	34.2	1 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Antimony Lead Selenium Tungsten	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Barium Lead Sodium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905524	EB092809-SO1A4 EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	EB092809-SO1A4	Boron Chromium Aluminum Barium	50.0U ug/L 5.0U ug/L 50.0U ug/L 5.0U ug/L	A	bl
R0905524	EB092809-SO2A4	Boron Manganese Molybdenum Strontium Aluminum Barium	50.0U ug/L 5.0U ug/L 2.0U ug/L 10.0U ug/L 50.0U ug/L 5.0U ug/L	A	bl
R0905524	SA29-0.5B	Tin Antimony	10.2U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA29-10B	Boron Tin Antimony	10.2U mg/Kg 10.2U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA29-25B	Tin Antimony	9.7U mg/Kg 1.9U mg/Kg	A	bl
R0905524	SA29-40B	Tin Antimony	10.7U mg/Kg 2.1U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA120-0.5B	Tin Antimony	10.4U mg/Kg 2.1U mg/Kg	A	bl
R0905524	SA120-10B	Tin Antimony	9.7U mg/Kg 1.9U mg/Kg	A	bl
R0905524	SA120-25B	Tin Antimony	9.6U mg/Kg 1.9U mg/Kg	A	bl
R0905524	SA120-43B	Tin Antimony	10.0U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA209-0.5B	Boron Tin Antimony	10.4U mg/Kg 10.4U mg/Kg 2.1U mg/Kg	A	bl
R0905524	SA209-10B	Boron Tin Antimony	10.3U mg/Kg 10.3U mg/Kg 2.1U mg/Kg	A	bl
R0905524	SA209009-10B	Boron Tin Antimony	10.0U mg/Kg 10.0U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA209-25B	Tin Antimony	9.9U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA209-35B	Tin Antimony	11.1U mg/Kg 2.2U mg/Kg	A	bl
R0905524	SA212-0.5B	Boron Tin Antimony	9.8U mg/Kg 9.8U mg/Kg 2.0U mg/Kg	A	bl
R0905524	SA212-13B	Boron Tin Antimony	10.8U mg/Kg 10.8U mg/Kg 2.2U mg/Kg	A	bl
R0905524	SA212009-13B	Boron Tin Antimony	10.9U mg/Kg 10.9U mg/Kg 2.2U mg/Kg	A	bl
R0905524	SA212-30B	Tin Antimony	11.3U mg/Kg 2.3U mg/Kg	A	bl
R0905524	SA212-44B	Tin Antimony	9.4U mg/Kg 1.9U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA29-0.5B	Tin	10.2U mg/Kg	A	be
R0905524	SA29-10B	Boron Tin	10.2U mg/Kg 10.2U mg/Kg	A	be
R0905524	SA29-25B	Tin	9.7U mg/Kg	A	be
R0905524	SA29-40B	Tin	10.7U mg/Kg	A	be
R0905524	SA120-0.5B	Tin	10.4U mg/Kg	A	be
R0905524	SA120-10B	Tin	9.7U mg/Kg	A	be
R0905524	SA120-25B	Tin	9.6U mg/Kg	A	be
R0905524	SA120-43B	Tin	10.0U mg/Kg	A	be
R0905524	SA209-0.5B	Boron Tin	10.4U mg/Kg 10.4U mg/Kg	A	be
R0905524	SA209-10B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	be
R0905524	SA209009-10B	Boron Tin	10.0U mg/Kg 10.0U mg/Kg	A	be
R0905524	SA209-25B	Tin	9.9U mg/Kg	A	be
R0905524	SA209-35B	Tin	11.1U mg/Kg	A	be
R0905524	SA212-0.5B	Boron Tin	9.8U mg/Kg 9.8U mg/Kg	A	be
R0905524	SA212-13B	Boron Tin	10.8U mg/Kg 10.8U mg/Kg	A	be
R0905524	SA212009-13B	Boron Tin	10.9U mg/Kg 10.9U mg/Kg	A	be
R0905524	SA212-30B	Tin	11.3U mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA212-44B	Tin	9.4U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D4
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12-18-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 9/28/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(12,13), (17,18)
XV	Field Blanks	SW	EB=1, 2, FB=FB080309-SO (SDG# R0904279)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: soil/water

1	EB092809-SO1A4 W	11	SA209-0.5B S	21	EB092809-SO1A4MS W	31	PBS
2	EB092809-SO2A4	12	SA209-10B	22	EB092809-SO1A4DUP	32	PBW
3	SA29-0.5B S	13	SA209009-10B	23	SA29-0.5BMS S	33	
4	SA29-10B	14	SA209-25B	24	SA29-0.5BDUP	34	
5	SA29-25B	15	SA209-35B	25	SA29-40BMS	35	
6	SA29-40B	16	SA212-0.5B	26	SA29-40BDUP	36	
7	SA120-0.5B	17	SA212-13B	27		37	
8	SA120-10B	18	SA212009-13B	28		38	
9	SA120-25B	19	SA212-30B	29		39	
10	SA120-43B	20	SA212-44B	30		40	

Notes: _____

LDC #: 22109D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: [handwritten initials]
2nd reviewer: [handwritten initials]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1,2	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
3-20	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 21,		Al, Sb, ~~As~~, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
22		Al, Sb, ~~As~~, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
23		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
24		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
25		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
26		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S/W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109D4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: NA
Associated Samples: All Water

Reviewer: [illegible]
2nd Reviewer: [illegible]

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	2								
B		2.4			3.4 / 50.0	4.0 / 50.0								
Ca			9.1											
Cr		0.7			0.7 / 5.0									
Mg			2.2											
Mn			0.5			4.7 / 5.0								
Mo			0.7			0.8 / 2.0								
Sr			0.1			1.6 / 10.0								
Tl			0.008											
W			0.08											
U			0.005											

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1									
Al			1.8		20.9 / 50.0									
Ba			0.8		0.8 / 5.0									
B			2.5		See PB									

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2									
Al			2.1		10.7 / 50.0									
Ba			1.3		0.8 / 5.0									
B			2.0		See PB									

LDC #: 22109D4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 200x x 5xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: All Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B		2.0			8.7 / 10.2							8.9 / ~~2.1~~ p4	8.0 / 10.3	8.2 / 10.0			5.9 / 9.8	7.4 / 10.8	7.0 / 10.9		
Cr	0.09																				
Fe	0.8																				
Mn	0.02	0.10																			
Sn	3.3			3.7 / 10.2	4.4 / 10.2	4.1 / 9.7	4.3 / 10.7	4.2 / 10.4	4.2 / 9.7	3.7 / 9.6	4.1 / 10.0	3.8 / 10.4	4.0 / 10.3	4.1 / 10.0	3.8 / 9.9	5.0 / 11.1	3.7 / 9.8	4.3 / 10.8	4.2 / 10.9	4.8 / 11.3	4.0 / 9.4
Zn	0.4																				

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 8-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	8	9	10	11	12	13	14	15	16	17	18	19	20
Sb		4.0		1.3 / 1.9	1.3 / 1.9	1.1 / 2.0	1.6 / 2.1	1.6 / 2.1	1.7 / 2.0	1.6 / 2.0	1.6 / 2.2	1.1 / 2.0	1.3 / 2.2	1.8 / 2.2	1.3 / 2.3	1.6 / 1.9
Ni		0.50														
Sr		0.10														
Ti		0.3														

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3-7

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers	3	4	5	6	7					
Sb		3.0			1.5 / 2.0	1.1 / 2.0	1.1 / 1.9	1.1 / 2.1	1.4 / 2.1					

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 18-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Ba		1.00												
Fe		6.0												

LDC #: 22109D4
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: 200x x 5xdil
Associated Samples: 8-17

Reviewer: CC
2nd Reviewer: W

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Ba		0.70												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 19, 20

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Tl		0.008												
W		0.070												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3-8

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
W		0.067												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 9-18

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
W		0.047												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A Were field blanks identified in this SDG?
(Y) N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/28/09 Soil factor applied 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: All Soil

Analyte	Blank ID	Blank ID	Sample Identification																	
	1	2	Action Level	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Al	20.9	10.7																			
Ba	0.8	0.8																			
B	3.4	4.0			8.7 / 10.2							8.9 / ~~2.1~~ 10.4	8.0 / 10.3	8.2 / 10.0			5.9 / 9.8	7.4 / 10.8	7.0 / 10.9		
Ca	172	190	380																		
Cr	0.7																				
Fe	72.7	58.7	145.4																		
Pb	0.051	0.045	0.102																		
Mg	41.7	33.3	83.4																		
Mn	12.6	4.7	25.2																		
Mo		0.8																			
K	73																				
Na	61.6	61.4																			
Sr	1.3	1.6																			
Sn		2.0		3.7 / 10.2	4.4 / 10.2	4.1 / 9.7	4.3 / 10.7	4.2 / 10.4	4.2 / 9.7	3.7 / 9.6	4.1 / 10.0	3.8 / 10.4	4.0 / 10.3	4.1 / 10.0	3.8 / 9.9	5.0 / 11.1	3.7 / 9.8	4.3 / 10.8	4.2 / 10.9	4.8 / 11.3	4.0 / 9.4
Ti	1.9	1.0																			
Zn	2.3	1.4																			

LDC #: 22109D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 200x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification										
	FB080309-SO (SDG# R0904279)	Action Level	No Qualifiers									
Al	18.6											
Ba	0.8											
Ca	113	113										
Fe	136	136										
Pb	0.042	0.042										
Mg	33.6	33.6										
Mn	7.5	7.5										
Na	66.0											
Sr	1.0											
Ti	1.5											
W	0.04											
Zn	0.8											

LDC #: 22109p4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Sb	43.3	All Soil	J- (UJ/A-(m)
			Pb	73.1	↓	↓
			Se	73.7		
			W	69.3	↓	↓

Comments: _____

MS.4S2

LDC #: 22109D4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: VR
2nd Reviewer: W

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	24	Soil	Ba	24.3 (≤20)		All Soil	J / UJ / A (ld)
			Pb	111.9		↓	↓
			Na	20.7			
				↓			

Comments:

DUP.4S2

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 12	Concentration (mg/Kg) 13	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	7550	7980	6			
Antimony	1.6	1.7		0.1	(≤2.1)	
Arsenic	3.65	2.67	31			
Barium	171	165	4			
Beryllium	0.585	0.422	32			
Boron	8.0	8.2		0.2	(≤10.3)	
Cadmium	0.14	0.16		0.02	(≤0.10)	
Calcium	33800	23200	37			
Chromium	11.5	8.66	28			
Cobalt	7.2	7.5		0.3	(≤2.1)	
Copper	19.5	18.0	8			
Iron	13500	14000	4			
Lead	8.0	7.8		0.2	(≤2.1)	
Magnesium	9190	9840	7			
Manganese	363	318	13			
Mercury	0.013	0.011		0.002	(≤0.016)	
Molybdenum	0.60	0.68		0.08	(≤0.31)	
Nickel	15.2	15.5	2			
Platinum	0.015	0.010		0.005	(≤0.098)	

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 12	Concentration (mg/Kg) 13	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	1710	1810	6			
Sodium	771	846	9			
Strontium	211	210	0			
Thallium	0.089	0.072		0.017	(≤0.020)	
Tin	4.0	4.1		0.1	(≤10.3)	
Titanium	636	676	6			
Tungsten	0.23	0.17		0.06	(≤0.098)	
Uranium	1.77	1.20	38			
Vanadium	38.8	40.2	4			
Zinc	31.4	34.1	8			

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
	17	18	RPD	Difference	Limits	(Parent Only)
Aluminum	8560	8200	4			
Antimony	1.3	1.8		0.5	(≤2.2)	
Arsenic	2.58	2.90	12			
Barium	190	192	1			
Beryllium	0.471	0.514	9			
Boron	7.4	7.0		0.4	(≤10.9)	
Cadmium	0.13	0.13		0	(≤0.11)	
Calcium	22500	20700	8			
Chromium	7.09	8.24	15			
Cobalt	7.4	7.8		0.4	(≤2.2)	
Copper	17.3	18.0	4			
Iron	14600	14600	0			
Lead	9.1	10.5		1.4	(≤2.2)	
Magnesium	8440	8270	2			
Manganese	412	462	11			
Mercury	0.015	0.018		0.003	(≤0.015)	
Molybdenum	0.41	0.24		0.17	(≤0.33)	
Nickel	17.7	16.6	6			
Platinum	0.009	0.011		0.002	(≤0.11)	

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 17	Concentration (mg/Kg) 18	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	2200	2090	5			
Sodium	1150	1220	6			
Strontium	173	169		4	(≤43.5)	
Thallium	0.091	0.114	22			
Tin	4.3	4.2		0.1	(≤10.9)	
Titanium	684	618	10			
Tungsten	0.72	0.74		0.02	(≤0.11)	
Uranium	0.996	1.14	13			
Vanadium	40.2	38.7	4			
Zinc	34.0	34.2	1			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 21, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

EB092909-SO1A4
EB092909-SO2A4
SA213-0.5B
SA213-14B
SA213-30B
SA213-44B
SA110-0.5B
SA110-10B
SA110-25B
SA110-37B
SA110009-37B
SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B
SA193-0.5B
SA193-10B
SA193009-10B
SA193-25B
SA193-42B
SA193-2.5B
SA213-0.5BMS
SA213-0.5BDUP
SA213-14BMS
SA213-14BDUP

Introduction

This data review covers 24 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Boron Antimony Cobalt Lead Manganese Sodium Strontium Thallium Tungsten Uranium	5.5 ug/L 0.050 ug/L 0.5 ug/L 0.007 ug/L 0.2 ug/L 149 ug/L 0.1 ug/L 0.007 ug/L 0.08 ug/L 0.004 ug/L	All water samples in SDG R0905539
ICB/CCB	Copper	0.8 ug/L	EB092909-SO1A4
ICB/CCB	Barium	0.4 ug/L	EB092909-SO2A4
PB (prep blank)	Boron Chromium Magnesium Manganese Tin	0.6 mg/Kg 0.11 mg/Kg 0.6 mg/Kg 0.02 mg/Kg 3.7 mg/Kg	All soil samples in SDG R0905539
ICB/CCB	Boron Molybdenum	2.0 ug/L 0.70 ug/L	All soil samples in SDG R0905539

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Barium Manganese Nickel Strontium	1.00 ug/L 0.50 ug/L 0.40 ug/L 0.10 ug/L	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B
ICB/CCB	Barium Manganese	0.30 ug/L 0.10 ug/L	SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B
ICB/CCB	Magnesium	2.0 ug/L	SA213-0.5B
ICB/CCB	Beryllium	0.009 ug/L	SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-2.5B
ICB/CCB	Platinum Thallium Tungsten Uranium	0.013 ug/L 0.015 ug/L 0.057 ug/L 0.015 ug/L	SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B
ICB/CCB	Thallium	0.009 ug/L	SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B
ICB/CCB	Thallium	0.008 ug/L	SA213-0.5B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Tungsten	0.070 ug/L	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092909-SO1A4	Boron Strontium Tungsten Uranium	8.4 ug/L 2.7 ug/L 0.06 ug/L 0.007 ug/L	50.0U ug/L 10.0U ug/L 0.10U ug/L 0.020U ug/L
EB092909-SO2A4	Boron Sodium Strontium Tungsten Uranium Barium	2.9 ug/L 295 ug/L 1.9 ug/L 0.04 ug/L 0.005 ug/L 0.02 ug/L	50.0U ug/L 300U ug/L 10.0U ug/L 0.10U ug/L 0.020U ug/L 0.05U ug/L
SA213-0.5B	Boron Tin	7.4 mg/Kg 4.0 mg/Kg	10.1U mg/Kg 10.1U mg/Kg
SA213-14B	Boron Tin	9.6 mg/Kg 4.0 mg/Kg	9.9U mg/Kg 9.9U mg/Kg
SA213-30B	Tin	4.3 mg/Kg	11.6U mg/Kg
SA213-44B	Tin	4.9 mg/Kg	11.4U mg/Kg
SA110-10B	Boron Tin	9.3 mg/Kg 4.3 mg/Kg	10.7U mg/Kg 10.7U mg/Kg
SA110-25B	Tin	4.8 mg/Kg	11.3U mg/Kg
SA110-37B	Tin	4.6 mg/Kg	10.8U mg/Kg
SA110009-37B	Tin	4.9 mg/Kg	10.3U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA191-0.5B	Tin	3.8 mg/Kg	10.1U mg/Kg
SA191-10B	Boron Tin	8.3 mg/Kg 3.8 mg/Kg	10.3U mg/Kg 10.3U mg/Kg
SA191-25B	Tin Platinum	4.2 mg/Kg 0.009 mg/Kg	10.0U mg/Kg 0.10U mg/Kg
SA191-40B	Tin Platinum	4.1 mg/Kg 0.010 mg/Kg	10.1U mg/Kg 0.10U mg/Kg
SA191009-40B	Tin Platinum	4.4 mg/Kg 0.012 mg/Kg	10.4U mg/Kg 0.10U mg/Kg
SA193-0.5B	Boron Tin Platinum	7.8 mg/Kg 3.3 mg/Kg 0.009 mg/Kg	9.4U mg/Kg 9.4U mg/Kg 0.095U mg/Kg
SA193-10B	Boron Tin Platinum	9.4 mg/Kg 4.1 mg/Kg 0.008 mg/Kg	10.3U mg/Kg 10.3U mg/Kg 0.10U mg/Kg
SA193009-10B	Boron Tin Platinum	10.1 mg/Kg 4.0 mg/Kg 0.009 mg/Kg	10.2U mg/Kg 10.2U mg/Kg 0.10U mg/Kg
SA193-25B	Tin Platinum	3.9 mg/Kg 0.010 mg/Kg	10.2U mg/Kg 0.10U mg/Kg
SA193-42B	Tin Platinum	4.6 mg/Kg 0.011 mg/Kg	10.9U mg/Kg 0.11U mg/Kg
SA193-2.5B	Boron Tin Platinum	6.8 mg/Kg 5.4 mg/Kg 0.009 mg/Kg	10.5U mg/Kg 10.5U mg/Kg 0.10U mg/Kg

Samples EB092909-SO1A4 and EB092909-SO2A4 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
EB092909-SO1A4	9/29/09	Aluminum Barium Boron Calcium Iron Lead Magnesium Manganese Nickel Sodium Strontium Tungsten Uranium Zinc	10.9 ug/L 1.9 ug/L 8.4 ug/L 382 ug/L 110 ug/L 0.232 ug/L 49.3 ug/L 12.0 ug/L 1.3 ug/L 411 ug/L 2.7 ug/L 0.06 ug/L 0.007 ug/L 5.7 ug/L	All soil samples in SDG R0905539
EB092909-SO2A4	9/29/09	Aluminum Barium Boron Calcium Iron Lead Magnesium Manganese Nickel Sodium Strontium Tungsten Uranium Zinc	10.2 ug/L 0.7 ug/L 2.9 ug/L 343 ug/L 33.1 ug/L 0.316 ug/L 47.7 ug/L 9.4 ug/L 0.7 ug/L 295 ug/L 1.9 ug/L 0.04 ug/L 0.005 ug/L 16.9 ug/L	All soil samples in SDG R0905539

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA213-0.5B	Boron	7.4 mg/Kg	10.0U mg/Kg
SA213-14B	Boron	9.6 mg/Kg	9.9U mg/Kg
SA110-10B	Boron	9.3 mg/Kg	10.7U mg/Kg
SA191-10B	Boron	8.3 mg/Kg	10.3U mg/Kg
SA193-0.5B	Boron	7.8 mg/Kg	9.4U mg/Kg
SA193-10B	Boron	9.4 mg/Kg	10.3U mg/Kg
SA193009-10B	Boron	10.1 mg/Kg	10.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA193-2.5B	Boron	6.8 mg/Kg	10.5U mg/Kg

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All soil samples in SDG R0905539

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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA213-0.5BMS (All soil samples in SDG R0905539)	Antimony Selenium Tungsten	38.4 (75-125) 74.7 (75-125) 69.0 (75-125)	J- (all detects) UJ (all non-detects)	A
SA213-0.5BMS (All soil samples in SDG R0905539)	Manganese	157.9 (75-125)	J+ (all detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results 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. Internal Standards

Raw data were not reviewed for this SDG.

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 with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA213-0.5BL	Beryllium	22 (≤10)	All soil samples in SDG R0905539	J (all detects) UJ (all non-detects)	A

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 R0905539	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples SA110-37B and SA110009-37B, samples SA191-40B and SA191009-40B, and samples SA193-10B and SA193009-10B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA110-37B	SA110009-37B				
Aluminum	19400	18800	3 (≤50)	-	-	-
Antimony	0.5U	1.5	-	1 (≤2.2)	-	-
Arsenic	21.3	25.2	17 (≤50)	-	-	-
Barium	228	349	42 (≤50)	-	-	-
Beryllium	0.552	0.634	14 (≤50)	-	-	-
Boron	31.5	29.5	-	2 (≤10.8)	-	-
Cadmium	0.11	0.17	-	0.06 (≤0.11)	-	-
Calcium	21600	34500	46 (≤50)	-	-	-
Chromium	26.8	28.2	5 (≤50)	-	-	-
Cobalt	8.3	7	-	1.3 (≤2.2)	-	-
Copper	20.6	18.9	9 (≤50)	-	-	-
Iron	17700	16400	8 (≤50)	-	-	-
Lead	14.5	13.2	-	1.3 (≤2.1)	-	-
Magnesium	44900	43800	2 (≤50)	-	-	-
Manganese	466	397	16 (≤50)	-	-	-
Mercury	0.014	0.027	-	0.013 (≤0.018)	-	-
Molybdenum	0.98	0.97	-	0.01 (≤0.33)	-	-
Nickel	17.3	15.9	8 (≤50)	-	-	-
Platinum	0.016	0.016	-	0 (≤0.11)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA110-37B	SA110009-37B				
Potassium	4370	4140	5 (≤50)	-	-	-
Sodium	1350	1260	7 (≤50)	-	-	-
Strontium	167	161	-	6 (≤43.4)	-	-
Thallium	0.188	0.231	21 (≤50)	-	-	-
Tin	4.6	4.9	-	0.3 (≤10.8)	-	-
Titanium	810	755	7 (≤50)	-	-	-
Tungsten	0.41	0.46	-	0.05 (≤0.11)	-	-
Uranium	6.73	7.94	16 (≤50)	-	-	-
Vanadium	58.3	58.3	0 (≤50)	-	-	-
Zinc	51.7	48.3	7 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Aluminum	10800	10400	4 (≤50)	-	-	-
Antimony	1.1	1.5	-	0.4 (≤2.1)	-	-
Arsenic	8.99	9.87	9 (≤50)	-	-	-
Barium	91.6	87.9	4 (≤50)	-	-	-
Beryllium	0.358	0.397	10 (≤50)	-	-	-
Boron	16.7	16.3	-	0.4 (≤10.4)	-	-
Cadmium	0.04U	0.04	-	0 (≤0.10)	-	-
Calcium	35400	35500	0 (≤50)	-	-	-
Chromium	12.5	14.3	13 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Cobalt	4.2	4.6	-	0.4 (≤2.1)	-	-
Copper	13.1	13.3	2 (≤50)	-	-	-
Iron	11100	11600	4 (≤50)	-	-	-
Lead	6	7.1	-	1.1 (≤2.1)	-	-
Magnesium	20300	19800	2 (≤50)	-	-	-
Manganese	197	212	7 (≤50)	-	-	-
Mercury	0.005	0.005	-	0 (≤0.019)	-	-
Molybdenum	0.62	0.56	-	0.06 (≤0.31)	-	-
Nickel	10.2	13.1	25 (≤50)	-	-	-
Platinum	0.01	0.012	-	0.002 (≤0.10)	-	-
Potassium	2910	2780	5 (≤50)	-	-	-
Sodium	1180	1220	3 (≤50)	-	-	-
Strontium	192	168	-	24 (≤41.4)	-	-
Thallium	0.132	0.14	6 (≤50)	-	-	-
Tin	4.1	4.4	-	0.3 (≤10.4)	-	-
Titanium	592	597	1 (≤50)	-	-	-
Tungsten	0.15	0.16	-	0.01 (≤0.10)	-	-
Uranium	1.67	1.88	12 (≤50)	-	-	-
Vanadium	33.5	35.8	7 (≤50)	-	-	-
Zinc	28.4	29.2	3 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
Aluminum	8450	8590	2 (≤50)	-	-	-
Antimony	0.7	1.4	-	0.7 (≤2.1)	-	-
Arsenic	2.29	2.52	10 (≤50)	-	-	-
Barium	179	175	2 (≤50)	-	-	-
Beryllium	0.411	0.441	7 (≤50)	-	-	-
Boron	9.4	10.1	-	0.7 (≤10.3)	-	-
Cadmium	0.14	0.04U	-	0.1 (≤0.10)	-	-
Calcium	44100	14700	100 (≤50)	-	J (all detects)	A
Chromium	7.1	8.15	14 (≤50)	-	-	-
Cobalt	6.4	6.8	-	0.4 (≤2.1)	-	-
Copper	16.7	17.3	4 (≤50)	-	-	-
Iron	12500	14100	12 (≤50)	-	-	-
Lead	9.3	8.9	-	0.4 (≤2.1)	-	-
Magnesium	8890	8310	7 (≤50)	-	-	-
Manganese	316	307	3 (≤50)	-	-	-
Mercury	0.018	0.01	-	0.008 (≤0.018)	-	-
Molybdenum	0.51	0.51	-	0 (≤0.31)	-	-
Nickel	13.7	14.5	6 (≤50)	-	-	-
Platinum	0.008	0.009	-	0.001 (≤0.10)	-	-
Potassium	2450	2480	1 (≤50)	-	-	-
Sodium	667	638	4 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
Strontium	249	194	25 (≤50)	-	-	-
Thallium	0.079	0.086	-	0.007 (≤0.020)	-	-
Tin	4.1	4	-	0.1 (≤10.3)	-	-
Titanium	547	664	19 (≤50)	-	-	-
Tungsten	0.15	0.14	-	0.01 (≤0.11)	-	-
Uranium	0.79	0.84	6 (≤50)	-	-	-
Vanadium	35.3	38.3	8 (≤50)	-	-	-
Zinc	33.3	31.8	5 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905539	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Antimony Selenium Tungsten	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905539	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Manganese	J+ (all detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905539	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Beryllium	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R0905539	SA193-10B SA193009-10B	Calcium	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	EB092909-SO1A4	Boron Strontium Tungsten Uranium	50.0U ug/L 10.0U ug/L 0.10U ug/L 0.020U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	EB092909-SO2A4	Boron Sodium Strontium Tungsten Uranium Barium	50.0U ug/L 300U ug/L 10.0U ug/L 0.10U ug/L 0.020U ug/L 0.05U ug/L	A	bl
R0905539	SA213-0.5B	Boron Tin	10.1U mg/Kg 10.1U mg/Kg	A	bl
R0905539	SA213-14B	Boron Tin	9.9U mg/Kg 9.9U mg/Kg	A	bl
R0905539	SA213-30B	Tin	11.6U mg/Kg	A	bl
R0905539	SA213-44B	Tin	11.4U mg/Kg	A	bl
R0905539	SA110-10B	Boron Tin	10.7U mg/Kg 10.7U mg/Kg	A	bl
R0905539	SA110-25B	Tin	11.3U mg/Kg	A	bl
R0905539	SA110-37B	Tin	10.8U mg/Kg	A	bl
R0905539	SA110009-37B	Tin	10.3U mg/Kg	A	bl
R0905539	SA191-0.5B	Tin	10.1U mg/Kg	A	bl
R0905539	SA191-10B	Boron Tin	10.3U mg/Kg 10.3U mg/Kg	A	bl
R0905539	SA191-25B	Tin Platinum	10.0U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA191-40B	Tin Platinum	10.1U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA191009-40B	Tin Platinum	10.4U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA193-0.5B	Boron Tin Platinum	9.4U mg/Kg 9.4U mg/Kg 0.095U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA193-10B	Boron Tin Platinum	10.3U mg/Kg 10.3U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA193009-10B	Boron Tin Platinum	10.2U mg/Kg 10.2U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA193-25B	Tin Platinum	10.2U mg/Kg 0.10U mg/Kg	A	bl
R0905539	SA193-42B	Tin Platinum	10.9U mg/Kg 0.11U mg/Kg	A	bl
R0905539	SA193-2.5B	Boron Tin Platinum	10.5U mg/Kg 10.5U mg/Kg 0.10U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA213-0.5B	Boron	10.0U mg/Kg	A	be
R0905539	SA213-14B	Boron	9.9U mg/Kg	A	be
R0905539	SA110-10B	Boron	10.7U mg/Kg	A	be
R0905539	SA191-10B	Boron	10.3U mg/Kg	A	be
R0905539	SA193-0.5B	Boron	9.4U mg/Kg	A	be
R0905539	SA193-10B	Boron	10.3U mg/Kg	A	be
R0905539	SA193009-10B	Boron	10.2U mg/Kg	A	be
R0905539	SA193-2.5B	Boron	10.5U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E4
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12-21-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 9/29/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(10,11), (15,16), (18,19)
XV	Field Blanks	SW	EB=1,2 FB= FB080309-SO (SDG# R0904279)

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: all soil except 1,2=water

1	EB092909-SO1A4	11	SA110009-37B	21	SA193-42B	31	PBW
2	EB092909-SO2A4	12	SA191-0.5B	22	SA193-2.5B	32	PBS
3	SA213-0.5B	13	SA191-10B	23	SA213-0.5BMS	33	
4	SA213-14B	14	SA191-25B	24	SA213-0.5BDUP	34	
5	SA213-30B	15	SA191-40B	25	SA213-14BMS	35	
6	SA213-44B	16	SA191009-40B	26	SA213-14BDUP	36	
7	SA110-0.5B	17	SA193-0.5B	27		37	
8	SA110-10B	18	SA193-10B	28		38	
9	SA110-25B	19	SA193009-10B	29		39	
10	SA110-37B	20	SA193-25B	30		40	

Notes: _____

LDC #: 22109E4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer:
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1, 2	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
3-22	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 23		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
24		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
25		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
26		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S/W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	S/W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109E4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Soil preparation factor applied: NA
Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	2								
B			5.5		8.4 / 50.0	2.9 / 50.0								
Sb			0.050											
Co			0.5											
Pb			0.007											
Mn			0.2											
Na			149			295 / 300								
Sr			0.1		2.7 / 10.0	1.9 / 10.0								
Tl			0.007											
W			0.08		0.06 / 0.10	0.04 / 0.10								
U			0.004		0.007 / 0.020	0.005 / 0.020								

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	No Qualifiers									
Cu			0.8											

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2									
Ba			0.4		0.02 / 0.05									

LDC #: 22109E4
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 x 2xdil
Associated Samples: All Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
B	0.6	2.0		7.4 / 10.1	9.6 / 9.9			9.3 / 10.7					8.3 / 10.3				7.8 / 9.4	9.4 / 10.3	10.1 / 10.2			6.8 / 10.5
Cr	0.11																					
Mo		0.70																				
Mg	0.6																					
Mn	0.02																					
Sn	3.7			4.0 / 10.1	4.0 / 9.9	4.3 / 11.6	4.9 / 11.4	4.3 / 10.7	4.8 / 11.3	4.6 / 10.8	4.9 / 10.3	3.8 / 10.1	3.8 / 10.3	4.2 / 10.0	4.1 / 10.1	4.4 / 10.4	3.3 / 9.4	4.1 / 10.3	4.0 / 10.2	3.9 / 10.2	4.6 / 10.9	5.4 / 10.5
Zn																						

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3-12

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Ba		1.00												
Mn		0.50												
Ni		0.40												
Sr		0.10												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 13-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Ba		0.30												
Mn		0.10												

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 2xdil
Associated Samples: 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Mg		2.0												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15-20, 22

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Be		0.009												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 14-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	14	15	16	17	18	19	20	21	22	
Pt		0.013		0.009 / 0.10	0.010 / 0.10	0.012 / 0.10	0.009 / 0.095	0.008 / 0.10	0.009 / 0.10	0.010 / 0.10	0.011 / 0.11	0.009 / 0.10	
Tl		0.015											
W		0.057											
U		0.015											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-13

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Tl		0.009												

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
Tl		0.008												

LDC #: 22109E4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 2xdil

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 3-13

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers										
W		0.070												

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109E4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg
Sampling date: 9/28/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Soil

Analyte	Blank ID	Blank ID	Sample Identification												
	1	2	Action Level	3	4	8	13	17	18	19	22				
Al	10.9	10.2													
Ba	1.9	0.7													
B	8.4	2.9		7.4 / 10.1	9.6 / 9.9	9.3 / 10.7	8.3 / 10.3	7.8 / 9.4	9.4 / 10.3	10.1 / 10.2	6.8 / 10.5				
Ca	382	343	382												
Fe	110	33.1	110												
Pb	0.232	0.316	0.316												
Mg	49.3	47.7	49.3												
Mn	12.0	9.4													
Ni	1.3	0.7													
Na	411	295													
Sr	2.7	1.9													
W	0.06	0.04													
U	0.007	0.005													
Zn	5.7	16.9	16.9												

LDC #: 22109E4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification											
	FB080309-SO (SDG# R0904279)	Action Level	No Qualifiers										
Al	18.6												
Ba	0.8												
Ca	113	113											
Fe	136	136											
Pb	0.042	0.042											
Mg	33.6	33.6											
Mn	7.5	7.5											
Na	66.0												
Sr	1.0												
Ti	1.5												
W	0.04												
Zn	0.8												

LDC #: 22109E4
SDG #: Seecover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CS
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Sb	38.4	All Soil	J- (UJ/A (m)
			Se	74.7		
			W	69.0		
			Mn	157.9		J+ det/A

Comments: _____

LDC #: 22109E4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	3	Soil	Be	22	All Soil	J (UJ/A (sd)
			CR Co	14.6		

Comments: [illegible]

LDC 22109E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 10	Concentration (mg/Kg) 11	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	19400	18800	3			
Antimony	0.5U	1.5		1	(≤2.2)	
Arsenic	21.3	25.2	17			
Barium	228	349	42			
Beryllium	0.552	0.634	14			
Boron	31.5	29.5		2	(≤10.8)	
Cadmium	0.11	0.17		0.06	(≤0.11)	
Calcium	21600	34500	46			
Chromium	26.8	28.2	5			
Cobalt	8.3	7.0		1.3	(≤2.2)	
Copper	20.6	18.9	9			
Iron	17700	16400	8			
Lead	14.5	13.2		1.3	(≤2.1)	
Magnesium	44900	43800	2			
Manganese	466	397	16			
Mercury	0.014	0.027		0.013	(≤0.018)	
Molybdenum	0.98	0.97		0.01	(≤0.33)	
Nickel	17.3	15.9	8			
Platinum	0.016	0.016		0	(≤0.11)	

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 10	Concentration (mg/Kg) 11	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	4370	4140	5			
Sodium	1350	1260	7			
Strontium	167	161		6	(≤43.4)	
Thallium	0.188	0.231	21			
Tin	4.6	4.9		0.3	(≤10.8)	
Titanium	810	755	7			
Tungsten	0.41	0.46		0.05	(≤0.11)	
Uranium	6.73	7.94	16			
Vanadium	58.3	58.3	0			
Zinc	51.7	48.3	7			

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	15	16				
Aluminum	10800	10400	4			
Antimony	1.1	1.5		0.4	(≤2.1)	
Arsenic	8.99	9.87	9			
Barium	91.6	87.9	4			
Beryllium	0.358	0.397	10			
Boron	16.7	16.3		0.4	(≤10.4)	
Cadmium	0.04U	0.04		0	(≤0.10)	
Calcium	35400	35500	0			
Chromium	12.5	14.3	13			
Cobalt	4.2	4.6		0.4	(≤2.1)	
Copper	13.1	13.3	2			
Iron	11100	11600	4			
Lead	6.0	7.1		1.1	(≤2.1)	
Magnesium	20300	19800	2			
Manganese	197	212	7			
Mercury	0.005	0.005		0	(≤0.019)	
Molybdenum	0.62	0.56		0.06	(≤0.31)	
Nickel	10.2	13.1	25			
Platinum	0.010	0.012		0.002	(≤0.10)	

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	15	16				
Potassium	2910	2780	5			
Sodium	1180	1220	3			
Strontium	192	168		24	(≤41.4)	
Thallium	0.132	0.140	6			
Tin	4.1	4.4		0.3	(≤10.4)	
Titanium	592	597	1			
Tungsten	0.15	0.16		0.01	(≤0.10)	
Uranium	1.67	1.88	12			
Vanadium	33.5	35.8	7			
Zinc	28.4	29.2	3			

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	18	19				
Aluminum	8450	8590	2			
Antimony	0.7	1.4		0.7	(≤2.1)	
Arsenic	2.29	2.52	10			
Barium	179	175	2			
Beryllium	0.411	0.441	7			
Boron	9.4	10.1		0.7	(≤10.3)	
Cadmium	0.14	0.04U		0.1	(≤0.10)	
Calcium	44100	14700	100			Jdet/A (fd)
Chromium	7.10	8.15	14			
Cobalt	6.4	6.8		0.4	(≤2.1)	
Copper	16.7	17.3	4			
Iron	12500	14100	12			
Lead	9.3	8.9		0.4	(≤2.1)	
Magnesium	8890	8310	7			
Manganese	316	307	3			
Mercury	0.018	0.010		0.008	(≤0.018)	
Molybdenum	0.51	0.51		0	(≤0.31)	
Nickel	13.7	14.5	6			
Platinum	0.008	0.009		0.001	(≤0.10)	

LDC 22109D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CP
2nd Reviewer: LW

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50)	(mg/Kg)	(mg/Kg)	Qualifications
	18	19	RPD	Difference	Limits	(Parent Only)
Potassium	2450	2480	1			
Sodium	667	638	4			
Strontium	249	194	25			
Thallium	0.079	0.086		0.007	(≤0.020)	
Tin	4.1	4.0		0.1	(≤10.3)	
Titanium	547	664	19			
Tungsten	0.15	0.14		0.01	(≤0.11)	
Uranium	0.790	0.840	6			
Vanadium	35.3	38.3	8			
Zinc	33.3	31.8	5			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

EB093009-SO1A4	EB093009-SO1A4MS
RSAQ3-0.5B	EB093009-SO1A4DUP
RSAQ3009-0.5B	RSAQ3-0.5BMS
RSAQ3-10B	RSAQ3-0.5BDUP
RSAQ3-25B	SA190-38BMS
RSAQ3-41B	SA190-38BDUP
SA190-0.5B	
SA190-10B	
SA190-25B	
SA190-38B	
RSAR4-0.5B	
RSAR4-10B	
RSAR4009-10B	
RSAR4-25B	
RSAR4-37B	
RSAR3-0.5B	
RSAR3-10B	
RSAR3-25B	
RSAR3-35B	
RSAR3-38B	

Introduction

This data review covers 23 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum	3.8 ug/L	All water samples in SDG R0905567
ICB/CCB	Barium Boron Chromium Strontium	0.5 ug/L 2.5 ug/L 0.8 ug/L 0.10 ug/L	All water samples in SDG R0905567
PB (prep blank)	Aluminum Antimony Boron Chromium Magnesium Manganese Sodium Tin Tungsten	0.9 mg/Kg 0.5 mg/Kg 0.4 mg/Kg 0.10 mg/Kg 0.5 mg/Kg 0.04 mg/Kg 17 mg/Kg 3.8 mg/Kg 0.014 mg/Kg	All soil samples in SDG R0905567
ICB/CCB	Aluminum Molybdenum Strontium	3.0 ug/L 0.70 ug/L 0.10 ug/L	All soil samples in SDG R0905567

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Barium Manganese Sodium	4.0 ug/L 0.30 ug/L 0.40 ug/L 90.0 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B
ICB/CCB	Antimony Barium Magnesium	3.0 ug/L 1.00 ug/L 2.0 ug/L	SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Aluminum Boron Manganese Sodium Tin	3.0 ug/L 9.0 ug/L 0.20 ug/L 70.0 ug/L 5.0 ug/L	SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B
ICB/CCB	Manganese	0.10 ug/L	RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Boron	6.0 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Platinum Thallium Tungsten Uranium	0.028 ug/L 0.031 ug/L 0.078 ug/L 0.029 ug/L	RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Platinum Thallium Tungsten Uranium	0.018 ug/L 0.019 ug/L 0.074 ug/L 0.019 ug/L	RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B
ICB/CCB	Beryllium Platinum Thallium Tungsten Uranium	0.013 ug/L 0.016 ug/L 0.017 ug/L 0.063 ug/L 0.014 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B
ICB/CCB	Beryllium	0.015 ug/L	RSAQ3-25B SA190-0.5B SA190-10B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B
ICB/CCB	Beryllium	0.031 ug/L	RSAR3-0.5B RSAR3-10B
ICB/CCB	Beryllium	0.009 ug/L	RSAQ3-41B SA190-25B SA190-38B RSAR4-37B RSAR3-25B RSAR3-35B RSAR3-38B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB093009-SO1A4	Aluminum Barium Boron Strontium	7.8 ug/L 0.6 ug/L 2.2 ug/L 1.3 ug/L	50.0U ug/L 5.0U ug/L 50.0U ug/L 10.0U ug/L
RSAQ3-0.5B	Antimony Tin Platinum	1.3 mg/Kg 5.3 mg/Kg 0.018 mg/Kg	2.1U mg/Kg 10.8U mg/Kg 0.11U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ3009-0.5B	Antimony Tin Platinum	1.8 mg/Kg 6.7 mg/Kg 0.030 mg/Kg	2.1U mg/Kg 10.4U mg/Kg 0.11U mg/Kg
RSAQ3-10B	Antimony Boron Tin Platinum	1.4 mg/Kg 10.0 mg/Kg 4.3 mg/Kg 0.009 mg/Kg	2.1U mg/Kg 10.4U mg/Kg 10.4U mg/Kg 0.11U mg/Kg
RSAQ3-25B	Antimony Tin Platinum	2.2 mg/Kg 4.4 mg/Kg 0.010 mg/Kg	2.2U mg/Kg 10.9U mg/Kg 0.11U mg/Kg
RSAQ3-41B	Antimony Tin Platinum	1.3 mg/Kg 4.9 mg/Kg 0.010 mg/Kg	2.5U mg/Kg 12.7U mg/Kg 0.11U mg/Kg
SA190-0.5B	Antimony Tin Platinum	1.7 mg/Kg 7.8 mg/Kg 0.019 mg/Kg	2.1U mg/Kg 10.3U mg/Kg 0.10U mg/Kg
SA190-10B	Antimony Tin Platinum	1.2 mg/Kg 4.5 mg/Kg 0.008 mg/Kg	2.1U mg/Kg 10.7U mg/Kg 0.10U mg/Kg
SA190-25B	Tin Platinum	5.4 mg/Kg 0.014 mg/Kg	11.3U mg/Kg 0.11U mg/Kg
SA190-38B	Antimony Tin Platinum	2.0 mg/Kg 5.0 mg/Kg 0.009 mg/Kg	2.2U mg/Kg 10.8U mg/Kg 0.11U mg/Kg
RSAR4-0.5B	Antimony Tin Tungsten Platinum	1.6 mg/Kg 4.7 mg/Kg 0.099 mg/Kg 0.008 mg/Kg	2.1U mg/Kg 10.7U mg/Kg 0.10U mg/Kg 0.10U mg/Kg
RSAR4-10B	Antimony Boron Tin Platinum	0.9 mg/Kg 10.3 mg/Kg 4.4 mg/Kg 0.009 mg/Kg	2.1U mg/Kg 10.3U mg/Kg 10.3U mg/Kg 0.11U mg/Kg
RSAR4009-10B	Tin Platinum	4.3 mg/Kg 0.009 mg/Kg	10.2U mg/Kg 0.10U mg/Kg
RSAR4-25B	Antimony Tin Platinum	0.6 mg/Kg 4.4 mg/Kg 0.006 mg/Kg	2.2U mg/Kg 10.8U mg/Kg 0.11U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR4-37B	Antimony Tin Platinum	1.8 mg/Kg 4.5 mg/Kg 0.010 mg/Kg	2.1U mg/Kg 10.3U mg/Kg 0.10U mg/Kg
RSAR3-0.5B	Antimony Boron Tin Platinum	1.3 mg/Kg 7.7 mg/Kg 4.3 mg/Kg 0.006 mg/Kg	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg
RSAR3-10B	Antimony Boron Tin Platinum	1.5 mg/Kg 10.5 mg/Kg 4.6 mg/Kg 0.007 mg/Kg	2.2U mg/Kg 10.7U mg/Kg 10.7U mg/Kg 0.10U mg/Kg
RSAR3-25B	Antimony Tin Platinum	1.9 mg/Kg 4.7 mg/Kg 0.013 mg/Kg	2.2U mg/Kg 11.0U mg/Kg 0.11U mg/Kg
RSAR3-35B	Antimony Tin Platinum	1.9 mg/Kg 4.7 mg/Kg 0.011 mg/Kg	2.2U mg/Kg 11.1U mg/Kg 0.11U mg/Kg
RSAR3-38B	Antimony Tin Platinum	1.6 mg/Kg 4.8 mg/Kg 0.010 mg/Kg	2.2U mg/Kg 11.2U mg/Kg 0.11U mg/Kg

Sample EB093009-SO1A4 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
EB093009-SO1A4	9/30/09	Aluminum Barium Boron Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Uranium Zinc	7.8 ug/L 0.6 ug/L 2.2 ug/L 271 ug/L 24.5 ug/L 0.095 ug/L 27.8 ug/L 3.9 ug/L 86.5 ug/L 1.3 ug/L 0.8 ug/L 0.004 ug/L 7.8 ug/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ3-10B	Boron	10.0 mg/Kg	10.4U mg/Kg
RSAR4-10B	Boron	10.3 mg/Kg	10.3U mg/Kg

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All soil samples in SDG R0905567

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR4-0.5B	Tungsten	0.099 mg/Kg	0.10U mg/Kg

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) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
RSAQ3-0.5BMS (All soil samples in SDG R0905567)	Antimony Lead	42.6 (75-125) 49.6 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
RSAQ3-0.5BDUP (All soil samples in SDG R0905567)	Arsenic Lead Thallium Titanium	21.0 (≤20) 20.7 (≤20) 39.7 (≤20) 27.1 (≤20)	- - - -	J (all detects) UJ (all non-detects)	A

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

Raw data were not reviewed for this SDG.

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 with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
RSAQ3-0.5BL	Aluminum Titanium	10.2 (≤10) 10.5 (≤10)	All soil samples in SDG R0905567	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A

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 R0905567	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B and samples RSAR4-10B and RSAR4009-10B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
Aluminum	8660	6750	25 (≤50)	-	-	-
Antimony	1.3	1.8	-	0.5 (≤2.1)	-	-
Arsenic	7.53	10.1	29 (≤50)	-	-	-
Barium	262	282	7 (≤50)	-	-	-
Beryllium	0.432	0.328	27 (≤50)	-	-	-
Boron	15.8	18.1	-	2.3 (≤10.5)	-	-
Cadmium	0.48	0.52	-	0.04 (≤0.10)	-	-
Calcium	42300	66400	44 (≤50)	-	-	-
Chromium	14.5	16.3	12 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
Cobalt	7.8	6.9	-	0.9 (≤2.1)	-	-
Copper	68.7	74.6	8 (≤50)	-	-	-
Iron	17000	16100	5 (≤50)	-	-	-
Lead	160	150	6 (≤50)	-	-	-
Magnesium	20700	23500	13 (≤50)	-	-	-
Manganese	982	1200	20 (≤50)	-	-	-
Mercury	0.086	0.128	-	0.042 (≤0.018)	J (all detects)	A
Molybdenum	1.28	1.91	39 (≤50)	-	-	-
Nickel	18.4	18.5	1 (≤50)	-	-	-
Platinum	0.018	0.03	-	0.012 (≤0.11)	-	-
Potassium	2610	2160	19 (≤50)	-	-	-
Sodium	1000	821	20 (≤50)	-	-	-
Strontium	157	172	-	15 (≤41.9)	-	-
Thallium	0.837	0.86	3 (≤50)	-	-	-
Tin	5.3	6.7	-	1.4 (≤10.5)	-	-
Titanium	753	586	25 (≤50)	-	-	-
Tungsten	1.16	1.39	18 (≤50)	-	-	-
Uranium	0.82	0.685	18 (≤50)	-	-	-
Vanadium	40.9	35.2	15 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
Zinc	71	124	54 (≤50)	-	J (all detects)	A

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Aluminum	7290	7680	5 (≤50)	-	-	-
Antimony	0.9	2.2	-	1.3 (≤2.1)	-	-
Arsenic	2.9	3.11	7 (≤50)	-	-	-
Barium	118	117	1 (≤50)	-	-	-
Beryllium	0.431	0.388	11 (≤50)	-	-	-
Boron	10.3	11.3	-	1 (≤10.3)	-	-
Cadmium	0.1	0.12	-	0.02 (≤0.10)	-	-
Calcium	25300	32800	26 (≤50)	-	-	-
Chromium	7.16	6.49	10 (≤50)	-	-	-
Cobalt	7.7	6.4	-	1.3 (≤2.1)	-	-
Copper	16.8	18.2	8 (≤50)	-	-	-
Iron	13400	13600	1 (≤50)	-	-	-
Lead	7.5	7.6	-	0.1 (≤2.1)	-	-
Magnesium	9500	9610	1 (≤50)	-	-	-
Manganese	344	310	10 (≤50)	-	-	-
Mercury	0.01	0.01	-	0 (≤0.019)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Molybdenum	0.33	0.51	-	0.18 (≤0.31)	-	-
Nickel	13.7	14.3	4 (≤50)	-	-	-
Platinum	0.009	0.009	-	0 (≤0.11)	-	-
Potassium	1400	1530	9 (≤50)	-	-	-
Sodium	618	628	2 (≤50)	-	-	-
Strontium	219	216	1 (≤50)	-	-	-
Thallium	0.079	0.081	-	0.002 (≤0.021)	-	-
Tin	4.4	4.3	-	0.1 (≤10.3)	-	-
Titanium	595	660	10 (≤50)	-	-	-
Tungsten	0.12	0.11	-	0.01 (≤0.11)	-	-
Uranium	1.76	1.63	8 (≤50)	-	-	-
Vanadium	38.1	37.7	1 (≤50)	-	-	-
Zinc	28.7	28.6	0 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	Antimony Lead	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	Arsenic Lead Thallium Titanium	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	Aluminum Titanium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0905567	EB093009-SO1A4 RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B	Mercury	J (all detects)	A	Field duplicates (Difference) (fd)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B	Zinc	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	EB093009-SO1A4	Aluminum Barium Boron Strontium	50.0U ug/L 5.0U ug/L 50.0U ug/L 10.0U ug/L	A	bl
R0905567	RSAQ3-0.5B	Antimony Tin Platinum	2.1U mg/Kg 10.8U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAQ3009-0.5B	Antimony Tin Platinum	2.1U mg/Kg 10.4U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAQ3-10B	Antimony Boron Tin Platinum	2.1U mg/Kg 10.4U mg/Kg 10.4U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAQ3-25B	Antimony Tin Platinum	2.2U mg/Kg 10.9U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAQ3-41B	Antimony Tin Platinum	2.5U mg/Kg 12.7U mg/Kg 0.11U mg/Kg	A	bl
R0905567	SA190-0.5B	Antimony Tin Platinum	2.1U mg/Kg 10.3U mg/Kg 0.10U mg/Kg	A	bl
R0905567	SA190-10B	Antimony Tin Platinum	2.1U mg/Kg 10.7U mg/Kg 0.10U mg/Kg	A	bl
R0905567	SA190-25B	Tin Platinum	11.3U mg/Kg 0.11U mg/Kg	A	bl
R0905567	SA190-38B	Antimony Tin Platinum	2.2U mg/Kg 10.8U mg/Kg 0.11U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAR4-0.5B	Antimony Tin Tungsten Platinum	2.1U mg/Kg 10.7U mg/Kg 0.10U mg/Kg 0.10U mg/Kg	A	bl
R0905567	RSAR4-10B	Antimony Boron Tin Platinum	2.1U mg/Kg 10.3U mg/Kg 10.3U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAR4009-10B	Tin Platinum	10.2U mg/Kg 0.10U mg/Kg	A	bl
R0905567	RSAR4-25B	Antimony Tin Platinum	2.2U mg/Kg 10.8U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAR4-37B	Antimony Tin Platinum	2.1U mg/Kg 10.3U mg/Kg 0.10U mg/Kg	A	bl
R0905567	RSAR3-0.5B	Antimony Boron Tin Platinum	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAR3-10B	Antimony Boron Tin Platinum	2.2U mg/Kg 10.7U mg/Kg 10.7U mg/Kg 0.10U mg/Kg	A	bl
R0905567	RSAR3-25B	Antimony Tin Platinum	2.2U mg/Kg 11.0U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAR3-35B	Antimony Tin Platinum	2.2U mg/Kg 11.1U mg/Kg 0.11U mg/Kg	A	bl
R0905567	RSAR3-38B	Antimony Tin Platinum	2.2U mg/Kg 11.2U mg/Kg 0.11U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-10B	Boron	10.4U mg/Kg	A	be
R0905567	RSAR4-10B	Boron	10.3U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAR4-0.5B	Tungsten	0.10U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F4
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12-3-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 9/30/09 - 10/1/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	Dup
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	SW	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3), (12, 13)
XV	Field Blanks	SW	EB=1, FB= FB080309-SO (SDG# R0904279)

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:
All soil except 1, 21, 22 = water

1	EB093009-SO1A4	11	RSAR4-0.5B	21	EB093009-SO1A4MS	31	PBW
2	RSAQ3-0.5B	12	RSAR4-10B	22	EB093009-SO1A4DUP	32	PBS
3	RSAQ3009-0.5B	13	RSAR4009-10B	23	RSAQ3-0.5BMS	33	
4	RSAQ3-10B	14	RSAR4-25B	24	RSAQ3-0.5BDUP	34	
5	RSAQ3-25B	15	RSAR4-37B	25	SA190-38BMS	35	
6	RSAQ3-41B	16	RSAR3-0.5B	26	SA190-38BDUP	36	
7	SA190-0.5B	17	RSAR3-10B	27		37	
8	SA190-10B	18	RSAR3-25B	28		38	
9	SA190-25B	19	RSAR3-35B	29		39	
10	SA190-38B	20	RSAR3-38B	30		40	

Notes: _____

LDC #: 22109F4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: QR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	S/W	[✓ Al, Sb] As [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K,] Se, [✓ Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
2-20		[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
QC:21,22		[✓ Al, Sb, ~~As~~, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn,] Hg, [✓ Ni, Pt, K, ~~Se~~, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
QC:23		[✓ Al, Sb, As, Ba, Be, B, Cd,] Ca, [✓ Cr, Co, Cu, Fe, Pb,] Mg, [✓ Mo, Mn,] Hg, [✓ Ni,] [✓ Pt,] K, [✓ Se, Ag,] Na, [✓ Sr, Tl, Sn, Ti, W, U, V, Zn]
24		[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn,] Hg, [✓ Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
25		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, [✓ Hg,] Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
26		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, [✓ Hg,] Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S/W	[✓ Al,] [✓ Sb, As,] [✓ Ba,] [✓ Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn,] Hg, [✓ Ni,] Pt, [✓ K, Se, Ag, Na, Sr,] Tl, [✓ Sn, Ti,] W, U, [✓ V, Zn]
ICP-MS		Al, [✓ Sb, As,] Ba, [✓ Be,] B, Cd, Ca, [✓ Cr,] Co, Cu, Fe, [✓ Pb,] Mg, Mo, Mn, Hg, Ni, [✓ Pt,] K, Se, Ag, Na, Sr, [✓ Tl,] Sn, Ti, [✓ W, U,] V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: [✓ Mercury by CVAA if performed]

LDC #: 22109F4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)
Sample Concentration units, unless otherwise noted: ug/L

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 5xdil
Associated Samples: All Water

Reason Code: bl

Reviewer: CR
2nd Reviewer:

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1									
Al		3.8			7.8 / 50.0									
Ba			0.5		0.6 / 5.0									
B			2.5		2.2 / 50.0									
Cr			0.8											
Sr			0.10		1.3 / 10.0									

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: All Soil

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Al	0.9	3.0																				
Sb	0.5			1.3 / 2.1	1.8 / 2.1	1.4 / 2.1	2.2 / 2.2	1.3 / 2.5	1.7 / 2.1	1.2 / 2.1		2.0 / 2.2	1.6 / 2.1	0.9 / 2.1		0.6 / 2.2	1.8 / 2.1	1.3 / 2.1	1.5 / 2.2	1.9 / 2.2	1.9 / 2.2	1.6 / 2.2
B	0.4					10.0 / 10.4								10.3 / 10.3				7.7 / 10.6	10.5 / 10.7			
Cr	0.10																					
Fe																						
Mg	0.5																					
Mn	0.04																					
Mo		0.70																				
Na	17																					
Sn	3.8			5.3 / 10.5	6.7 / 10.4	4.3 / 10.4	4.4 / 10.9	4.9 / 12.7	7.8 / 10.3	4.5 / 10.7	5.4 / 11.3	5.0 / 10.8	4.7 / 10.7	4.4 / 10.3	4.3 / 10.2	4.4 / 10.8	4.5 / 10.3	4.3 / 10.6	4.6 / 10.7	4.7 / 11.0	4.7 / 11.1	4.8 / 11.2
W	0.014												0.099 / 0.10									
Sr		0.10																				

LDC #: 22109F4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 5xdil

Reason Code: bl

Reviewer: CR
2nd Reviewer: LA

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-6

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4	5	6					
Sb			4.0		See PB	See PB	See PB	See PB	See PB					
Ba			0.30											
Mn			0.40											
Na			90.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	7	8	10	11	12	14	15	16	17	18	19	20
Sb			3.0		See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB
Ba			1.00													
Mg			2.0													

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 7-14

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	7	8	9	10	11	12	13	14		
Al			3.0											
~~Ba~~			~~0.60~~											
B			9.0							See PB				
Mn			0.20											
Na			70.0											
Sn			5.0		See PB	See PB	See PB	See PB	See PB	See PB	See PB	See PB		

LDC #: 22109F4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 5xdil

Reason Code: bl

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
~~Ba~~			1.00											
Mn			0.10											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-6, 15-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	4	16	17							
B			6.0		See PB	See PB	See PB							

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 15-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	15	16	17	18	19	20				
Pt			0.028		0.010 / 0.10	0.006 / 0.11	0.007 / 0.10	0.013 / 0.11	0.011 / 0.11	0.010 / 0.11				
Tl			0.031											
W			0.078											
U			0.029											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 5-14

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	5	6	7	8	9	10	11	12	13	14
Pt			0.018		0.010 / 0.11	0.010 / 0.11	0.019 / 0.10	0.008 / 0.10	0.014 / 0.11	0.009 / 0.11	0.008 / 0.10	0.009 / 0.11	0.009 / 0.10	0.006 / 0.11
Tl			0.019											
W			0.074								See PB			
U			0.019											

LDC #: 22109F4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x x 5xdil

Reason Code: bl

Reviewer: ar
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-4

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4							
Be			0.013											
Pt			0.016		0.018 / 0.11	0.030 / 0.11	0.009 / 0.11							
Tl			0.017											
W			0.063											
U			0.014											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 5, 7, 8, 11-14

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Be			0.015											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 16, 17

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Be			0.031											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6, 9, 10, 15, 18-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Be			0.009											

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109F4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)
Y N N/A 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: 9/30/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2-15

Analyte	Blank ID	Sample Identification										
	1	Action Level	4	12								
Al	7.8											
Ba	0.6											
B	2.2		10.0 / 10.4	10.3 / 10.3								
Ca	271	271										
Fe	24.5	24.5										
Pb	0.095	0.095										
Mg	27.8	27.8										
Mn	3.9											
Na	86.5											
Sr	1.3											
Ti	0.8											
U	0.004											
Zn	7.8											

LDC #: 22109F4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification											
	FB080309-SO (SDG# R0904279)	Action Level	11										
Al	18.6												
Ba	0.8												
Ca	113	113											
Fe	136	136											
Pb	0.042	0.042											
Mg	33.6	33.6											
Mn	7.5	7.5											
Na	66.0												
Sr	1.0												
Ti	1.5												
W	0.04		0.099 / 0.10										
Zn	0.8												

LDC #: 22109F4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Sb	42.6	All Soil	J-/UJ/A (m)
			Pb	49.6	↓	↓

Comments: _____

MS.4S2

LDC #: 22109F4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: CC
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L. for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	22124	Soil	As	21.0 (≤20)		All Soil	J/UJ/A (01)
			Pb	20.7		↓	↓
			Tl	39.7			
			Ti	27.1	↓		

Comments: _____

DUP.4S2

LDC #: 22109F4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) (≤10%?)
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	2	Soil	Al	10.2	All Soil	J (all) / A (sd)
			Ti	10.5	↓	↓

Comments: _____

LDC 22109F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA Method 6020/6010/7000)

(Y)N NA Were field duplicate pairs identified in this SDG?
Y/N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 2	Concentration (mg/Kg) 3	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	8660	6750	25			
Antimony	1.3	1.8		0.5	(≤2.1)	
Arsenic	7.53	10.1	29			
Barium	262	282	7			
Beryllium	0.432	0.328	27			
Boron	15.8	18.1		2.3	(≤10.5)	
Cadmium	0.48	0.52		0.04	(≤0.10)	
Calcium	42300	66400	44			
Chromium	14.5	16.3	12			
Cobalt	7.8	6.9		0.9	(≤2.1)	
Copper	68.7	74.6	8			
Iron	17000	16100	5			
Lead	160	150	6			
Magnesium	20700	23500	13			
Manganese	982	1200	20			
Mercury	0.086	0.128		0.042	(≤0.018)	Jdet/A (fd)
Molybdenum	1.28	1.91	39			
Nickel	18.4	18.5	1			
Platinum	0.018	0.030		0.012	(≤0.11)	

LDC#: 22109F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CP
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	2	3				
Potassium	2610	2160	19			
Sodium	1000	821	20			
Strontium	157	172		15	(≤41.9)	
Thallium	0.837	0.860	3			
Tin	5.3	6.7		1.4	(≤10.5)	
Titanium	753	586	25			
Tungsten	1.160	1.390	18			
Uranium	0.820	0.685	18			
Vanadium	40.9	35.2	15			
Zinc	71.0	124	54			Jdet/A (fd)

V:\FIELD DUPLICATES\FD_inorganic\22109F4.wpd

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	12	13				
Aluminum	7290	7680	5			
Antimony	0.9	2.2		1.3	(≤2.1)	
Arsenic	2.90	3.11	7			
Barium	118	117	1			
Beryllium	0.431	0.388	11			
Boron	10.3	11.3		1	(≤10.3)	

LDC#: 22109F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: VE
2nd Reviewer: VE

METHOD: Metals (EPA Method 6020/6010/7000)

(Y)N NA Were field duplicate pairs identified in this SDG?
(Y)N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 12	Concentration (mg/Kg) 13	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Cadmium	0.10	0.12		0.02	(≤0.10)	
Calcium	25300	32800	26			
Chromium	7.16	6.49	10			
Cobalt	7.7	6.4		1.3	(≤2.1)	
Copper	16.8	18.2	8			
Iron	13400	13600	1			
Lead	7.5	7.6		0.1	(≤2.1)	
Magnesium	9500	9610	1			
Manganese	344	310	10			
Mercury	0.010	0.010		0	(≤0.019)	
Molybdenum	0.33	0.51		0.18	(≤0.31)	
Nickel	13.7	14.3	4			
Platinum	0.009	0.009		0	(≤0.11)	
Potassium	1400	1530	9			
Sodium	618	628	2			
Strontium	219	216	1			
Thallium	0.079	0.081		0.002	(≤0.021)	
Tin	4.4	4.3		0.1	(≤10.3)	
Titanium	595	660	10			

LDC#: 22109F4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CP
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 12	Concentration (mg/Kg) 13	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Tungsten	0.12	0.11		0.01	(≤0.11)	
Uranium	1.76	1.63	8			
Vanadium	38.1	37.7	1			
Zinc	28.7	28.6	0			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 1, 2009

LDC Report Date: December 11, 2009

Matrix: Soil

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626/K0909568

Sample Identification

RSAR3-0.5B-SPLP2
RSAR3-0.5B-SPLP3
RSAR3-35B-SPLP2
RSAR3-35B-SPLP3
RSAQ4-10B-SPLP2
RSAQ4-10B-SPLP3
RSAQ4-32B-SPLP2
RSAQ4-32B-SPLP3
RSAR3-0.5B-SPLP2MS
RSAR3-0.5B-SPLP2DUP
RSAR3-0.5B-SPLP3MS
RSAR3-0.5B-SPLP3DUP
RSAR3-35B-SPLP2MS
RSAR3-35B-SPLP2DUP
RSAR3-35B-SPLP3MS
RSAR3-35B-SPLP3DUP

Introduction

This data review covers 16 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Barium Boron Strontium Zinc	0.071 mg/L 0.03 mg/L 0.0006 mg/L 0.044 mg/L	RSAR3-0.5B-SPLP2 RSAR3-35B-SPLP2 RSAQ4-10B-SPLP2 RSAQ4-32B-SPLP2
ICB/CCB	Barium	0.0003 mg/L	RSAR3-0.5B-SPLP2 RSAR3-35B-SPLP2 RSAQ4-10B-SPLP2 RSAQ4-32B-SPLP2
PB (prep blank)	Barium Strontium Zinc	0.033 mg/L 0.0008 mg/L 0.003 mg/L	RSAR3-0.5B-SPLP3 RSAR3-35B-SPLP3 RSAQ4-10B-SPLP3 RSAQ4-32B-SPLP3

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR3-0.5B-SPLP2	Barium Boron	0.098 mg/L 0.06 mg/L	0.098J+ mg/L 0.06J+ mg/L
RSAR3-35B-SPLP2	Barium Boron Zinc	0.217 mg/L 0.06 mg/L 0.004 mg/L	0.217J+ mg/L 0.06J+ mg/L 0.004J+ mg/L
RSAQ4-10B-SPLP2	Barium Boron Zinc	0.346 mg/L 0.05 mg/L 0.005 mg/L	0.346J+ mg/L 0.05J+ mg/L 0.005J+ mg/L
RSAQ4-32B-SPLP2	Barium Boron Zinc	0.179 mg/L 0.12 mg/L 0.004 mg/L	0.179J+ mg/L 0.12J+ mg/L 0.004J+ mg/L
RSAR3-0.5B-SPLP3	Barium Zinc	0.303 mg/L 0.004 mg/L	0.303J+ mg/L 0.004J+ mg/L
RSAR3-35B-SPLP3	Barium Zinc	0.205 mg/L 0.005 mg/L	0.205J+ mg/L 0.005J+ mg/L
RSAQ4-10B-SPLP3	Zinc	0.004 mg/L	0.004J+ mg/L
RSAQ4-32B-SPLP3	Barium Zinc	0.183 mg/L 0.003 mg/L	0.183J+ mg/L 0.003J+ mg/L

No field blanks were identified 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) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results 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. Internal Standards

Raw data were not reviewed for this SDG.

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.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626/K0909568	All analytes reported below the PQL.	J (all detects)	A

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, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905626/K0909568

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905626/ K0909568	RSAR3-0.5B-SPLP2 RSAR3-0.5B-SPLP3 RSAR3-35B-SPLP2 RSAR3-35B-SPLP3 RSAQ4-10B-SPLP2 RSAQ4-10B-SPLP3 RSAQ4-32B-SPLP2 RSAQ4-32B-SPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905626/K0909568

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905626/ K0909568	RSAR3-0.5B-SPLP2	Barium Boron	0.098J+ mg/L 0.06J+ mg/L	A	bl
R0905626/ K0909568	RSAR3-35B-SPLP2	Barium Boron Zinc	0.217J+ mg/L 0.06J+ mg/L 0.004J+ mg/L	A	bl
R0905626/ K0909568	RSAQ4-10B-SPLP2	Barium Boron Zinc	0.346J+ mg/L 0.05J+ mg/L 0.005J+ mg/L	A	bl
R0905626/ K0909568	RSAQ4-32B-SPLP2	Barium Boron Zinc	0.179J+ mg/L 0.12J+ mg/L 0.004J+ mg/L	A	bl
R0905626/ K0909568	RSAR3-0.5B-SPLP3	Barium Zinc	0.303J+ mg/L 0.004J+ mg/L	A	bl
R0905626/ K0909568	RSAR3-35B-SPLP3	Barium Zinc	0.205J+ mg/L 0.005J+ mg/L	A	bl
R0905626/ K0909568	RSAQ4-10B-SPLP3	Zinc	0.004J+ mg/L	A	bl
R0905626/ K0909568	RSAQ4-32B-SPLP3	Barium Zinc	0.183J+ mg/L 0.003J+ mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905626/K0909568

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 22109L4 (G) (S)
SDG #: ~~K0909568~~ R0905626 / K0909568 Stage ~~2B~~ 4
Laboratory: Columbia Analytical Services

Date: 12-4-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 10/1/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
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	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

Soil

1	RSAR3-0.5B-SPLP#2	11	RSAR3-0.5B-SPLP#3MS	21	PBW2	31	
2	RSAR3-0.5B-SPLP#3	12	RSAR3-0.5B-SPLP#3DUP	22	PBW3	32	
3	RSAR3-35B-SPLP#2	13	RSAR3-35B-SPLP#2MS	23		33	
4	RSAR3-35B-SPLP#3	14	RSAR3-35B-SPLP#2DUP	24		34	
5	RSAQ4-10B-SPLP#2	15	RSAR3-35B-SPLP#3MS	25		35	
6	RSAQ4-10B-SPLP#3	16	RSAR3-35B-SPLP#3DUP	26		36	
7	RSAQ4-32B-SPLP#2	17		27		37	
8	RSAQ4-32B-SPLP#3	18		28		38	
9	RSAR3-0.5B-SPLP#2MS	19		29		39	
10	RSAR3-0.5B-SPLP#2DUP	20		30		40	

Notes: _____

LDC #: 224064
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: CR
2nd Reviewer: VA

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution < 5%?	✓			
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995?	✓			
III. 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. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 220964
SDG #: 52ecaver

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
VI. 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?			✓	
VII. ICP Serial dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (ICP-MS) SW846 Method 6020				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓	✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 2210964
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: CR
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:9-12		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:13-16		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109G4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason: bl

Reviewer: CR
2nd Reviewer: [illegible]

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 1, 3, 5, 7

Analyte	Extraction PB[a] (mg/l)	Method PB[a] (mg/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	3	5	7						
Ba	0.071	0.003		0.71	0.098 J+	0.217 J+	0.346 J+	0.179 J+						
B	0.03			0.3	0.06 J+	0.06 J+	0.05 J+	0.12 J+						
Sr	0.0006			0.006										
Zn	0.044			0.44		0.004 J+	0.005 J+	0.004 J+						

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: 2, 4, 6, 8

Analyte	Extraction PB[a] (mg/l)	Method PB[a] (mg/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	4	6	8						
Ba	0.033			0.33	0.303 J+	0.205 J+		0.183 J+						
Sr	0.0008			0.008										
Zn	0.003			0.03	0.004 J+	0.005 J+	0.004 J+	0.003 J+						

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 224964
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: QR
2nd Reviewer: 1

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Al	1.00	1.00	100	100	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	0.0052	0.0050	104	104	Y
CCV2	ICP (Continuing calibration)	Ca	10.1	10.0	101	101	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	0.0050	0.0050	100	100	Y
ICV	ICP/MS (Initial calibration)	Sb	0.023	0.025	92	92	Y
CCV	ICP/MS (Continuing calibation)	U	0.025	0.025	100	100	Y

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 #: 22109G4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: GK
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:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units) (mg/L)	True / D / SDR (units) (mg/L)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ag	0.9882	1.00	99	99	Y
LCS	Laboratory control sample	U	0.02	0.02	100	100	↓
9	Matrix spike	Al	(SSR-SR) 1,862	2.00	93	93	↓
10	Duplicate	Na	4.98	4.88	2.0	2.0	↓
1	ICP serial dilution	K	22.7	23.275	2.5	2.5	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 220964
SDG #: 5e2ae2

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Sc were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

Raw Data: 0.1841 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
8	Ba	0.183	0.183	Y
	B	0.12	0.12	
	Ca	9.16	9.17	
	Mg	3.49	3.44	
	K	1.1	1.1	
	Na	21.8	21.8	
	Sc	0.184	0.184	
	V	0.019	0.019	
	Zn	0.003	0.003	✓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 2 through October 5, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905635

Sample Identification

EB100209-SO1A4
SA169-0.5B
SA169-10B
SA169-25B
SA169-42B
SA211-0.5B
SA211-11B
SA211-25B
SA211-43B
EB100509-SO1A4
SA111-1.5B
SA111-10B
SA111-25B
SA111-39B
SA214-0.5B
SA214-15B
SA214-30B
SA214-43B
RSAQ4-0.5B
RSAQ4-10B
RSAQ4-25B
RSAQ4-32B
SA169-0.5BMS
SA169-0.5BDUP
SA211-0.5BMS
SA211-0.5BDUP
SA111-25BMS
SA111-25BDUP

Introduction

This data review covers 26 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Boron Chromium Iron Magnesium Manganese Molybdenum Tin	0.5 mg/Kg 0.5 mg/Kg 0.07 mg/Kg 18.9 mg/Kg 0.3 mg/Kg 0.16 mg/Kg 0.18 mg/Kg 4.1 mg/Kg	All soil samples in SDG R0905635
ICB/CCB	Antimony Magnesium Manganese Strontium Thallium	3.0 ug/L 2.0 ug/L 0.20 ug/L 0.20 ug/L 0.009 ug/L	All soil samples in SDG R0905635

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Tungsten	0.054 ug/L	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B
ICB/CCB	Tungsten	0.052 ug/L	SA111-25B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B
ICB/CCB	Barium Iron	2.00 ug/L 4.0 ug/L	SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B
ICB/CCB	Barium	1.00 ug/L	SA169-0.5B SA169-10B SA169-25B SA169-42B
PB (prep blank)	Aluminum	3.8 ug/L	All water samples in SDG R0905635
ICB/CCB	Barium Boron Chromium Strontium Thallium	0.5 ug/L 2.5 ug/L 0.8 ug/L 0.1 ug/L 0.002 ug/L	All water samples in SDG R0905635

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA169-0.5B	Antimony Boron Tin	1.0 mg/Kg 10.4 mg/Kg 4.5 mg/Kg	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg
SA169-10B	Antimony Tin	1.9 mg/Kg 4.8 mg/Kg	2.1U mg/Kg 10.7U mg/Kg
SA169-25B	Antimony Tin	1.6 mg/Kg 5.0 mg/Kg	2.1U mg/Kg 10.7U mg/Kg
SA169-42B	Antimony Tin	1.2 mg/Kg 4.1 mg/Kg	2.0U mg/Kg 10.1U mg/Kg
SA211-0.5B	Antimony Boron Tin	1.5 mg/Kg 8.0 mg/Kg 4.2 mg/Kg	2.1U mg/Kg 10.5U mg/Kg 10.5U mg/Kg
SA211-11B	Antimony Boron Tin	0.9 mg/Kg 6.8 mg/Kg 4.2 mg/Kg	2.1U mg/Kg 10.5U mg/Kg 10.5U mg/Kg
SA211-25B	Antimony Tin	1.1 mg/Kg 4.5 mg/Kg	2.2U mg/Kg 11.1U mg/Kg
SA211-43B	Tin	4.6 mg/Kg	11.2U mg/Kg
SA111-1.5B	Antimony Tin	1.2 mg/Kg 4.4 mg/Kg	2.1U mg/Kg 10.7U mg/Kg
SA111-10B	Antimony Tin	0.6 mg/Kg 4.4 mg/Kg	2.1U mg/Kg 10.7U mg/Kg
SA111-25B	Antimony Tin Tungsten	0.9 mg/Kg 4.7 mg/Kg 0.22 mg/Kg	2.3U mg/Kg 11.6U mg/Kg 0.23U mg/Kg
SA111-39B	Antimony Tin	1.1 mg/Kg 4.3 mg/Kg	2.1U mg/Kg 10.3U mg/Kg
SA214-0.5B	Antimony Boron Tin	1.0 mg/Kg 7.8 mg/Kg 4.1 mg/Kg	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg
SA214-15B	Antimony Boron Tin	0.9 mg/Kg 8.8 mg/Kg 4.2 mg/Kg	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA214-30B	Antimony Boron Tin	0.7 mg/Kg 8.8 mg/Kg 4.4 mg/Kg	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg
SA214-43B	Antimony Tin	0.9 mg/Kg 4.8 mg/Kg	2.2U mg/Kg 10.8U mg/Kg
RSAQ4-0.5B	Antimony Tin	1.3 mg/Kg 4.4 mg/Kg	2.1U mg/Kg 10.3U mg/Kg
RSAQ4-10B	Antimony Boron Tin	0.9 mg/Kg 8.9 mg/Kg 4.6 mg/Kg	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg
RSAQ4-25B	Antimony Tin Tungsten	0.9 mg/Kg 4.1 mg/Kg 0.16 mg/Kg	1.9U mg/Kg 9.3U mg/Kg 0.19U mg/Kg
RSAQ4-32B	Antimony Tin	0.9 mg/Kg 5.2 mg/Kg	2.3U mg/Kg 11.4U mg/Kg
EB100209-SO1A4	Aluminum Barium Strontium	9.9 ug/L 0.4 ug/L 0.8 ug/L	50.0U ug/L 5.0U ug/L 10.0U ug/L
EB100509-SO1A4	Aluminum Barium Strontium	9.8 ug/L 0.5 ug/L 1.8 ug/L	50.0U ug/L 5.0U ug/L 10.0U ug/L

Samples EB100209-SO1A4 and EB100509-SO1A4 were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB100209-SO1A4	10/2/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	9.9 ug/L 0.4 ug/L 73 ug/L 21.5 ug/L 0.068 ug/L 16.8 ug/L 3.6 ug/L 46.8 ug/L 0.8 ug/L 0.9 ug/L 0.04 ug/L 0.7 ug/L	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB100509-SO1A4	10/5/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Potassium Sodium Strontium Titanium Tungsten Uranium Zinc	9.8 ug/L 0.5 ug/L 307 ug/L 36.5 ug/L 0.119 ug/L 47.5 ug/L 4.6 ug/L 99 ug/L 124 ug/L 1.8 ug/L 0.8 ug/L 0.01 ug/L 0.003 ug/L 7.7 ug/L	SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA111-25B	Tungsten	0.22 mg/Kg	0.23U mg/Kg
RSAQ4-25B	Tungsten	0.16 mg/Kg	0.19U mg/Kg

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All samples in SDG R0905635

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA111-25B	Tungsten	0.22 mg/Kg	0.23U mg/Kg
RSAQ4-25B	Tungsten	0.16 mg/Kg	0.19U mg/Kg

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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA169-0.5BMS (All soil samples in SDG R0905635)	Antimony Tungsten	58.6 (75-125) 70.8 (75-125)	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
SA169-0.5BMS (All soil samples in SDG R0905635)	Lead	-1.9 (75-125)	J- (all detects) R (all non-detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA169-0.5BDUP (All soil samples in SDG R0905635)	Lead Thallium Tungsten	95.5 (≤20) 45.2 (≤20) 75.8 (≤20)	- - -	J (all detects) UJ (all non-detects)	A

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 with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA169-0.5BL	Beryllium Copper Nickel	25 (≤10) 60.2 (≤10) 12.0 (≤10)	All soil samples in SDG R0905635	J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905635	All analytes reported below the PQL.	J (all detects)	A

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, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905635

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905635	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905635	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B	Lead	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905635	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B	Lead Thallium Tungsten	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0905635	SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B	Beryllium Copper Nickel	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905635	EB100209-SO1A4 SA169-0.5B SA169-10B SA169-25B SA169-42B SA211-0.5B SA211-11B SA211-25B SA211-43B EB100509-SO1A4 SA111-1.5B SA111-10B SA111-25B SA111-39B SA214-0.5B SA214-15B SA214-30B SA214-43B RSAQ4-0.5B RSAQ4-10B RSAQ4-25B RSAQ4-32B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905635

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905635	SA169-0.5B	Antimony Boron Tin	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA169-10B	Antimony Tin	2.1U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA169-25B	Antimony Tin	2.1U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA169-42B	Antimony Tin	2.0U mg/Kg 10.1U mg/Kg	A	bl
R0905635	SA211-0.5B	Antimony Boron Tin	2.1U mg/Kg 10.5U mg/Kg 10.5U mg/Kg	A	bl
R0905635	SA211-11B	Antimony Boron Tin	2.1U mg/Kg 10.5U mg/Kg 10.5U mg/Kg	A	bl
R0905635	SA211-25B	Antimony Tin	2.2U mg/Kg 11.1U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905635	SA211-43B	Tin	11.2U mg/Kg	A	bl
R0905635	SA111-1.5B	Antimony Tin	2.1U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA111-10B	Antimony Tin	2.1U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA111-25B	Antimony Tin Tungsten	2.3U mg/Kg 11.6U mg/Kg 0.23U mg/Kg	A	bl
R0905635	SA111-39B	Antimony Tin	2.1U mg/Kg 10.3U mg/Kg	A	bl
R0905635	SA214-0.5B	Antimony Boron Tin	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA214-15B	Antimony Boron Tin	2.1U mg/Kg 10.7U mg/Kg 10.7U mg/Kg	A	bl
R0905635	SA214-30B	Antimony Boron Tin	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg	A	bl
R0905635	SA214-43B	Antimony Tin	2.2U mg/Kg 10.8U mg/Kg	A	bl
R0905635	RSAQ4-0.5B	Antimony Tin	2.1U mg/Kg 10.3U mg/Kg	A	bl
R0905635	RSAQ4-10B	Antimony Boron Tin	2.1U mg/Kg 10.6U mg/Kg 10.6U mg/Kg	A	bl
R0905635	RSAQ4-25B	Antimony Tin Tungsten	1.9U mg/Kg 9.3U mg/Kg 0.19U mg/Kg	A	bl
R0905635	RSAQ4-32B	Antimony Tin	2.3U mg/Kg 11.4U mg/Kg	A	bl
R0905635	EB100209-SO1A4	Aluminum Barium Strontium	50.0U ug/L 5.0U ug/L 10.0U ug/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905635	EB100509-SO1A4	Aluminum Barium Strontium	50.0U ug/L 5.0U ug/L 10.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905635

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905635	SA111-25B	Tungsten	0.23U mg/Kg	A	be
R0905635	RSAQ4-25B	Tungsten	0.19U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905635

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905635	SA111-25B	Tungsten	0.23U mg/Kg	A	bf
R0905635	RSAQ4-25B	Tungsten	0.19U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B 4

LDC #: 22109H4
SDG #: R0905635
Laboratory: Columbia Analytical Services

Date: 12-4-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: V

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 10/2/09 - 10/5/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	SW	DUP
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	SW	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	EB = 1, 10. FB = FB080309-SO (CSOG # R0904279)

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: all soil except 1, 10 = water

1	EB100209-SO1A4	11	SA111-1.5B	21	RSAQ4-25B	31	PBW
2	SA169-0.5B	12	SA111-10B	22	RSAQ4-32B	32	PBS
3	SA169-10B	13	SA111-25B	23	SA169-0.5BMS	33	
4	SA169-25B	14	SA111-39B	24	SA169-0.5BDUP	34	
5	SA169-42B	15	SA214-0.5B	25	SA211-0.5BMS	35	
6	SA211-0.5B	16	SA214-15B	26	SA211-0.5BDUP	36	
7	SA211-11B	17	SA214-30B	27	SA111-25BMS	37	
8	SA211-25B	18	SA214-43B	28	SA111-25BDUP	38	
9	SA211-43B	19	RSAQ4-0.5B	29		39	
10	EB100509-SO1A4	20	RSAQ4-10B	30		40	

Notes: _____

LDC #: 22109H4
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution < 5%?	✓			
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
III. 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. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.		✓		
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 22109Hv
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VI. 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?			✓	
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		✓
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field Duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field Blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 22109A4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
2-9, 11-22	S	[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
1, 10	W	[✓ Al, Sb] As [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K] Se [✓ Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC: 23		[✓ Al, Sb, As, Ba, Be, B, Cd] Ca [✓ Cr, Co, Cu, Fe, Pb] Mg [✓ Mo, Mn] Hg [✓ Ni, Pt] K [✓ Se, Ag] Na [✓ Sr, Tl, Sn, Ti, W, U, V, Zn]
24		[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn] Hg [✓ Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
25-28		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn [✓ Hg] Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

		Analysis Method
ICP	S/W	[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn] Hg [✓ Ni] Pt [✓ K, Se, Ag, Na, Sr] Tl [✓ Sn, Ti] W, U [✓ V, Zn]
ICP-MS	↓	Al [✓ Sb] [✓ As] Ba [✓ Be] B, Cd, Ca [✓ Cr] Co, Cu, Fe [✓ Pb] Mg, Mo, Mn, Hg, Ni [✓ Pt] K, Se, Ag, Na, Sr [✓ Tl] Sn, Ti [✓ W, U] V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: [✓ Mercury by CVAA if performed]

LDC #: 22109H4
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 Soil

Reason: bl

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4	5	6	7	8	9	11	12	13
Al	0.5													
Sb		3.0		1.0 / 2.1	1.9 / 2.1	1.6 / 2.1	1.2 / 2.0	1.5 / 2.1	0.9 / 2.1	1.1 / 2.2		1.2 / 2.1	0.6 / 2.1	0.9 / 2.3
B	0.5			10.4 / 10.7				8.0 / 10.5	6.8 / 10.5					
Cr	0.07													
Fe	18.9		189											
Mg	0.3	2.0												
Mn	0.16	0.20												
Mo	0.18													
Sr		0.20												
Sn	4.1			4.5 / 10.7	4.8 / 10.7	5.0 / 10.7	4.1 / 10.1	4.2 / 10.5	4.2 / 10.5	4.5 / 11.1	4.6 / 11.2	4.4 / 10.7	4.4 / 10.7	4.7 / 11.6
Tl		0.009												

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	14	15	16	17	18	19	20	21	22		
Al	0.5													
Sb		3.0		1.1 / 2.1	1.0 / 2.1	0.9 / 2.1	0.7 / 2.1	0.9 / 2.2	1.3 / 2.1	0.9 / 2.1	0.9 / 1.9	0.9 / 2.3		
B	0.5				7.8 / 10.7	8.8 / 10.7	8.8 / 10.6			8.9 / 10.6				
Cr	0.07													
Fe	18.9		189											
Mg	0.3	2.0												
Mn	0.16	0.20												
Mo	0.18													
Sr		0.20												
Sn	4.1			4.3 / 10.3	4.1 / 10.7	4.2 / 10.7	4.4 / 10.6	4.8 / 10.8	4.4 / 10.3	4.6 / 10.6	4.1 / 9.3	5.2 / 11.4		
Tl		0.009												

LDC #: 22109H4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason: bl

Reviewer: CR
2nd Reviewer: VR

Soil preparation factor applied: 100x

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-9, 11, 12, 14-18

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
W			0.054											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 13, 19-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	13	21								
W			0.052		0.22 / 0.23	0.16 / 0.19								

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 6-9, 11-22

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			2.00											
Fe			4.0											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-5

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			1.00											

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	10								
Al		3.8			9.9 / 50.0	9.8 / 50.0								
Ba			0.5		0.4 / 5.0	0.5 / 5.0								
B			2.5											
Cr			0.8											
Sr			0.1		0.8 / 10.0	1.8 / 10.0								
Tl			0.002											

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109H4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A 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: 10/2/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2-9

Analyte	Blank ID	Sample Identification										
	1	Action Level	No Quals -									
Al	9.9											
Ba	0.4											
Ca	73	73										
Fe	21.5	21.5										
Pb	0.068	0.068										
Mg	16.8											
Mn	3.6											
Na	46.8											
Sr	0.8											
Ti	0.9											
W	0.04											
Zn	0.7											

LDC #: 22109H4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: W

METHOD: Trace Metals (EPA SW846 6010B/7000)

(Y) N N/A 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: 10/5/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11-22

Analyte	Blank ID	Sample Identification											
	10/14/10	Action Level	13	21									
Al	9.8												
Ba	0.5												
Ca	307	307											
Fe	36.5	36.5											
Pb	0.119	0.119											
Mg	47.5	47.5											
Mn	4.6												
K	99												
Na	124												
Sr	1.8												
Ti	0.8												
W	0.01		0.22 / 0.23	0.16 / 0.19									
U	0.003												
Zn	7.7												

LDC #: 22109H4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification										
	FB080309-SO (SDG# R0904279)	Action Level	13	21								
Al	18.6											
Ba	0.8											
Ca	113	113										
Fe	136	136										
Pb	0.042	0.042										
Mg	33.6	33.6										
Mn	7.5	7.5										
Na	66.0											
Sr	1.0											
Ti	1.5											
W	0.04		0.22 / 0.23	0.16 / 0.19								
Zn	0.8											

LDC #: 22109H4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y (N) N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Sb	58.6	All Soil	J-/UJ/A (m)
			Pb *	-1.9	↓	J-/R/A ↓
			W	70.8	↓	J-/UJ/A ↓

Comments: * No Post spike analyzed

LDC #: 22109H4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤ 35% for soil samples? If no, see qualifications below. A control limit of ±R.L. (±2X R.L for soil) was used for sample values that were <5X the R.L., including the case when only one of the duplicate sample values was <5X R.L.. If field blanks were used for laboratory duplicates, note in the Overall Assessment.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
	24	Soil	Pb	95.5 (≤20)		All Soil	J/UJ/A (dd)
			Ti	45.2		↓	↓
			W	75.8	↓		

Comments:

LDC #: 22109H4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Reviewer: CR
2nd Reviewer: 1

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the IDL, was an ICP serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	2	Soil	Be	25	All Soil	J UJ A (sd)
			Cu	60.2	↓	↓
			Ni	12.0		

Comments:

LDC #: 22609H4
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: QR
2nd Reviewer: LA

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Ba	5066	5000	101	101	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	5.14	5.00	103	103	Y
CCV4	ICP (Continuing calibration)	Ca	10280	10000	103	103	Y
	GFAA (Continuing calibration)						
CCV8	CVAA (Continuing calibration)	Hg	4.96	5.00	99	99	Y
ICV	ICP/MS (Initial calibration)	Cr	10.5	10.0	105	105	Y
CCV4	ICP/MS (Continuing calibation)	As	25.4	25.0	102	102	Y

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 #: 22109H4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: GR
2nd Reviewer: LC

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:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result). True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration, D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L), SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Zn	897	1000	90	90	Y
LCS	Laboratory control sample	Sb	85.2	105	81.1	81.1	
23	Matrix spike	Ag	(SSR-SR) 10.0	10.61	94.3	94.3	
25	Duplicate	Zn	43.5	49.3	12.5	12.5	
2	ICP serial dilution	Al	40920.0	38520.0	5.9	5.9	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22109H4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer: VK

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for B were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$$2 = \frac{(0.1L)(2)(0.0485 mg/L)}{(0.933)(0.001 kg)} = 10.4 mg/kg$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
2	Al	8770	8770	Y
	Sb	1.0	1.0	
	As	2.37	2.37	
	Ba	214	214	
	Be	0.450	0.450	
	B	10.4	10.4	
	Cd	0.17	0.17	
	Ca	20900	20900	
	Cr	33.2	33.2	
	Co	7.6	7.5	
	Cu	21.3	21.3	
	Fe	15500	15500	
	Pb	136	136	
	Mg	9740	9740	
	Mn	526	526	
	Hg	0.035	0.035	
	Mo	0.92	0.92	
	Ni	16.1	16.1	
	Pb	0.048	0.048	
	K	2630	2630	
	Na	1570	520	
	Sr	147	147	

LDC #: 22409H4
SDG #: 56626

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer: W

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Cd were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

Recalculation:

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

$$q = \frac{(0.1L)(2)(0.0009\ mg/L)}{(0.746)(0.0012\ kg)} = 0.20\ mg/kg$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
...con't 2	Tl	0.154	0.154	Y
	Sn	4.5	4.5	
	Ti	807	807	
	W	0.68	0.68	
	U	0.721	0.721	
	V	43.9	43.9	
	Zn	43.5	43.5	
9	Al	11800	11800	Y
	As	16.2	16.2	
	Ba	35.7	35.7	
	Be	0.406	0.406	
	B	18.8	18.8	
	Cd	0.20	0.20	
	Ca	149000	149000	
	Cr	27.5	27.5	
	Co	3.2	3.2	
	Cu	14.5	14.5	
	Fe	9770	9770	
	Pb	4.8	4.8	
	Mg	21400	21400	
	Mn	122	122	

LDC #: 22109H4
SDG #: seaaer

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer: W

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Tl were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

17 = $\frac{0.1L(5)\left(\frac{0.122\,ug/L}{1000}\right)}{(0.942)(0.00101\,kg)} = 0.064\,mg/kg$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
...Con't 9	Mo	1.83	1.83	Y
	Ni	9.09	9.09	
	Pb	0.009	0.009	
	K	2860	2860	
	Na	326	326	
	Sr	181	181	
	Tl	0.176	0.176	
	Sn	4.6	4.6	
	Ti	565	565	
	W	0.14	0.14	
	U	3.91	3.91	
	V	25.9	25.9	
	Zn	26.1	26.1	
17	Al	6720	6720	
	Sb	0.7	0.7	
	As	5.33	5.33	
	Ba	129	129	
	Be	0.280	0.280	
	B	8.8	8.8	
	Cd	0.08	0.08	
	Ca	20500	20500	

LDC #: 22109H4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation: See Previous sheet

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
...con't 17	Cr	7.36	7.36	✓
	Co	4.9	4.9	
	Cu	12.1	12.1	
	Fe	10500	10500	
	Pb	6.6	6.6	
	Mg	7580	7580	
	Mn	218	218	
	Hg	0.003	0.003	
	Mo	0.89	0.89	
	Ni	14.6	14.6	
	K	1530	1530	
	Na	731	731	
	Sr	442	442	
	Tl	0.064	0.064	
	Sn	4.4	4.4	
	Ti	603	603	
	W	0.25	0.25	
	U	1.13	1.13	
	V	35.9	35.9	
	Zn	23.0	23.0	✓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 2, 2009

LDC Report Date: December 2, 2009

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905636

Sample Identification

PB100209-A2
M-76B
M-76009B
MC-94B
M-76BMS
M-76BDUP

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Copper Magnesium	1.1 ug/L 2.4 ug/L	All samples in SDG R0905636
ICB/CCB	Antimony Copper Manganese Thallium Tungsten	0.026 ug/L 1.1 ug/L 0.2 ug/L 0.004 ug/L 0.03 ug/L	All samples in SDG R0905636
PB (prep blank)	Aluminum	2.3 ug/L	M-76B
ICB/CCB	Barium Magnesium Strontium	0.5 ug/L 2.8 ug/L 0.1 ug/L	M-76B
ICB/CCB	Barium Magnesium Potassium Strontium	0.8 ug/L 3.5 ug/L 51 ug/L 0.2 ug/L	PB100209-A2 M-76009B MC-94B
ICB/CCB	Sodium	94 ug/L	PB100209-A2

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
PB100209-A2	Copper Magnesium Manganese Thallium Tungsten Strontium Sodium	0.9 ug/L 13.1 ug/L 3.1 ug/L 0.005 ug/L 0.02 ug/L 0.3 ug/L 196 ug/L	10.0U ug/L 20.0U ug/L 5.0U ug/L 0.020U ug/L 0.10U ug/L 10.0U ug/L 300U ug/L
M-76B	Antimony Copper Thallium Tungsten	0.25 ug/L 4.4 ug/L 0.066 ug/L 0.84 ug/L	0.50U ug/L 10.0U ug/L 0.200U ug/L 1.00U ug/L
M-76009B	Copper Thallium Tungsten	3.4 ug/L 0.078 ug/L 0.72 ug/L	10.0U ug/L 0.200U ug/L 1.00U ug/L
MC-94B	Antimony Copper Manganese	0.28 ug/L 8.5 ug/L 4.6 ug/L	0.50U ug/L 10.0U ug/L 5.0U ug/L

Sample FB080409-SO (from SDG R0904290) 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
FB080409-SO	8/4/09	Boron Chromium Copper Tungsten	9.0 ug/L 0.9 ug/L 0.8 ug/L 0.01 ug/L	M-76B M-76009B

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-76B	Copper Tungsten	4.4 ug/L 0.84 ug/L	10.0U ug/L 1.00U ug/L
M-76009B	Copper Tungsten	3.4 ug/L 0.72 ug/L	10.0U ug/L 1.00U ug/L

Sample PB100209-A2 was identified as a pump blank. No metal contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB100209-A2	10/2/09	Aluminum Calcium Cobalt Copper Lead Magnesium Manganese Molybdenum Sodium Strontium Thallium Titanium Tungsten Zinc	5.5 ug/L 40 ug/L 0.4 ug/L 0.9 ug/L 0.026 ug/L 13.1 ug/L 3.1 ug/L 1.2 ug/L 196 ug/L 0.3 ug/L 0.005 ug/L 0.5 ug/L 0.02 ug/L 1.7 ug/L	M-76B M-76009B

Sample concentrations were compared to concentrations detected in the pump blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-76B	Cobalt Copper Lead Thallium Titanium Tungsten Zinc	0.7 ug/L 4.4 ug/L 0.214 ug/L 0.066 ug/L 4.2 ug/L 0.84 ug/L 2.2 ug/L	10.0U ug/L 10.0U ug/L 0.214J+ ug/L 0.200U ug/L 10.0U ug/L 1.00U ug/L 10.0U ug/L
M-76009B	Copper Lead Thallium Titanium Tungsten Zinc	3.4 ug/L 0.183 ug/L 0.078 ug/L 2.7 ug/L 0.72 ug/L 2.3 ug/L	10.0U ug/L 0.200U ug/L 0.200U ug/L 10.0U ug/L 1.00U ug/L 10.0U ug/L

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) samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results 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. Internal Standards

Raw data were not reviewed for this SDG.

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 R0905636	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples M-76B and M-76009B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-76B	M-76009B				
Aluminum	142	116	-	26 (≤50.0)	-	-
Antimony	0.25	0.20U	-	0.05 (≤0.50)	-	-
Barium	28.7	28.2	2 (≤50)	-	-	-
Beryllium	0.09U	0.1	-	0.01 (≤0.30)	-	-
Boron	3570	3600	1 (≤50)	-	-	-
Cadmium	0.3U	0.3	-	0 (≤0.5)	-	-
Calcium	150000	147000	2 (≤50)	-	-	-
Chromium	2360	2330	1 (≤50)	-	-	-
Cobalt	0.7	0.4U	-	0.3 (≤10.0)	-	-
Copper	4.4	3.4	-	1 (≤10.0)	-	-
Iron	98	82.2	-	15.8 (≤20.0)	-	-
Lead	0.214	0.183	-	0.031 (≤0.200)	-	-
Magnesium	101000	98500	3 (≤50)	-	-	-
Manganese	11.4	10.4	-	1 (≤5.0)	-	-
Mercury	0.11	0.12	-	0.01 (≤0.20)	-	-
Molybdenum	27.1	27.6	-	0.5 (≤2.0)	-	-
Platinum	0.07U	0.07	-	0 (≤1.00)	-	-
Potassium	20600	21400	4 (≤50)	-	-	-
Sodium	1140000	1220000	7 (≤50)	-	-	-
Strontium	4280	4310	1 (≤50)	-	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-76B	M-76009B				
Thallium	0.066	0.078	-	0.012 (≤0.200)	-	-
Tin	2.2	2.0U	-	0.2 (≤50.0)	-	-
Titanium	4.2	2.7	-	1.5 (≤10.0)	-	-
Tungsten	0.84	0.72	-	0.12 (≤1.00)	-	-
Uranium	8.72	8.74	0 (≤50)	-	-	-
Vanadium	29.7	29.7	0 (≤50)	-	-	-
Zinc	2.2	2.3	-	0.1 (≤10.0)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905636

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905636	PB100209-A2 M-76B M-76009B MC-94B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905636

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905636	PB100209-A2	Copper Magnesium Manganese Thallium Tungsten Strontium Sodium	10.0U ug/L 20.0U ug/L 5.0U ug/L 0.020U ug/L 0.10U ug/L 10.0U ug/L 300U ug/L	A	bl
R0905636	M-76B	Antimony Copper Thallium Tungsten	0.50U ug/L 10.0U ug/L 0.200U ug/L 1.00U ug/L	A	bl
R0905636	M-76009B	Copper Thallium Tungsten	10.0U ug/L 0.200U ug/L 1.00U ug/L	A	bl
R0905636	MC-94B	Antimony Copper Manganese	0.50U ug/L 10.0U ug/L 5.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905636

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905636	M-76B	Copper Tungsten	10.0U ug/L 1.00U ug/L	A	bf
R0905636	M-76009B	Copper Tungsten	10.0U ug/L 1.00U ug/L	A	bf

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Pump Blank Data Qualification Summary - SDG R0905636

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905636	M-76B	Cobalt Copper Lead Thallium Titanium Tungsten Zinc	10.0U ug/L 10.0U ug/L 0.214J+ ug/L 0.200U ug/L 10.0U ug/L 1.00U ug/L 10.0U ug/L	A	bp
R0905636	M-76009B	Copper Lead Thallium Titanium Tungsten Zinc	10.0U ug/L 0.200U ug/L 0.200U ug/L 10.0U ug/L 1.00U ug/L 10.0U ug/L	A	bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109I4
SDG #: R0905636
Laboratory: Columbia Analytical Services

Date: 11-30-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 10/2/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	A	MS
VII.	Duplicate Sample Analysis	A	DUP
VIII.	Laboratory Control Samples (LCS)	A	LCS
IX.	Internal Standard (ICP-MS)	N	Not reviewed
X.	Furnace Atomic Absorption QC	N	Not utilized
XI.	ICP Serial Dilution	A	
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(2,3)
XV	Field Blanks	SW	Pump Blank = 1, FB = FB080409-GW, ~~FB060310~~ (SDG# R0904210) CR

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water

1	PB100209-A2	11	PBW	21		31	
2	M-76B	12		22		32	
3	M-76009B	13		23		33	
4	MC-94B	14		24		34	
5	M-76BMS	15		25		35	
6	M-76BDUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22109I 4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer: L

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-4	water	[✓ Al, Sb], As, [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K], Se, [✓ Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
QC:5&		[✓ Al, Sb] As, [✓ Ba, Be, B, Cd], Ca, [✓ Cr, Co, Cu, Fe, Pb] Mg [✓ Mo, Mn, Hg, Ni, Pt] K, Se, [✓ Ag], Na, [✓ Sr, Tl, Sn, Ti, W, U, V, Zn]
6		[✓ Al, Sb], As, [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K], Se, [✓ Ag], Na, [✓ Sr, Tl, Sn, Ti, W, U, V, Zn]
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Analysis Method

ICP	W	[✓ Al], Sb, As, [✓ Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe], Pb [✓ Mg, Mo, Mn] Hg [✓ Ni] Pt, [✓ K], Se, [✓ Ag, Na, Sr] Tl, [✓ Sn, Ti] W, U, [✓ V, Zn]
ICP-MS	W	Al, [✓ Sb] As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, [✓ Pb], Mg, Mo, Mn, Hg, Ni, [✓ Pt] K, Se, Ag, Na, Sr, [✓ Tl], Sn, Ti, [✓ W, U], V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: [✓ Mercury by CVAA if performed]

LDC #: 22109I4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reason Code: bl
Raise to RL

METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000) Soil preparation factor applied: NA

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	1	2	3	4
Sb		0.026		0.50		0.25		0.28
Cu	1.1	1.1		10.0	0.9	4.4	3.4	8.5
Mg	2.4			20.0	13.1			
Mn		0.2		5.0	3.1			4.6
Tl		0.004		~~0.020~~ 0.200	0.005 ~~0.020~~	0.066	0.078	
W		0.03		~~0.10~~ 1.00	0.02 ~~0.10~~	0.84	0.72	

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2

Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	No Qualifiers
Al	2.3				
Ba		0.5			
Mg		2.8			
Sr		0.1			

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1, 3, 4

Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	1
Ba		0.8			
Mg		3.5			See PB
K		51			
Sr		0.2		10.0	0.3

LDC #: 22109I4
SDG #: See Cover
METHOD: Trace metals (EPA SW 846 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason Code: bl
Raise to RL

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1

Analyte	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	RL	1									
Na		94			196 / 300									

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109I4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Reason Code: bf

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 8/4/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: 2, 3

Analyte	Blank ID	Sample Identification										
	FB080409-GW SDG#: R0904290)	Action Level	2	3								
B	9.0											
Cr	0.9											
Cu	0.8		4.4 / 10.0	3.4 / 10.0								
W	0.01		0.84 / 1.00	0.72 / 1.00								

LDC #: 22109I4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: ER
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/6020/7000)

(Y) N N/A Were field blanks identified in this SDG?
Y (N) N/A Were target analytes detected in the field blanks?

Reason Code: bp

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 10/2/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: ~~Filter Blank~~ PumpBlank Associated Samples: 2, 3

Analyte	Blank ID	Sample Identification											
	1	Action Level	2	3									
Al	5.5												
Ca	40												
Co	0.4		0.7 / 10.0										
Cu	0.9		4.4 / 10.0	3.4 / 10.0									
Pb	0.026	0.26	0.214 J+	0.183 / 0.200									
Mg	13.1												
Mn	3.1												
Mo	1.2												
Na	196												
Sr	0.3												
Tl	0.005		0.066 / 0.200	0.078 / 0.200									
Ti	0.5		4.2 / 10.0	2.7 / 10.0									
W	0.02		0.84 / 1.00	0.72 / 1.00									
Zn	1.7		2.2 / 10.0	2.3 / 10.0									

LDC 22109I4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: VV

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
Y (N) NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L) 2	Concentration (ug/L) 3	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Aluminum	142	116		26	(≤50.0)	
Antimony	0.25	0.20U		0.05	(≤0.50)	
Barium	28.7	28.2	2			
Beryllium	0.09U	0.10		0.01	(≤0.30)	
Boron	3570	3600	1			
Cadmium	0.3U	0.3		0	(≤0.5)	
Calcium	150000	147000	2			
Chromium	2360	2330	1			
Cobalt	0.7	0.4U		0.3	(≤10.0)	
Copper	4.4	3.4		1	(≤10.0)	
Iron	98.0	82.2		15.8	(≤20.0)	
Lead	0.214	0.183		0.031	(≤0.200)	
Magnesium	101000	98500	3			
Manganese	11.4	10.4		1	(≤5.0)	
Mercury	0.11	0.12		0.01	(≤0.20)	
Molybdenum	27.1	27.6		0.5	(≤2.0)	
Platinum	0.07U	0.07		0	(≤1.00)	
Potassium	20600	21400	4			
Sodium	1140000	1220000	7			

LDC#: 22109I4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Metals (EPA Method 6020/6010/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L) 2	Concentration (ug/L) 3	(≤30) RPD	(ug/L) Difference	(ug/L) Limits	Qualifications (Parent Only)
Strontium	4280	4310	1			
Thallium	0.066	0.078		0.012	(≤0.200)	
Tin	2.2	2.0U		0.2	(≤50.0)	
Titanium	4.2	2.7		1.5	(≤10.0)	
Tungsten	0.84	0.72		0.12	(≤1.00)	
Uranium	8.720	8.740	0			
Vanadium	29.7	29.7	0			
Zinc	2.2	2.3		0.1	(≤10.0)	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: October 6, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905693

Sample Identification

EB100609-SO1A4	EB100609-SO1A4MS
SA138-0.5B	EB100609-SO1A4DUP
SA138-10B	SA138-0.5BMS
SA138009-10B	SA138-0.5BDUP
SA138-30B	RSAR5-40BMS
SA138-45B	RSAR5-40BDUP
SA103-0.5B	
SA103-10B	
SA103009-10B	
SA103-25B	
SA103-35B	
RSAR5-0.5B	
RSAR5-10B	
RSAR5-25B	
RSAR5-40B	
RSAS5-0.5B	
RSAS5-10B	
RSAS5-25B	
RSAS5-36B	
RSAS5009-36B	

Introduction

This data review covers 23 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B, 6020, and 7000 for Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Platinum, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Tungsten, Uranium, Vanadium, and Zinc.

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) as there are no current guidelines for the method stated above.

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 contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Chromium Iron Manganese Tin	0.4 mg/Kg 0.09 mg/Kg 1.8 mg/Kg 0.04 mg/Kg 4.0 mg/Kg	All soil samples in SDG R0905693
ICB/CCB	Boron Iron Manganese Molybdenum Strontium	6.0 ug/L 6.0 ug/L 0.10 ug/L 0.40 ug/L 0.10 ug/L	All soil samples in SDG R0905693
ICB/CCB	Platinum Thallium Tungsten	0.011 ug/L 0.013 ug/L 0.035 ug/L	RSAR5-10B RSAR5-25B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Platinum Thallium Tungsten	0.009 ug/L 0.012 ug/L 0.043 ug/L	SA138-0.5B SA138-10B SA138009-10B SA103-0.5B SA103-10B SA103009-10B SA103-35B RSAR5-0.5B
ICB/CCB	Thallium Tungsten	0.008 ug/L 0.050 ug/L	SA138-30B SA138-45B SA103-25B RSAR5-40B
ICB/CCB	Barium	0.50 ug/L	RSAR5-25B RSAR5-40B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B
ICB/CCB	Barium	0.40 ug/L	SA138-0.5B SA138-10B
ICB/CCB	Barium	0.30 ug/L	SA138009-10B SA138-30B SA138-45B SA103-0.5B SA103-10B SA103009-10B SA103-25B SA103-35B RSAR5-0.5B RSAR5-10B
PB (prep blank)	Silver	0.9 ug/L	All water samples in SDG R0905693
ICB/CCB	Antimony Boron Chromium Cobalt Iron Silver Tungsten Thallium	0.026 ug/L 2.3 ug/L 0.6 ug/L 0.7 ug/L 3.0 ug/L 0.8 ug/L 0.03 ug/L 0.004 ug/L	All water samples in SDG R0905693

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA138-0.5B	Boron Tin Platinum	9.8 mg/Kg 4.0 mg/Kg 0.028 mg/Kg	10.6U mg/Kg 10.6U mg/Kg 0.10U mg/Kg
SA138-10B	Tin Platinum	4.4 mg/Kg 0.010 mg/Kg	10.6U mg/Kg 0.11U mg/Kg
SA138009-10B	Boron Tin Platinum	9.8 mg/Kg 4.5 mg/Kg 0.009 mg/Kg	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg
SA138-30B	Tin	5.3 mg/Kg	11.4U mg/Kg
SA138-45B	Tin	4.8 mg/Kg	10.8U mg/Kg
SA103-0.5B	Tin Platinum	5.4 mg/Kg 0.015 mg/Kg	10.6U mg/Kg 0.11U mg/Kg
SA103-10B	Boron Tin Platinum	7.0 mg/Kg 4.6 mg/Kg 0.008 mg/Kg	10.5U mg/Kg 10.5U mg/Kg 0.11U mg/Kg
SA103009-10B	Boron Tin Platinum	7.1 mg/Kg 4.3 mg/Kg 0.012 mg/Kg	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg
SA103-25B	Tin	4.4 mg/Kg	11.0U mg/Kg
SA103-35B	Tin Platinum	4.7 mg/Kg 0.018 mg/Kg	11.1U mg/Kg 0.11U mg/Kg
RSAR5-0.5B	Boron Tin Platinum	9.3 mg/Kg 4.5 mg/Kg 0.007 mg/Kg	10.9U mg/Kg 10.9U mg/Kg 0.11U mg/Kg
RSAR5-10B	Boron Tin Platinum	8.3 mg/Kg 4.5 mg/Kg 0.009 mg/Kg	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg
RSAR5-25B	Boron Tin Platinum	8.7 mg/Kg 4.4 mg/Kg 0.007 mg/Kg	10.5U mg/Kg 10.5U mg/Kg 0.10U mg/Kg
RSAR5-40B	Tin	4.9 mg/Kg	11.8U mg/Kg
RSAS5-0.5B	Tin Platinum	4.6 mg/Kg 0.011 mg/Kg	10.5U mg/Kg 0.10U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAS5-10B	Tin Platinum	4.1 mg/Kg 0.008 mg/Kg	10.6U mg/Kg 0.11U mg/Kg
RSAS5-25B	Tin Platinum	4.4 mg/Kg 0.010 mg/Kg	10.5U mg/Kg 0.10U mg/Kg
RSAS5-36B	Tin Platinum	4.5 mg/Kg 0.008 mg/Kg	10.4U mg/Kg 0.10U mg/Kg
RSAS5009-36B	Tin Platinum	4.5 mg/Kg 0.010 mg/Kg	10.3U mg/Kg 0.10U mg/Kg
EB100609-SO1A4	Chromium Tungsten Thallium	0.7 ug/L 0.03 ug/L 0.003 ug/L	5.0U ug/L 0.10U ug/L 0.020U ug/L

Sample EB100609-SO1A4 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
EB100609-SO1A4	10/6/09	Aluminum Calcium Chromium Iron Lead Magnesium Manganese Sodium Strontium Thallium Tungsten Uranium Zinc	4.3 ug/L 144 ug/L 0.7 ug/L 50.3 ug/L 0.071 ug/L 28.8 ug/L 3.7 ug/L 43.8 ug/L 1.1 ug/L 0.003 ug/L 0.03 ug/L 0.004 ug/L 0.7 ug/L	All soil samples in SDG R0905693

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified.

Sample FB080309-SO (from SDG R0904279) 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
FB080309-SO	8/3/09	Aluminum Barium Calcium Iron Lead Magnesium Manganese Sodium Strontium Titanium Tungsten Zinc	18.6 ug/L 0.8 ug/L 113 ug/L 136 ug/L 0.042 ug/L 33.6 ug/L 7.5 ug/L 66.0 ug/L 1.0 ug/L 1.5 ug/L 0.04 ug/L 0.8 ug/L	All soil samples in SDG R0905693

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) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
SA138-0.5BMS (All soil samples in SDG R0905693)	Antimony	58.0 (75-125)	J- (all detects) UJ (all non-detects)	A
SA138-0.5BMS (All soil samples in SDG R0905693)	Manganese	29.3 (75-125)	J- (all detects) R (all non-detects)	A

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results 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. 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 with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SA138-0.5BL	Nickel	11.5 (≤10)	All soil samples in SDG R0905693	J (all detects) UJ (all non-detects)	A

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905693	All analytes reported below the PQL.	J (all detects)	A

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples SA138-10B and SA138009-10B and samples RSAS5-36B and RSAS5009-36B were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA138-10B	SA138009-10B				
Aluminum	8200	7430	10 (≤50)	-	-	-
Antimony	1.4	0.5U	-	0.9 (≤2.1)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA138-10B	SA138009-10B				
Arsenic	3.06	3.09	1 (≤50)	-	-	-
Barium	153	129	17 (≤50)	-	-	-
Beryllium	0.437	0.416	5 (≤50)	-	-	-
Boron	10.6	9.8	-	0.8 (≤10.6)	-	-
Cadmium	0.25	0.25	-	0 (≤0.11)	-	-
Calcium	22400	29500	27 (≤50)	-	-	-
Chromium	8.09	7.51	7 (≤50)	-	-	-
Cobalt	8.3	7.7	-	0.6 (≤2.1)	-	-
Copper	20.6	21	2 (≤50)	-	-	-
Iron	15500	15200	2 (≤50)	-	-	-
Lead	8.2	7.4	-	0.8 (≤2.1)	-	-
Magnesium	11300	11100	2 (≤50)	-	-	-
Manganese	332	334	1 (≤50)	-	-	-
Mercury	0.006	0.008	-	0.002 (≤0.018)	-	-
Molybdenum	0.51	0.49	-	0.02 (≤0.032)	-	-
Nickel	15.6	16	3 (≤50)	-	-	-
Platinum	0.01	0.009		0.001 (≤0.11)	-	-
Potassium	1620	1510	7 (≤50)	-	-	-
Sodium	802	722	10 (≤50)	-	-	-
Strontium	242	217	-	25 (≤42.3)	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA138-10B	SA138009-10B				
Thallium	0.077	0.07	-	0.007 (≤0.022)	-	-
Tin	4.4	4.5	-	0.1 (≤10.6)	-	-
Titanium	757	721	5 (≤50)	-	-	-
Tungsten	0.18	0.18	-	0 (≤0.11)	-	-
Uranium	1.39	1.4	1 (≤50)	-	-	-
Vanadium	46.2	46	0 (≤50)	-	-	-
Zinc	33	32.2	2 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAS5-36B	RSAS5009-36B				
Aluminum	10700	11200	5 (≤50)	-	-	-
Antimony	0.7	1	-	0.3 (≤2.1)	-	-
Arsenic	15.6	13.9	12 (≤50)	-	-	-
Barium	133	81	49 (≤50)	-	-	-
Beryllium	0.375	0.357	5 (≤50)	-	-	-
Boron	21.5	22.3	-	0.8 (≤10.4)	-	-
Cadmium	0.21	0.23	-	0.02 (≤0.10)	-	-
Calcium	59300	43500	31 (≤50)	-	-	-
Chromium	17.1	15.6	9 (≤50)	-	-	-
Cobalt	5	5.4	-	0.4 (≤2.1)	-	-
Copper	13.6	13.8	1 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAS5-36B	RSAS5009-36B				
Iron	10400	10700	3 (≤50)	-	-	-
Lead	6.7	6.7	-	0 (≤2.1)	-	-
Magnesium	32000	31800	1 (≤50)	-	-	-
Manganese	215	236	9 (≤50)	-	-	-
Mercury	0.005	0.007	-	0.002 (≤0.019)	-	-
Molybdenum	0.85	0.76	-	0.09 (≤0.31)	-	-
Nickel	10.6	10.9	3 (≤50)	-	-	-
Platinum	0.008	0.01	-	0.002 (≤0.10)	-	-
Potassium	2650	2830	7 (≤50)	-	-	-
Sodium	1530	1540	1 (≤50)	-	-	-
Strontium	162	126	-	36 (≤41.4)	-	-
Thallium	0.123	0.121	2 (≤50)	-	-	-
Tin	4.5	4.5	-	0 (≤10.4)	-	-
Titanium	532	555	4 (≤50)	-	-	-
Tungsten	0.34	0.35	-	0.01 (≤0.10)	-	-
Uranium	2.68	2.54	5 (≤50)	-	-	-
Vanadium	31.3	31.5	1 (≤50)	-	-	-
Zinc	30.3	31.6	4 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0905693

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905693	SA138-0.5B SA138-10B SA138009-10B SA138-30B SA138-45B SA103-0.5B SA103-10B SA103009-10B SA103-25B SA103-35B RSAR5-0.5B RSAR5-10B RSAR5-25B RSAR5-40B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B	Antimony	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0905693	SA138-0.5B SA138-10B SA138009-10B SA138-30B SA138-45B SA103-0.5B SA103-10B SA103009-10B SA103-25B SA103-35B RSAR5-0.5B RSAR5-10B RSAR5-25B RSAR5-40B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B	Manganese	J- (all detects) R (all non-detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905693	SA138-0.5B SA138-10B SA138009-10B SA138-30B SA138-45B SA103-0.5B SA103-10B SA103009-10B SA103-25B SA103-35B RSAR5-0.5B RSAR5-10B RSAR5-25B RSAR5-40B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B	Nickel	J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0905693	EB100609-SO1A4 SA138-0.5B SA138-10B SA138009-10B SA138-30B SA138-45B SA103-0.5B SA103-10B SA103009-10B SA103-25B SA103-35B RSAR5-0.5B RSAR5-10B RSAR5-25B RSAR5-40B RSAS5-0.5B RSAS5-10B RSAS5-25B RSAS5-36B RSAS5009-36B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Laboratory Blank Data Qualification Summary - SDG R0905693

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905693	SA138-0.5B	Boron Tin Platinum	10.6U mg/Kg 10.6U mg/Kg 0.10U mg/Kg	A	bl
R0905693	SA138-10B	Tin Platinum	10.6U mg/Kg 0.11U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905693	SA138009-10B	Boron Tin Platinum	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905693	SA138-30B	Tin	11.4U mg/Kg	A	bl
R0905693	SA138-45B	Tin	10.8U mg/Kg	A	bl
R0905693	SA103-0.5B	Tin Platinum	10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905693	SA103-10B	Boron Tin Platinum	10.5U mg/Kg 10.5U mg/Kg 0.11U mg/Kg	A	bl
R0905693	SA103009-10B	Boron Tin Platinum	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905693	SA103-25B	Tin	11.0U mg/Kg	A	bl
R0905693	SA103-35B	Tin Platinum	11.1U mg/Kg 0.11U mg/Kg	A	bl
R0905693	RSAR5-0.5B	Boron Tin Platinum	10.9U mg/Kg 10.9U mg/Kg 0.11U mg/Kg	A	bl
R0905693	RSAR5-10B	Boron Tin Platinum	10.6U mg/Kg 10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905693	RSAR5-25B	Boron Tin Platinum	10.5U mg/Kg 10.5U mg/Kg 0.10U mg/Kg	A	bl
R0905693	RSAR5-40B	Tin	11.8U mg/Kg	A	bl
R0905693	RSAS5-0.5B	Tin Platinum	10.5U mg/Kg 0.10U mg/Kg	A	bl
R0905693	RSAS5-10B	Tin Platinum	10.6U mg/Kg 0.11U mg/Kg	A	bl
R0905693	RSAS5-25B	Tin Platinum	10.5U mg/Kg 0.10U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905693	RSAS5-36B	Tin Platinum	10.4U mg/Kg 0.10U mg/Kg	A	bl
R0905693	RSAS5009-36B	Tin Platinum	10.3U mg/Kg 0.10U mg/Kg	A	bl
R0905693	EB100609-SO1A4	Chromium Tungsten Thallium	5.0U ug/L 0.10U ug/L 0.020U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0905693

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0905693

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage ~~2B~~ 4

LDC #: 22109J4
SDG #: R0905693
Laboratory: Columbia Analytical Services

Date: 12-4-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA SW 846 Method 6010B/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
I.	Technical holding times	A	Sampling dates: 10/6/09
II.	ICP/MS Tune	A	
III.	Calibration	A	
IV.	Blanks	SW	
V.	ICP Interference Check Sample (ICS) Analysis	A	
VI.	Matrix Spike Analysis	SW	MS
VII.	Duplicate Sample Analysis	A	Dup
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	SW	
XII.	Sample Result Verification	A	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	SW	(3,4), (19,20)
XV	Field Blanks	SW	EB=1, FB= FB080300I-SO (SDG# R0904279)

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: all soil except 1, 21, 22 = water

1	EB100609-SO1A4	11	SA103-35B	21	EB100609-SO1A4MS	31	PBS
2	SA138-0.5B	12	RSAR5-0.5B	22	EB100609-SO1A4DUP	32	PBW
3	SA138-10B	13	RSAR5-10B	23	SA138-0.5BMS	33	
4	SA138009-10B	14	RSAR5-25B	24	SA138-0.5BDUP	34	
5	SA138-30B	15	RSAR5-40B	25	RSAR5-40BMS	35	
6	SA138-45B	16	RSAS5-0.5B	26	RSAR5-40BDUP	36	
7	SA103-0.5B	17	RSAS5-10B	27		37	
8	SA103-10B	18	RSAS5-25B	28		38	
9	SA103009-10B	19	RSAS5-36B	29		39	
10	SA103-25B	20	RSAS5009-36B	30		40	

Notes: _____

LDC #: 22109J4
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: VC

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution < 5%?	✓			
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
III. 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. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

LDC #: 224095A
SDG #: 5ECCAVER

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
VI. 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?			✓	
VII. ICP Serial dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field Duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field Blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 22109J4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
2-20	S	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
1	W	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
QC:21		Al, Sb, ~~As~~, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, ~~Se~~, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
22		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
23		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
24		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
25,26		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
Analysis Method		
ICP	SW	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn
ICP-MS	↓	Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, ~~U~~, V, Zn
GFAA		Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn

Comments: Mercury by CVAA if performed

LDC #: 22109J4
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 Soil

Reason: bl

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4	5	6	7	8	9	10	11	12
Al	0.4													
B		6.0		9.8 / 10.6		9.8 / 10.6				7.0 / 10.5	7.1 / 10.6			9.3 / 10.9
Cr	0.09													
Fe	1.8	6.0												
Mn	0.04	0.10												
Mo		0.40												
Sr		0.10												
Sn	4.0			4.0 / 10.6	4.4 / 10.6	4.5 / 10.6	5.3 / 11.4	4.8 / 10.8	5.4 / 10.6	4.6 / 10.5	4.3 / 10.6	4.4 / 11.0	4.7 / 11.1	4.5 / 10.9

Analyte	Maximum PB[a] (mg/Kg)	Maximum ICB/CCB[a] (ug/l)	Action Limit	13	14	15	16	17	18	19	20
Al	0.4										
B		6.0		8.3 / 10.6	8.7 / 10.5						
Cr	0.09										
Fe	1.8	6.0									
Mn	0.04	0.10									
Mo		0.40									
Sr		0.10									
Sn	4.0			4.5 / 10.6	4.4 / 10.5	4.9 / 11.8	4.6 / 10.5	4.1 / 10.6	4.4 / 10.5	4.5 / 10.4	4.5 / 10.3

Sample Concentration units, unless otherwise noted: mg/Kg
Associated Samples: 13, 14, 16-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	13	14	16	17	18	19	20
Pt			0.011		0.009 / 0.11	0.007 / 0.10	0.011 / 0.10	0.008 / 0.11	0.010 / 0.10	0.008 / 0.10	0.010 / 0.10
Tl			0.013								
W			0.035								

LDC #: 22109J4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: 100x

Reason: bl

Reviewer: CR
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2-4, 7-9, 11, 12

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	2	3	4	7	8	9	11	12		
Pt			0.009		0.028 / 0.10	0.010 / 0.11	0.009 / 0.11	0.015 / 0.11	0.008 / 0.11	0.012 / 0.11	0.018 / 0.11	0.007 / 0.11		
Tl			0.012											
W			0.043											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 5, 6, 10, 15

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Tl			0.008											
W			0.050											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 14-20

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			0.50											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 2, 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			0.40											

Sample Concentration units, unless otherwise noted: mg/Kg Associated Samples: 4-13

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	No Qualifiers									
Ba			0.30											

S

LDC #: 22109J4
SDG #: See Cover
METHOD: Trace metals (EPA SW 864 Method 6010B/6020/7000)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES
Soil preparation factor applied: NA

Reason: bl

Reviewer:
2nd Reviewer:

ample Concentration units, unless otherwise noted: ug/L Associated Samples: All Water

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1									
Sb			0.026											
B			2.3											
Cr			0.6		0.7 / 5.0									
Co			0.7											
Fe			3.0											
Ag		0.9	0.8											
W			0.03		0.03 / 0.10									
Tl			0.004		0.003 / 0.020									

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 22109J4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A 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: 10/6/09 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Soil

Analyte	Blank ID	Sample Identification										
	1	Action Level	No Qualifiers									
Al	4.3											
Ba												
Ca	144	144										
Cr	0.7											
Fe	50.3	50.3										
Pb	0.071	0.071										
Mg	28.8	28.8										
Mn	3.7											
Na	43.8											
Sr	1.1											
Tl	0.003											
W	0.03											
U	0.004											
Zn	0.7											

LDC #: 22109J4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Trace Metals (EPA SW846 6010B/7000)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: ug/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 ~~Soil factor~~ applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All Soil

Analyte	Blank ID	Sample Identification										
	FB080309-SO (SDG# R0904279)	Action Level	No Qualifiers									
Al	18.6											
Ba	0.8											
Ca	113	113										
Fe	136	136										
Pb	0.042	0.042										
Mg	33.6	33.6										
Mn	7.5	7.5										
Na	66.0											
Sr	1.0											
Ti	1.5											
W	0.04											
Zn	0.8											

LDC #: 22109J4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: QR
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Sb	58.0	All Soil	J-/UJ/A (m)
			Mn	29.3	"	J-/R/A "

Comments:

LDC #: 22109J4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the IDL, was ~~an ICP~~ serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) (≤10%?)
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Diluted Sample ID	Matrix	Analyte	%D	Associated Samples	Qualifications
	2	Soil	Ni	11.5	All Soil	J/UJ/A (soil)

Comments: _____

SDIL_482

LDC 22109J4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 3	Concentration (mg/Kg) 4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	8200	7430	10			
Antimony	1.4	0.5U		0.9	(≤2.1)	
Arsenic	3.06	3.09	1			
Barium	153	129	17			
Beryllium	0.437	0.416	5			
Boron	10.6	9.8		0.8	(≤10.6)	
Cadmium	0.25	0.25		0	(≤0.11)	
Calcium	22400	29500	27			
Chromium	8.09	7.51	7			
Cobalt	8.3	7.7		0.6	(≤2.1)	
Copper	20.6	21.0	2			
Iron	15500	15200	2			
Lead	8.2	7.4		0.8	(≤2.1)	
Magnesium	11300	11100	2			
Manganese	332	334	1			
Mercury	0.006	0.008		0.002	(≤0.018)	
Molybdenum	0.51	0.49		0.02	(≤0.032)	
Nickel	15.6	16.0	3			
Platinum	0.010	0.009		0.001	(≤0.11)	

LDC#: 22109J4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: VC

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 3	Concentration (mg/Kg) 4	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Potassium	1620	1510	7			
Sodium	802	722	10			
Strontium	242	217		25	(≤42.3)	
Thallium	0.077	0.070		0.007	(≤0.022)	
Tin	4.4	4.5		0.1	(≤10.6)	
Titanium	757	721	5			
Tungsten	0.18	0.18		0	(≤0.11)	
Uranium	1.390	1.400	1			
Vanadium	46.2	46.0	0			
Zinc	33.0	32.2	2			

V:\FIELD DUPLICATES\FD_inorganic\22109J4.wpd

Compound	Concentration (mg/Kg) 19	Concentration (mg/Kg) 20	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Aluminum	10700	11200	5			
Antimony	0.7	1.0		0.3	(≤2.1)	
Arsenic	15.6	13.9	12			
Barium	133	81.0	49			
Beryllium	0.375	0.357	5			
Boron	21.5	22.3		0.8	(≤10.4)	

LDC#: 22109J4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg)		(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
	19	20				
Cadmium	0.21	0.23		0.02	(≤0.10)	
Calcium	59300	43500	31			
Chromium	17.1	15.6	9			
Cobalt	5.0	5.4		0.4	(≤2.1)	
Copper	13.6	13.8	1			
Iron	10400	10700	3			
Lead	6.7	6.7		0	(≤2.1)	
Magnesium	32000	31800	1			
Manganese	215	236	9			
Mercury	0.005	0.007		0.002	(≤0.019)	
Molybdenum	0.85	0.76		0.09	(≤0.31)	
Nickel	10.6	10.9	3			
Platinum	0.008	0.010		0.002	(≤0.10)	
Potassium	2650	2830	7			
Sodium	1530	1540	1			
Strontium	162	126		36	(≤41.4)	
Thallium	0.123	0.121	2			
Tin	4.5	4.5		0	(≤10.4)	
Titanium	532	555	4			

LDC#: 22109J4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: Metals (EPA Method 6020/6010/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (mg/Kg) 19	Concentration (mg/Kg) 20	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Tungsten	0.34	0.35		0.01	(≤0.10)	
Uranium	2.680	2.540	5			
Vanadium	31.3	31.5	1			
Zinc	30.3	31.6	4			

LDC #: 22109J4
SDG #: secover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: GR
2nd Reviewer: LV

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Sn	4976	5000	100	100	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	5.14	5.00	103	103	Y
CCV5	ICP (Continuing calibration)	Mg	9883	10000	99	99	Y
	GFAA (Continuing calibration)						
CCV10	CVAA (Continuing calibration)	Hg	4.96	5.00	99	99	Y
ICV	ICP/MS (Initial calibration)	Cu	26.7	25.00	107	107	Y
CCV2	ICP/MS (Continuing calibation)	U	25.0	25.0	100	100	Y

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 #: 22609J4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: QR
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:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Sb	890	1000	89	89	Y
LCS	Laboratory control sample	Cu	72.7	70	~~103.9~~ 87	~~87~~ 103.9	
23	Matrix spike	Se	(SSR-SR) 81.3	105.93	76.7	76.7	
24	Duplicate	V	37.4	38.6	3.2	3.2	
2	ICP serial dilution	Al	35520	34120	3.9	3.9	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 22109J4
SDG #: seeaver

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 3
Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Sb were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(DIl)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$$\frac{(0.1L)(2)\ 0.0056 mg/L}{(0.624)(0.0014 Kg)} = 1.3 mg/kg$$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
5	Al	21300	21300	Y
	Sb	1.3	1.3	
	As	26.2	26.2	
	Ba	275	275	
	Be	0.740	0.740	
	B	42.7	42.7	
	Cd	0.37	0.37	
	Ca	29100	29100	
	Cr	36.2	36.2	
	Co	6.6	6.6	
	Cu	19.1	19.1	
	Fe	16700	16700	
	Pb	10.4	10.4	
	Mg	45400	45400	
	Mn	278	278	
	Hg	0.010	0.010	
	Mo	2.20	2.20	
	Ni	16.5	16.5	
	K	4180	4180	
	Na	2230	2230	
	Sr	139	139	
	Tl	0.274	0.274	

LDC #: 22109J4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer: W

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for Be were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

U: $\frac{(0.1L)(10)\left(\frac{0.2817\ ug/L}{1000}\right)}{(0.746)(0.001208)} = 0.315\ mg/kg$

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
...ICon't 5	Sn	5.3	5.3	Y
	Ti	852	852	
	W	0.35	0.35	
	U	7.580	7.580	
	V	47.3	47.3	
	Zn	47.7	47.7	↓
10	Al	7920	7920	U
	As	43.7	43.8	
	Ba	72.6	72.6	
	Be	0.315	0.315	
	B	31.0	31.0	
	Cd	0.15	0.15	
	Ca	96700	96700	
	Cr	35.7	35.7	
	Co	2.9	2.9	
	Cu	10.9	10.9	
	Fe	6610	6610	
	Pb	2.8	2.8	
	Mg	57800	57800	
	Mn	93.8	93.8	
	Hg	0.004	0.004	↓

LDC #: 22109J4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CR
2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

Recalculations: see previous sheet

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
...Cont'd	Mo	0.35	0.35	Y
	Ni	7.27	7.27	
	K	2170	2170	
	Na	923	923	
	Sr	1740	1740	
	Tl	0.097	0.097	
	Sn	4.4	4.4	
	Ti	356	356	
	W	0.28	0.28	
	U	13.5	13.5	
	V	45.1	45.1	
	Zn	19.6	19.6	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Wet Chemistry

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	August 5, 2009
LDC Report Date:	December 15, 2009
Matrix:	Soil
Parameters:	Wet Chemistry
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP2RE
RSAU5-0.5BSPLP3

Introduction

This data review covers 3 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 353.2 for Nitrite as Nitrogen, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, Standard Method 2540C for Total Dissolved Solids, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2540D for Total Suspended Solids, EPA Method 300.1 for Chlorate, and 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) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
RSAU5-0.5BSPLP2RE	Nitrate as N	108.7 hours	48 hours	J- (all detects) UJ (all non-detects)	A
RSAU5-0.5BSPLP2RE	Total dissolved solids	8 days	7 days	J- (all detects) R (all non-detects)	A
RSAU5-0.5BSPLP2	Hexavalent chromium	28.25 & 28.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
8/13/09	CCV	Surfactants	88.8 (90-110)	RSAU5-0.5BSPLP2	J- (all detects) UJ (all non-detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride pH Total phosphorus Sulfate	1.0 mg/L 1.0 mg/L 0.1 mg/L 0.14 mg/L 5.02 units 0.016 mg/L 0.10 mg/L	RSAU5-0.5BSPLP2
PB (prep blank)	Nitrate as N	0.102 mg/L	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP2RE
ICB/CCB	Total dissolved solids	8 mg/L	RSAU5-0.5BSPLP2RE
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate	2.1 mg/L 2.1 mg/L 0.1 mg/L 0.14 mg/L 0.101 mg/L 6.47 units 0.019 mg/L 8 mg/L 0.92 mg/L	RSAU5-0.5BSPLP3
ICB/CCB	Alkalinity, total Sulfate	1.0 mg/L 0.107 mg/L	RSAU5-0.5BSPLP3
ICB/CCB	Total phosphorus Chloride	0.0099 mg/L 0.144 mg/L	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3
ICB/CCB	Alkalinity, total Sulfate	1.5 mg/L 0.093 mg/L	RSAU5-0.5BSPLP2

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAU5-0.5BSPLP2	Total phosphorus	0.022 mg/L	0.050U mg/L
RSAU5-0.5BSPLP3	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	11.5 mg/L 11.5 mg/L 0.019 mg/L	11.5J+ mg/L 11.5J+ mg/L 0.050U mg/L

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Sample Result Verification and Project Quantitation Limit

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VIII. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
RSAU5-0.5BSPLP2RE	Nitrate as N Total dissolved solids	X X	A

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, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0904370

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2RE	Nitrate as N	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0904370	RSAU5-0.5BSPLP2RE	Total dissolved solids	J- (all detects) R (all non-detects)	A	Technical holding times (h)
R0904370	RSAU5-0.5BSPLP2	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0904370	RSAU5-0.5BSPLP2	Surfactants	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP2RE RSAU5-0.5BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0904370	RSAU5-0.5BSPLP2RE	Nitrate as N Total dissolved solids	X X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0904370

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP2	Total phosphorus	0.050U mg/L	A	bl
R0904370	RSAU5-0.5BSPLP3	Alkalinity, total Alkalinity, bicarbonate Total phosphorus	11.5J+ mg/L 11.5J+ mg/L 0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A6
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12-7-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, ~~Nitrite-N~~, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), ~~Conductivity (EPA Method 120.1)~~, Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (9060), chlorate (300.1), perchlorate (314.0)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 8/5/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate	~~A~~ A	~~Not required for~~
V	Matrix Spike/Matrix Spike Duplicates	N	Client Specified
VI.	Duplicates	N	↓
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	~~SW~~ N	
IX.	Overall assessment of data	SW	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: SO:1

1	RSAU5-0.5BSPLP2	11	PBW1	21		31	
2	RSAU5-0.5BSPLP2RE	12	PBW2	22		32	
3	RSAU5-0.5BSPLP3	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 #: 22109A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer:
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1,3	Soil	[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3] [✓ TOC] [✓ CN Cr^{6+} T-P MBAS TDS TSS] [✓ Cond] [✓ ClO_3] [✓ ClO_4]
2	⊥	Alk pH Br Cl [✓ NO_3] NO_2 SO_4 NH_3 ~~TOC~~ CN Cr^{6+} T-P MBAS [✓ TDS] TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109A6
SDG #: Seecaer

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CR
2nd reviewer: W

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
Y N N/A Were all cooler temperatures within validation criteria?

Method:	NO_3-N	7199	2540C			
Parameters:	9056 for Cl		TDS			
Technical holding time:	48hrs	24hrs	7days			

Sample ID	Leaching Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
2	8/13/09 07:15	8/17/09 19:57	(108.7hrs)				J-/R/A* (Cl)
				8/21/09 (8days)			J-/UJ/A* ↓
↓	8/13/09 07:15		8/14/09 11:33	(28.25hrs)			J-/UJ/A* (NO3)
↓	↓		11:44	(28.5hrs)			↓

*Reanalysis

LDC #: 22609A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: ___ of ___
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	8/13/09	CCV	Surfactants	88-8	1	J-/UJ/P (c)

Comments: _____

LDC #: 22109A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 1

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1									
Alk., Total	1.0	1.5											
Alk., Bicarb.	1.0												
TOC	0.1												
Cl	0.14												
pH (pHunits)	5.02												
T-P	0.016			0.022 / 0.050									
SO4	0.10	0.093											

Conc. units: mg/L **Associated Samples:** 1, 2

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
NO3-N	0.102		1.02										

Conc. units: mg/L **Associated Samples:** 2

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
TDS	8												

LDC #: 22109A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: GR
2nd Reviewer: L

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			3									
Alk., Total	2.1	1.0	21	11.5 J+									
Alk., Bicarb.	2.1		21	11.5 J+									
TOC	0.1												
Cl	0.14												
NO3-N	0.101		1.01										
pH (pHunits)	6.47												
T-P	0.019			0.019 / 0.050									
TDS	8												
SO4	0.92	0.107	9.2										

Conc. units: mg/L **Associated Samples:** 1, 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	3								
T-P		0.0099		See PB	See pB								
Cl		0.144											

LDC #: 221946
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated ~~Samples~~ Analytes	Qualifications
		2	Reanalysis was not necessary	NO_3-N, TDS	X R/A (o)

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-30B
SA203-46B
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-30B
SA148-35B
SA148-45B
RSAT7-44BMS
RSAT7-44BMSD
RSAT7-44BDUP

Introduction

This data review covers 21 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 for Total Organic Carbon.

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) as there are no current guidelines for the method stated above.

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 X.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	1.7 mg/L 1.7 mg/L 0.12 mg/L	All water samples in SDG R0905402
ICB/CCB	Alkalinity, total Chloride Ammonia as N	1.8 mg/L 0.119 mg/L 0.0161 mg/L	All water samples in SDG R0905402
PB (prep blank)	Total organic carbon	40 mg/Kg	All soil samples in SDG R0905402
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0905402
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	15 mg/Kg 15 mg/Kg 1.1 mg/Kg	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	12 mg/Kg 12 mg/Kg 1.0 mg/Kg	SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B
PB (prep blank)	Chloride Nitrite as N	1 mg/Kg 0.08 mg/Kg	SA148-35B SA148-45B
ICB/CCB	Nitrite as N	0.00756 mg/L	SA148-35B SA148-45B
PB (prep blank)	Total phosphorus	1.4 mg/Kg	SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B
ICB/CCB	Total phosphorus	0.0064 mg/L	SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B
ICB/CCB	Alkalinity, total	0.5 mg/L	RSAT7-0.5B RSAT7-10B RSAT7-44B
ICB/CCB	Sulfate	0.096 mg/L	SA148-10B
ICB/CCB	Chloride	0.116 mg/L	RSAT8-44B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B
ICB/CCB	Chloride Sulfate	0.124 mg/L 0.149 mg/L	SA148-30B SA148-35B SA148-45B
ICB/CCB	Sulfate	0.104 mg/L	RSAT8-44B SA203-30B SA203-46B SA148-0.5B
ICB/CCB	Sulfate	0.161 mg/L	RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-25B RSAT8009-25B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092309-SO1A4	Alkalinity, total Alkalinity, bicarbonate Chloride Ammonia as N	1.9 mg/L 1.9 mg/L 1.3 mg/L 0.042 mg/L	2.0U mg/L 2.0U mg/L 2.0U mg/L 0.050U mg/L
RSAT7-44B	Total organic carbon	220 mg/Kg	290U mg/Kg
SA148-35B	Nitrite as N	0.15 mg/Kg	0.15U mg/Kg
SA148-45B	Nitrite as N	0.14 mg/Kg	0.15U mg/Kg

Sample EB092309-SO1A4 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092309-SO1A4	9/23/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride pH Surfactants	1.9 mg/L 1.9 mg/L 0.042 mg/L 0.4 mg/L 1.3 mg/L 6.27 units 0.53 mg/L	SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10B	Surfactants	1.1 mg/Kg	2.1U mg/Kg
SA148-30B	Surfactants	2.3 mg/Kg	2.7U mg/Kg
SA148-35B	Surfactants	1.8 mg/Kg	3.0U mg/Kg
SA148-45B	Surfactants	1.1 mg/Kg	3.1U mg/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	All soil samples in SDG R0905402

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAT7-0.5B	Chloride Nitrate as N Surfactants	4.9 mg/Kg 0.96 mg/Kg 1.4 mg/Kg	4.9J+ mg/Kg 0.96J+ mg/Kg 2.1U mg/Kg
RSAT7-10B	Chloride Nitrate as N Surfactants	6.2 mg/Kg 0.89 mg/Kg 1.4 mg/Kg	6.2J+ mg/Kg 0.89J+ mg/Kg 2.2U mg/Kg
RSAT7-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	153 mg/Kg 153 mg/Kg 55.6 mg/Kg 3.78 mg/Kg	153J+ mg/Kg 153J+ mg/Kg 55.6J+ mg/Kg 3.78J+ mg/Kg
RSAT7-44B	Total organic carbon Chloride Nitrate as N Surfactants	220 mg/Kg 65.2 mg/Kg 1.38 mg/Kg 0.9 mg/Kg	290U mg/Kg 65.2J+ mg/Kg 1.38J+ mg/Kg 2.6U mg/Kg
RSAT8-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	275 mg/Kg 262 mg/Kg 4.3 mg/Kg 1.13 mg/Kg 0.9 mg/Kg	275J+ mg/Kg 262J+ mg/Kg 4.3J+ mg/Kg 1.13J+ mg/Kg 2.1U mg/Kg
RSAT8-10B	Chloride Nitrate as N Surfactants	6.0 mg/Kg 1.45 mg/Kg 0.7 mg/Kg	6.0J+ mg/Kg 1.45J+ mg/Kg 2.1U mg/Kg
RSAT8-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	138 mg/Kg 138 mg/Kg 61.4 mg/Kg 4.73 mg/Kg 0.9 mg/Kg	138J+ mg/Kg 138J+ mg/Kg 61.4J+ mg/Kg 4.73J+ mg/Kg 2.3U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAT8009-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	141 mg/Kg 141 mg/Kg 60.4 mg/Kg 4.58 mg/Kg	141J+ mg/Kg 141J+ mg/Kg 60.4J+ mg/Kg 4.58J+ mg/Kg
RSAT8-44B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	296 mg/Kg 291 mg/Kg 157 mg/Kg 2.90 mg/Kg 0.8 mg/Kg	296J+ mg/Kg 291J+ mg/Kg 157J+ mg/Kg 2.90J+ mg/Kg 2.6U mg/Kg
SA203-0.5B	Chloride Nitrate as N	59.6 mg/Kg 1.82 mg/Kg	59.6J+ mg/Kg 1.82J+ mg/Kg
SA203-10B	Chloride Nitrate as N Surfactants	91.0 mg/Kg 2.11 mg/Kg 1 mg/Kg	91.0J+ mg/Kg 2.11J+ mg/Kg 2.2U mg/Kg
SA203-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	87 mg/Kg 87 mg/Kg 214 mg/Kg 5.42 mg/Kg	87J+ mg/Kg 87J+ mg/Kg 214J+ mg/Kg 5.42J+ mg/Kg
SA203-46B	Nitrate as N	3.59 mg/Kg	3.59J+ mg/Kg
SA148-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	118 mg/Kg 114 mg/Kg 11.2 mg/Kg	118J+ mg/Kg 114J+ mg/Kg 11.2J+ mg/Kg
SA148-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	219 mg/Kg 211 mg/Kg 300 mg/Kg 4.59 mg/Kg 1.1 mg/Kg	219J+ mg/Kg 211J+ mg/Kg 300J+ mg/Kg 4.59J+ mg/Kg 2.1U mg/Kg
SA148-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	141 mg/Kg 141 mg/Kg 55.5 mg/Kg 4.77 mg/Kg 2.3 mg/Kg	141J+ mg/Kg 141J+ mg/Kg 55.5J+ mg/Kg 4.77J+ mg/Kg 2.7U mg/Kg
SA148-35B	Chloride Nitrate as N Surfactants	170 mg/Kg 8.40 mg/Kg 1.8 mg/Kg	170J+ mg/Kg 8.40J+ mg/Kg 3.0U mg/Kg
SA148-45B	Chloride Nitrate as N Surfactants	361 mg/Kg 4.64 mg/Kg 1.1 mg/Kg	361J+ mg/Kg 4.64J+ mg/Kg 3.1U mg/Kg

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
RSAT7-44BMS (All soil samples in SDG R0905402)	Chloride	127 (75-125)	-	-	J+ (all detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
RSAT7-44BDUP (All soil samples in SDG R0905402)	Chloride	52 (≤20)	-	J (all detects) UJ (all non-detects)	A

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. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA203-46B	Dichloroacetate	129 (90-115)	Chlorate	J+ (all detects)	A
SA148-10B	Dichloroacetate	117 (90-115)	Chlorate	J+ (all detects)	A

VIII. 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 R0905402	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAT8-25B	RSAT8009-25B				
Alkalinity, total	138 mg/Kg	141 mg/Kg	2 (≤50)	-	-	-
Alkalinity, bicarbonate	138 mg/Kg	141 mg/Kg	2 (≤50)	-	-	-
Chloride	61.4 mg/Kg	60.4 mg/Kg	2 (≤50)	-	-	-
Nitrate as N	4.73 mg/Kg	4.58 mg/Kg	3 (≤50)	-	-	-
pH	8.06 units	8.09 units	0 (≤50)	-	-	-
Sulfate	17700 mg/Kg	18000 mg/Kg	2 (≤50)	-	-	-
Surfactants	0.9 mg/Kg	0.6U mg/Kg	-	0.3 (≤2.3)	-	-
Total organic carbon	630 mg/Kg	1000 mg/Kg	-	370 (≤300)	J (all detects)	A
Total phosphorus	887 mg/Kg	892 mg/Kg	1 (≤50)	-	-	-
Chlorate	2090 ug/Kg	2490 ug/Kg	17 (≤50)	-	-	-
Perchlorate	1940 ug/Kg	2400 ug/Kg	-	460 (≤590)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	Chloride	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	Chloride	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (ld)
R0905402	SA203-46B SA148-10B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R) (s)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B EB092309-SO1A4 SA148-0.5B SA148-10B SA148-30B SA148-35B SA148-45B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905402	RSAT8-25B RSAT8009-25B	Total organic carbon	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	EB092309-SO1A4	Alkalinity, total Alkalinity, bicarbonate Chloride Ammonia as N	2.0U mg/L 2.0U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905402	RSAT7-44B	Total organic carbon	290U mg/Kg	A	bl
R0905402	SA148-35B	Nitrite as N	0.15U mg/Kg	A	bl
R0905402	SA148-45B	Nitrite as N	0.15U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	SA148-10B	Surfactants	2.1U mg/Kg	A	be
R0905402	SA148-30B	Surfactants	2.7U mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	SA148-35B	Surfactants	3.0U mg/Kg	A	be
R0905402	SA148-45B	Surfactants	3.1U mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905402

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	RSAT7-0.5B	Chloride Nitrate as N Surfactants	4.9J+ mg/Kg 0.96J+ mg/Kg 2.1U mg/Kg	A	bf
R0905402	RSAT7-10B	Chloride Nitrate as N Surfactants	6.2J+ mg/Kg 0.89J+ mg/Kg 2.2U mg/Kg	A	bf
R0905402	RSAT7-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	153J+ mg/Kg 153J+ mg/Kg 55.6J+ mg/Kg 3.78J+ mg/Kg	A	bf
R0905402	RSAT7-44B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 65.2J+ mg/Kg 1.38J+ mg/Kg 2.6U mg/Kg	A	bf
R0905402	RSAT8-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	275J+ mg/Kg 262J+ mg/Kg 4.3J+ mg/Kg 1.13J+ mg/Kg 2.1U mg/Kg	A	bf
R0905402	RSAT8-10B	Chloride Nitrate as N Surfactants	6.0J+ mg/Kg 1.45J+ mg/Kg 2.1U mg/Kg	A	bf
R0905402	RSAT8-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	138J+ mg/Kg 138J+ mg/Kg 61.4J+ mg/Kg 4.73J+ mg/Kg 2.3U mg/Kg	A	bf
R0905402	RSAT8009-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	141J+ mg/Kg 141J+ mg/Kg 60.4J+ mg/Kg 4.58J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905402	RSAT8-44B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	296J+ mg/Kg 291J+ mg/Kg 157J+ mg/Kg 2.90J+ mg/Kg 2.6U mg/Kg	A	bf
R0905402	SA203-0.5B	Chloride Nitrate as N	59.6J+ mg/Kg 1.82J+ mg/Kg	A	bf
R0905402	SA203-10B	Chloride Nitrate as N Surfactants	91.0J+ mg/Kg 2.11J+ mg/Kg 2.2U mg/Kg	A	bf
R0905402	SA203-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	87J+ mg/Kg 87J+ mg/Kg 214J+ mg/Kg 5.42J+ mg/Kg	A	bf
R0905402	SA203-46B	Nitrate as N	3.59J+ mg/Kg	A	bf
R0905402	SA148-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	118J+ mg/Kg 114J+ mg/Kg 11.2J+ mg/Kg	A	bf
R0905402	SA148-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	219J+ mg/Kg 211J+ mg/Kg 300J+ mg/Kg 4.59J+ mg/Kg 2.1U mg/Kg	A	bf
R0905402	SA148-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	141J+ mg/Kg 141J+ mg/Kg 55.5J+ mg/Kg 4.77J+ mg/Kg 2.7U mg/Kg	A	bf
R0905402	SA148-35B	Chloride Nitrate as N Surfactants	170J+ mg/Kg 8.40J+ mg/Kg 3.0U mg/Kg	A	bf
R0905402	SA148-45B	Chloride Nitrate as N Surfactants	361J+ mg/Kg 4.64J+ mg/Kg 3.1U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B6
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12-7-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [signature]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / EPA SW846 Method 9060),

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: 9/22/09 - 9/23/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	SW	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(7,8)
XI	Field blanks	SW	EB=14, FB=FB080309-SO(SDG# R0904279)

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: all soil except EB=14

1	RSAT7-0.5B	11	SA203-10B	21	RSAT7-44BMSD	31	PBS
2	RSAT7-10B	12	SA203-30B	22	RSAT7-44BDUP	32	PBW
3	RSAT7-25B	13	SA203-46B	23		33	
4	RSAT7-44B	14	EB092309-SO1A4	24		34	
5	RSAT8-0.5B	15	SA148-0.5B	25		35	
6	RSAT8-10B	16	SA148-10B	26		36	
7	RSAT8-25B	17	SA148-30B	27		37	
8	RSAT8009-25B	18	SA148-35B	28		38	
9	RSAT8-44B	19	SA148-45B	29		39	
10	SA203-0.5B	20	RSAT7-44BMS	30		40	

Notes: _____

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-19	S/W	[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
QC:20		[✓ Alk] pH [✓ Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
21		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond [✓ ClO_3 ClO_4]
22		[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			14									
Alk., Total	1.7	1.8		1.9 / 2.0									
Alk., Bicarb.	1.7			1.9 / 2.0									
Cl	0.12	0.119		1.3 / 2.0									
NH3-N		0.0161		0.042 / 0.050									

Conc. units: mg/Kg **Associated Samples:** All Soil

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			4									
TOC	40	116.0		220 / 290									

Conc. units: mg/Kg **Associated Samples:** 1-11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	15												
Alk., Bicarb.	15												
Cl	1.1												

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 12, 13, 15-17

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	12												
Alk., Bicarb.	12												
Cl	1.0												

Conc. units: mg/Kg **Associated Samples:** 18, 19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			18	19								
Cl	1												
NO2-N	0.08	0.00756		0.15 / 0.15	0.14 / 0.15								

Conc. units: mg/Kg **Associated Samples:** 15-19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P	1.4	0.0064											

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: L

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 1, 2, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk. Total		0.5											

Conc. units: mg/Kg **Associated Samples:** 16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.096											

Conc. units: mg/Kg **Associated Samples:** 9, 11-13, 15, 16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.116											

Conc. units: mg/Kg **Associated Samples:** 17-19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.124											
SO4		0.149											

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: QR
2nd Reviewer: LA

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 9, 12, 13, 15, ~~16~~

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.104											

Conc. units: mg/Kg **Associated Samples:** 2-4, 7, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.161											

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Reason Code: be

Blank units: mg/L **Associated sample units:** mg/Kg
Sampling date: 9/23/09 Soil factor applied 10x except TOC @1x
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: 15-19

Analyte	Blank ID	Action Limit	Sample Identification							
	14		16	17	18	19				
Alk., Total	1.9									
Alk., Bicarb.	1.9									
NH3-N	0.042									
TOC	0.4									
Cl	1.3									
pH (pH units)	6.27									
Surfactants	0.53	53	1.1 / 2.1	2.3 / 2.7	1.8 / 3.0	1.1 / 3.1				

LDC #: 22109B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg
Sampling date: 8/3/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other:_____
Reason Code: bf
Associated Samples: All Soil

Analyte	Blank ID	Sample Identification																		
	FB080309-SO (SDG# R0904279)	Action Level	1	2	3	4	5	6	7	8	9	10	11	12	13	15	16	17	18	19
Total alkalinity	3.0	300			153 J+		275 J+		138 J+	141 J+	296 J+			87 J+		118 J+	219 J+	141 J+		
Bicarbonate alkalinity	3.0	300			153 J+		262 J+		138 J+	141 J+	291 J+			87 J+		114 J+	211 J+	141 J+		
Ammonia as N	0.113	11.3																		
TOC (average)	1.2					220 / 290														
Cl	3.9	390	4.9 J+	6.2 J+	55.6 J+	65.2 J+	4.3 J+	6.0 J+	61.4 J+	60.4 J+	157 J+	59.6 J+	91.0 J+	214 J+			300 J+	55.5 J+	170 J+	361 J+
Nitrate as N	0.65	65	0.96 J+	0.89 J+	3.78 J+	1.38 J+	1.13 J+	1.45 J+	4.73 J+	4.58 J+	2.90 J+	1.82 J+	2.11 J+	5.42 J+	3.59 J+	11.2 J+	4.59 J+	4.77 J+	8.40 J+	4.64 J+
pH (pH Units)	6.48																			
Total	0.015																			
TDS	22																			
Sulfate	1.6																			
Surfactants	0.043	4.3	1.4 / 2.1	1.4 / 2.2		0.9 / 2.6	0.9 / 2.1	0.7 / 2.1	0.9 / 2.3		0.8 / 2.6		1 / 2.2				1.1 / 2.1	2.3 / 2.7	1.8 / 3.0	1.1 / 3.1

LDC #: 22109B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: QR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	20	Soil	Cl	127	All Soil	J+det/A (m)

Comments:

LDC #: 22196B6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ≤ 35% for soil samples (≤ 10% for Method 300.0)? If no, see qualification below. 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. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
	22	Soil	Cl	52 (≤20)	All Soil	J/UJ/A (all)

Comments:

LDC #: 22109B6
SDG #: see cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes____ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
		Chlorate		DCA	129 (90-115)	13	J+det/A (s)
					117 (↓)	16	↓
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC#: 22109B6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg) 7	Concentration (mg/Kg) 8	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Total Alkalinity	138	141	2			
Bicarbonate Alkalinity	138	141	2			
Chloride	61.4	60.4	2			
Nitrate as N	4.73	4.58	3			
pH (pH Units)	8.06	8.09	0			
Sulfate	17700	18000	2			
Surfactants	0.9	0.6U		0.3	(≤2.3)	
TOC	630	1000		370	(≤300)	Jdet/A (fd)
Total Phosphorus	887	892	1			
Chlorate (ug/Kg)	2090	2490	17			
Perchlorate (ug/Kg)	1940	2400		460	(≤590)	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 23, 2009

LDC Report Date: December 14, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905434

Sample Identification

SA148-10BSPLP2
SA148-10BSPLP3
SA148-35BSPLP2
SA148-35BSPLP3

Introduction

This data review covers 4 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 353.2 for Nitrite as Nitrogen, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, Standard Method 2540C for Total Dissolved Solids, EPA SW 846 Method 9060 for Total Organic Carbon, EPA Method 300.1 for Chlorate, EPA Method 314.0 for Perchlorate, and Standard Method 2540D for Total Suspended Solids.

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) as there are no current guidelines for the method stated above.

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 X.

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
SA148-10BSPLP2	Hexavalent chromium	28.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA148-35BSPLP2	Hexavalent chromium	28.5 & 28.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA148-10BSPLP3	Hexavalent chromium	27.5 & 27.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P
SA148-35BSPLP3	Hexavalent chromium	26.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P

All samples were received in good condition with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
SA148-10BSPLP3	Total cyanide	Sample pH reported at 9 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P
SA148-35BSPLP3	Total cyanide	Sample pH reported at 10 upon receipt by the laboratory.	Sample must be preserved at pH >12.	J- (all detects) R (all non-detects)	P

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Conductivity Nitrate as N pH Sulfate	1.5 mg/L 1.5 mg/L 0.046 mg/L 0.17 mg/L 4.36 umhos/cm 0.049 mg/L 7.88 units 0.36 mg/L	SA148-10BSPLP2 SA148-35BSPLP2
ICB/CCB	Chloride	0.136 mg/L	SA148-10BSPLP2 SA148-35BSPLP2
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Conductivity Total phosphorus pH Sulfate	1.9 mg/L 1.9 mg/L 0.5 mg/L 0.11 mg/L 1.79 umhos/cm 0.011 mg/L 5.70 units 0.14 mg/L	SA148-10BSPLP3 SA148-35BSPLP3
ICB/CCB	Ammonia as N Total phosphorus Sulfate	0.0250 mg/L 0.0063 mg/L 0.192 mg/L	SA148-10BSPLP3 SA148-35BSPLP3
PB (prep blank)	Alkalinity, total	0.5 mg/L	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP3
ICB/CCB	Chloride	0.112 mg/L	SA148-35BSPLP3
ICB/CCB	Sulfate	0.044 mg/L	SA148-35BSPLP2

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10BSPLP2	Ammonia as N Sulfate	0.046 mg/L 2.49 mg/L	0.050U mg/L 2.49J+ mg/L
SA148-35BSPLP2	Ammonia as N	0.038 mg/L	0.050U mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA148-10BSPLP3	Total organic carbon Total phosphorus	0.3 mg/L 0.010 mg/L	1.0U mg/L 0.050U mg/L
SA148-35BSPLP3	Total organic carbon Total phosphorus	0.6 mg/L 0.021 mg/L	1.0U mg/L 0.050U mg/L

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

VIII. 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 R0905434	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0905434

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905434	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP2 SA148-35BSPLP3	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905434	SA148-10BSPLP3 SA148-35BSPLP3	Cyanide	J- (all detects) R (all non-detects)	P	Sample condition (preservation) (pH)
R0905434	SA148-10BSPLP2 SA148-10BSPLP3 SA148-35BSPLP2 SA148-35BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905434

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905434	SA148-10BSPLP2	Ammonia as N Sulfate	0.050U mg/L 2.49J+ mg/L	A	bl
R0905434	SA148-35BSPLP2	Ammonia as N	0.050U mg/L	A	bl
R0905434	SA148-10BSPLP3	Total organic carbon Total phosphorus	1.0U mg/L 0.050U mg/L	A	bl
R0905434	SA148-35BSPLP3	Total organic carbon Total phosphorus	1.0U mg/L 0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905434

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109C6
SDG #: R0905434
Laboratory: Columbia Analytical Services

Date: 12-7-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, ~~Nitrite-N~~ Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (9060), Chlorate (300.1), Perchlorate (314.0)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/23/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Client specified
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: SO1

1	SA148-10BSPLP2	11	PBS	21		31	
2	SA148-10BSPLP3	12		22		32	
3	SA148-35BSPLP2	13		23		33	
4	SA148-35BSPLP3	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 #: 22109C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [signature]
2nd reviewer: [signature]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-4	Soil	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109C6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CR
2nd reviewer: [illegible]

All circled dates have exceeded the technical holding time.
(X) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		7199	[illegible]	9012A			
Parameters:		Cr6+		CN			
Technical holding time:		24hrs					
Sample ID	Leaching ~~Sampling~~ date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	9/29/09 07:45	9/30/09 11:54	(28.25hrs)				J-/UJ/P (n)
↓		12:05	↓				
3		12:15	(28.5hrs)				
↓	↓ ↓	↓ 12:25	(28.75hrs)				
2	10/1/09 09:30	10/2/09 13:06	(27.75hrs)				
↓		13:05	(27.5hrs)				
4		11:42	(26.25hrs)				
↓	↓ ↓	↓ 11:52	↓				↓
2				pH=9	(Required ≥12)		J-/R/P (pH)
4				pH=10	↓		↓

LDC #: 22109C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: GR
2nd Reviewer: L

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 1, 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	3								
Alk., Total	1.5												
Alk., Bicarb.	1.5												
NH3-N	0.046			0.046 / 0.050	0.038 / 0.050								
Cl	0.17	0.136											
Cond. (umhos/cm)	4.36		43.6										
NO3-N	0.049												
pH (pH units)	7.88												
SO4	0.36		3.6	2.49 J+									

LDC #: 22109C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: LA

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 2, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			2	4								
Alk., Total	1.9												
Alk., Bicarb.	1.9												
NH3-N		0.0250											
TOC	0.5			0.3 / 1.0	0.6 / 1.0								
Cl	0.11												
Cond. (umhos/cm)	1.79		17.9										
T-P	0.011	0.0063		0.010 / 0.050	0.021 / 0.050								
pH (pH units)	5.70												
SO4	0.14	0.192											

Conc. units: mg/L **Associated Samples:** 1, 2, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Alk., Total		0.5											

LDC #: 22109C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.112											

Conc. units: mg/L **Associated Samples:** 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
SO4		0.044											

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 18, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO1A4
EB092809-SO2A4
SA29-0.5B
SA29-10B
SA29-25B
SA29-40B
SA120-0.5B
SA120-10B
SA120-25B
SA120-43B
SA209-0.5B
SA209-10B
SA209009-10B
SA209-25B
SA209-35B
SA212-0.5B
SA212-13B
SA212009-13B
SA212-30B
SA212-44B
SA29-40BMS
SA29-40BDUP
SA29-40BMSD
EB092809-SO1A4MS
EB092809-SO1A4MSD
EB092809-SO1A4DUP

Introduction

This data review covers 21 soil samples and 5 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, Lloyd/Kahn Method and EPA SW 846 Method 9060 for Total Organic Carbon, EPA Method 300.1 for Chlorate, and 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) as there are no current guidelines for the method stated above.

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 X.

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
EB092809-SO1A4	Hexavalent chromium	26.5 & 26.75 hours	24 hours	J- (all detects) UJ (all non-detects)	P

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon Total phosphorus	0.2 mg/L 0.006 mg/L	All water samples in SDG R0905524
ICB/CCB	Alkalinity, total Total organic carbon Ammonia as N Chloride Total phosphorus	0.5 mg/L 0.118 mg/L 0.0161 mg/L 0.136 mg/L 0.0166 mg/L	All water samples in SDG R0905524
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride Sulfate	12 mg/Kg 12 mg/Kg 1.4 mg/Kg 1.1 mg/Kg	SA29-0.5B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	10 mg/Kg 10 mg/Kg 1.0 mg/Kg	SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride	5 mg/Kg 5 mg/Kg 0.28 mg/Kg 1.2 mg/Kg	SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
ICB/CCB	Alkalinity, total	0.9 mg/L	SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
PB (prep blank)	Total phosphorus	1.6 mg/Kg	SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
PB (prep blank)	Total organic carbon	40 mg/Kg	SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	50 mg/Kg	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B
ICB/CCB	Total organic carbon Total phosphorus	116.0 mg/Kg 0.0064 mg/L	All soil samples in SDG R0905524
ICB/CCB	Chloride	0.107 mg/L	SA29-0.5B SA120-0.5B SA120-10B SA209-10B SA209009-10B
ICB/CCB	Sulfate	0.183 mg/L	SA29-0.5B SA29-10B SA209009-10B
ICB/CCB	Chloride	0.105 mg/L	SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B
ICB/CCB	Sulfate	0.124 mg/L	SA212-0.5B SA212-13B SA212009-13B
ICB/CCB	Chloride	0.120 mg/L	SA29-10B SA29-25B SA120-25B SA120-43B SA209-0.5B
ICB/CCB	Sulfate	0.198 mg/L	SA120-0.5B SA120-10B SA209-10B SA209-25B SA209-35B SA212-30B SA212-44B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Sulfate	0.039 mg/L	SA29-25B SA29-40B SA120-25B SA120-43B SA209-0.5B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092809-SO1A4	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Ammonia as N Chloride Total phosphorus	1.2 mg/L 1.2 mg/L 0.3 mg/L 0.019 mg/L 0.8 mg/L 0.011 mg/L	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L 2.0U mg/L 0.050U mg/L
EB092809-SO2A4	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Total phosphorus	1.5 mg/L 1.5 mg/L 0.3 mg/L 0.012 mg/L	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L
SA120-43B	Total organic carbon	200 mg/Kg	300U mg/Kg
SA209-35B	Total organic carbon	260 mg/Kg	290U mg/Kg

Samples EB092809-SO1A4 and EB092809-SO2A4 were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092809-SO1A4	9/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride pH Total phosphorus Sulfate Surfactants Chlorate Perchlorate	1.2 mg/L 1.2 mg/L 0.019 mg/L 0.3 mg/L 0.8 mg/L 7.48 units 0.011 mg/L 2.4 mg/L 0.118 mg/L 6 ug/L 0.7 ug/L	All soil samples in SDG R0905524

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092809-SO2A4	9/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon pH Total phosphorus Surfactants Perchlorate	1.5 mg/L 1.5 mg/L 0.076 mg/L 0.3 mg/L 7.00 units 0.012 mg/L 0.021 mg/L 0.7 ug/L	All soil samples in SDG R0905524

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA29-0.5B	Surfactants Sulfate Chlorate	0.7 mg/Kg 57.6 mg/Kg 183 ug/Kg	2.1U mg/Kg 57.6J+ mg/Kg 220U ug/Kg
SA29-10B	Surfactants Sulfate	0.7 mg/Kg 30.2 mg/Kg	2.1U mg/Kg 30.2J+ mg/Kg
SA29-25B	Surfactants	0.6 mg/Kg	2.4U mg/Kg
SA120-0.5B	Surfactants Sulfate	1.3 mg/Kg 172 mg/Kg	2.2U mg/Kg 172J+ mg/Kg
SA120-10B	Surfactants Sulfate	0.9 mg/Kg 174 mg/Kg	2.1U mg/Kg 174J+ mg/Kg
SA120-43B	Total organic carbon	200 mg/Kg	300U mg/Kg
SA209-0.5B	Surfactants	0.7 mg/Kg	2.1U mg/Kg
SA209-10B	Surfactants Sulfate	1 mg/Kg 108 mg/Kg	2.1U mg/Kg 108J+ mg/Kg
SA209009-10B	Sulfate	94.0 mg/Kg	94.0J+ mg/Kg
SA209-25B	Surfactants	1.3 mg/Kg	2.8U mg/Kg
SA209-35B	Total organic carbon Surfactants	260 mg/Kg 1.6 mg/Kg	290U mg/Kg 3.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA212-0.5B	Surfactants Sulfate	0.6 mg/Kg 78.2 mg/Kg	2.1U mg/Kg 78.2J+ mg/Kg
SA212-13B	Sulfate	25.6 mg/Kg	25.6J+ mg/Kg
SA212009-13B	Sulfate	27.3 mg/Kg	27.3J+ mg/Kg
SA212-30B	Surfactants	1.5 mg/Kg	2.8U mg/Kg
SA212-44B	Surfactants Chlorate	0.9 mg/Kg 292 ug/Kg	2.9U mg/Kg 300U ug/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	All soil samples in SDG R0905524

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA29-0.5B	Chloride Nitrate as N Surfactants	15.8 mg/Kg 1.68 mg/Kg 0.7 mg/Kg	15.8J+ mg/Kg 1.68J+ mg/Kg 2.1U mg/Kg
SA29-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	238 mg/Kg 229 mg/Kg 364 mg/Kg 2.41 mg/Kg 0.7 mg/Kg	238J+ mg/Kg 229J+ mg/Kg 364J+ mg/Kg 2.41J+ mg/Kg 2.1U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA29-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	118 mg/Kg 118 mg/Kg 8.50 mg/Kg 0.6 mg/Kg	118J+ mg/Kg 118J+ mg/Kg 8.50J+ mg/Kg 2.4U mg/Kg
SA29-40B	Nitrate as N	10.5 mg/Kg	10.5J+ mg/Kg
SA120-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	281 mg/Kg 270 mg/Kg 37.4 mg/Kg 3.20 mg/Kg 1.3 mg/Kg	281J+ mg/Kg 270J+ mg/Kg 37.4J+ mg/Kg 3.20J+ mg/Kg 2.2U mg/Kg
SA120-10B	Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	294 mg/Kg 16.5 mg/Kg 2.75 mg/Kg 0.9 mg/Kg	294J+ mg/Kg 16.5J+ mg/Kg 2.75J+ mg/Kg 2.1U mg/Kg
SA120-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	139 mg/Kg 139 mg/Kg 35.0 mg/Kg	139J+ mg/Kg 139J+ mg/Kg 35.0J+ mg/Kg
SA120-43B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	228 mg/Kg 228 mg/Kg 200 mg/Kg 331 mg/Kg 12.9 mg/Kg	228J+ mg/Kg 228J+ mg/Kg 300U mg/Kg 331J+ mg/Kg 12.9J+ mg/Kg
SA209-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	164 mg/Kg 164 mg/Kg 18.4 mg/Kg 0.7 mg/Kg	164J+ mg/Kg 164J+ mg/Kg 18.4J+ mg/Kg 2.1U mg/Kg
SA209-10B	Chloride Nitrate as N Surfactants	98.4 mg/Kg 3.78 mg/Kg 1 mg/Kg	98.4J+ mg/Kg 3.78J+ mg/Kg 2.1U mg/Kg
SA209009-10B	Chloride Nitrate as N	79.1 mg/Kg 3.25 mg/Kg	79.1J+ mg/Kg 3.25J+ mg/Kg
SA209-25B	Chloride Nitrate as N Surfactants	146 mg/Kg 3.74 mg/Kg 1.3 mg/Kg	146J+ mg/Kg 3.74J+ mg/Kg 2.8U mg/Kg
SA209-35B	Total organic carbon Chloride Nitrate as N Surfactants	260 mg/Kg 143 mg/Kg 4.59 mg/Kg 1.6 mg/Kg	290U mg/Kg 143J+ mg/Kg 4.59J+ mg/Kg 3.2U mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA212-0.5B	Chloride Nitrate as N Surfactants	68.2 mg/Kg 3.47 mg/Kg 0.6 mg/Kg	68.2J+ mg/Kg 3.47J+ mg/Kg 2.1U mg/Kg
SA212-13B	Chloride Nitrate as N	3.9 mg/Kg 1.10 mg/Kg	3.9J+ mg/Kg 1.10J+ mg/Kg
SA212009-13B	Chloride Nitrate as N	4.1 mg/Kg 1.17 mg/Kg	4.1J+ mg/Kg 1.17J+ mg/Kg
SA212-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	129 mg/Kg 129 mg/Kg 11.2 mg/Kg 1.37 mg/Kg 1.5 mg/Kg	129J+ mg/Kg 129J+ mg/Kg 11.2J+ mg/Kg 1.37J+ mg/Kg 2.8U mg/Kg
SA212-44B	Chloride Nitrate as N Surfactants	34.7 mg/Kg 2.58 mg/Kg 0.9 mg/Kg	34.7J+ mg/Kg 2.58J+ mg/Kg 2.9U mg/Kg

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
SA29-40BMS (All soil samples in SDG R0905524)	Alkalinity, total	130 (75-125)	-	-	Alkalinity, total Alkalinity, bicarbonate	J+ (all detects) J+ (all detects)	A
SA29-40BMS (All soil samples in SDG R0905524)	Sulfate	11 (75-125)	-	-	Sulfate	J- (all detects) R (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
SA29-40BDUP (All samples in SDG R0905524)	Total phosphorus	22 (≤20)	-	J (all detects) UJ (all non-detects)	A

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 with the following exceptions:

LCS ID (Associated Samples)	Analyte	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS (All soil samples in SDG R0905524)	Perchlorate	76 (85-115)	-	-	J- (all detects) UJ (all non-detects)	P

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA29-10B	Dichloroacetate	116 (90-115)	Chlorate	J+ (all detects)	A
SA120-25B	Dichloroacetate	118 (90-115)	Chlorate	J+ (all detects)	A
SA120-43B	Dichloroacetate	119 (90-115)	Chlorate	J+ (all detects)	A
SA209-10B	Dichloroacetate	142 (90-115)	Chlorate	J+ (all detects)	A
SA209009-10B	Dichloroacetate	118 (90-115)	Chlorate	J+ (all detects)	A
SA209-25B	Dichloroacetate	116 (90-115)	Chlorate	J+ (all detects)	A
SA212-0.5B	Dichloroacetate	146 (90-115)	Chlorate	J+ (all detects)	A
SA212-44B	Dichloroacetate	116 (90-115)	Chlorate	J+ (all detects)	A

VIII. 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 R0905524	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples SA209-10B and SA209009-10B and samples SA212-13B and SA212009-13B were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Alkalinity, total	386 mg/Kg	412 mg/Kg	7 (≤50)	-	-	-
Alkalinity, bicarbonate	365 mg/Kg	388 mg/Kg	6 (≤50)	-	-	-
Alkalinity, carbonate	20 mg/Kg	24 mg/Kg	-	4 (≤21)	-	-
Chloride	98.4 mg/Kg	79.1 mg/Kg	22 (≤50)	-	-	-
Nitrate as N	3.78 mg/Kg	3.25 mg/Kg	15 (≤50)	-	-	-
pH	8.96 units	9.06 units	1 (≤50)	-	-	-
Sulfate	108 mg/Kg	94.0 mg/Kg	14 (≤50)	-	-	-
Surfactants	1 mg/Kg	0.6U mg/Kg	-	0.4 (≤2.1)	-	-
Total organic carbon	630 mg/Kg	490 mg/Kg	-	140 (≤300)	-	-
Total phosphorus	1040 mg/Kg	1020 mg/Kg	2 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Chlorate	1000 ug/Kg	937 ug/Kg	7 (≤50)	-	-	-
Perchlorate	1430 ug/Kg	1490 ug/Kg	-	60 (≤540)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA212-13B	SA212009-13B				
Alkalinity, total	706 mg/Kg	783 mg/Kg	10 (≤50)	-	-	-
Alkalinity, bicarbonate	655 mg/Kg	730 mg/Kg	11 (≤50)	-	-	-
Alkalinity, carbonate	51 mg/Kg	52 mg/Kg	-	1 (≤22)	-	-
Chloride	3.9 mg/Kg	4.1 mg/Kg	-	0.2 (≤2.2)	-	-
Nitrate as N	1.10 mg/Kg	1.17 mg/Kg	-	0.07 (≤0.54)	-	-
pH	9.95 units	9.73 units	2 (≤50)	-	-	-
Sulfate	25.6 mg/Kg	27.3 mg/Kg	6 (≤50)	-	-	-
Total organic carbon	640 mg/Kg	440 mg/Kg	-	200 (≤300)	-	-
Total phosphorus	738 mg/Kg	632 mg/Kg	15 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905524	EB092809-SO1A4	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Alkalinity, total Alkalinity, bicarbonate	J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Sulfate	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Total phosphorus	J (all detects) UJ (all non-detects)	A	Duplicate sample analysis (RPD) (Id)
R0905524	SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	Perchlorate	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (I)
R0905524	SA29-10B SA120-25B SA120-43B SA209-10B SA209009-10B SA209-25B SA212-0.5B SA212-44B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905524	EB092809-SO1A4 EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	EB092809-SO1A4	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Ammonia as N Chloride Total phosphorus	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905524	EB092809-SO2A4	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Total phosphorus	2.0U mg/L 2.0U mg/L 1.0U mg/L 0.050U mg/L	A	bl
R0905524	SA120-43B	Total organic carbon	300U mg/Kg	A	bl
R0905524	SA209-35B	Total organic carbon	290U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA29-0.5B	Surfactants Sulfate Chlorate	2.1U mg/Kg 57.6J+ mg/Kg 220U ug/Kg	A	be
R0905524	SA29-10B	Surfactants Sulfate	2.1U mg/Kg 30.2J+ mg/Kg	A	be
R0905524	SA29-25B	Surfactants	2.4U mg/Kg	A	be
R0905524	SA120-0.5B	Surfactants Sulfate	2.2U mg/Kg 172J+ mg/Kg	A	be
R0905524	SA120-10B	Surfactants Sulfate	2.1U mg/Kg 174J+ mg/Kg	A	be
R0905524	SA120-43B	Total organic carbon	300U mg/Kg	A	be
R0905524	SA209-0.5B	Surfactants	2.1U mg/Kg	A	be
R0905524	SA209-10B	Surfactants Sulfate	2.1U mg/Kg 108J+ mg/Kg	A	be
R0905524	SA209009-10B	Sulfate	94.0J+ mg/Kg	A	be
R0905524	SA209-25B	Surfactants	2.8U mg/Kg	A	be
R0905524	SA209-35B	Total organic carbon Surfactants	290U mg/Kg 3.2U mg/Kg	A	be
R0905524	SA212-0.5B	Surfactants Sulfate	2.1U mg/Kg 78.2J+ mg/Kg	A	be
R0905524	SA212-13B	Sulfate	25.6J+ mg/Kg	A	be
R0905524	SA212009-13B	Sulfate	27.3J+ mg/Kg	A	be
R0905524	SA212-30B	Surfactants	2.8U mg/Kg	A	be
R0905524	SA212-44B	Surfactants Chlorate	2.9U mg/Kg 300U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905524

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA29-0.5B	Chloride Nitrate as N Surfactants	15.8J+ mg/Kg 1.68J+ mg/Kg 2.1U mg/Kg	A	bf
R0905524	SA29-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	238J+ mg/Kg 229J+ mg/Kg 364J+ mg/Kg 2.41J+ mg/Kg 2.1U mg/Kg	A	bf
R0905524	SA29-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	118J+ mg/Kg 118J+ mg/Kg 8.50J+ mg/Kg 2.4U mg/Kg	A	bf
R0905524	SA29-40B	Nitrate as N	10.5J+ mg/Kg	A	bf
R0905524	SA120-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	281J+ mg/Kg 270J+ mg/Kg 37.4J+ mg/Kg 3.20J+ mg/Kg 2.2U mg/Kg	A	bf
R0905524	SA120-10B	Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	294J+ mg/Kg 16.5J+ mg/Kg 2.75J+ mg/Kg 2.1U mg/Kg	A	bf
R0905524	SA120-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	139J+ mg/Kg 139J+ mg/Kg 35.0J+ mg/Kg	A	bf
R0905524	SA120-43B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	228J+ mg/Kg 228J+ mg/Kg 300U mg/Kg 331J+ mg/Kg 12.9J+ mg/Kg	A	bf
R0905524	SA209-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	164J+ mg/Kg 164J+ mg/Kg 18.4J+ mg/Kg 2.1U mg/Kg	A	bf
R0905524	SA209-10B	Chloride Nitrate as N Surfactants	98.4J+ mg/Kg 3.78J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905524	SA209009-10B	Chloride Nitrate as N	79.1J+ mg/Kg 3.25J+ mg/Kg	A	bf
R0905524	SA209-25B	Chloride Nitrate as N Surfactants	146J+ mg/Kg 3.74J+ mg/Kg 2.8U mg/Kg	A	bf
R0905524	SA209-35B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 143J+ mg/Kg 4.59J+ mg/Kg 3.2U mg/Kg	A	bf
R0905524	SA212-0.5B	Chloride Nitrate as N Surfactants	68.2J+ mg/Kg 3.47J+ mg/Kg 2.1U mg/Kg	A	bf
R0905524	SA212-13B	Chloride Nitrate as N	3.9J+ mg/Kg 1.10J+ mg/Kg	A	bf
R0905524	SA212009-13B	Chloride Nitrate as N	4.1J+ mg/Kg 1.17J+ mg/Kg	A	bf
R0905524	SA212-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	129J+ mg/Kg 129J+ mg/Kg 11.2J+ mg/Kg 1.37J+ mg/Kg 2.8U mg/Kg	A	bf
R0905524	SA212-44B	Chloride Nitrate as N Surfactants	34.7J+ mg/Kg 2.58J+ mg/Kg 2.9U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D6
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12-7-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6),~~ Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / EPA SW846 Method 9060), Chlorate (300.1), Perchlorate (314.0)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/28/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	~~Not required~~ CR
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	SW	DUP
VII.	Laboratory control samples	~~A~~ SW	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(12,13), (17,18)
XI	Field blanks	SW	EB=1, 2, FB= FB080309-SO (SDG# R0904279)

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: all soil except 1, 2 = water

1	EB092809-SO1A4	11	SA209-0.5B	21	SA29-40BMS	31	PBLW
2	EB092809-SO2A4	12	SA209-10B	22	SA29-40BDUP	32	PBS
3	SA29-0.5B	13	SA209009-10B	~~23~~	~~SA29-0.5BRE~~	33	
4	SA29-10B	14	SA209-25B	24	EB092809-SO1A4MS	34	
5	SA29-25B	15	SA209-35B	25	↓ MSD	35	
6	SA29-40B	16	SA212-0.5B	26	↓ DUP	36	
7	SA120-0.5B	17	SA212-13B	27	SA29-40BMSD	37	
8	SA120-10B	18	SA212009-13B	28		38	
9	SA120-25B	19	SA212-30B	29		39	
10	SA120-43B	20	SA212-44B	30		40	

Notes: _____

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-20	S/W	[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
~~23~~		Alk pH Br Cl NO_3 NO_2 SO_4 ~~NH_3~~ TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC:24		[✓ Alk] pH [✓ Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
↓ 25		[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
QC:24-26		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond [✓ ClO_3] ClO_4
↓ 27		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond [✓ ClO_3] [✓ ClO_4]
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109D6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CR
2nd reviewer: ✓

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
Y (N) N/A Were all cooler temperatures within validation criteria?

Method:		7199					
Parameters:		Cr6+					
Technical holding time:		24hrs					
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
(01)	9/28/09 0922	9/29/09 11:53	(26.5 hrs)				(J-/UJ/R) (h)
↓	↓	↓ 12:04	(26.75 hrs)				↓

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	2								
Alk., Total		0.5		1.2 / 2.0	1.5 / 2.0								
TOC	0.2	0.118		0.3 / 1.0	0.3 / 1.0								
NH3-N		0.0161		0.019 / 0.050									
Cl		0.136		0.8 / 2.0									
T-P	0.006	0.0166		0.011 / 0.050	0.012 / 0.050								

Alk, Bicarb 1.2/2.0 1.5/2.0

Conc. units: mg/Kg **Associated Samples:** 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	12												
Alk., Bicarb.	12												
Cl	1.4												
SO4	1.1												

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 4-13

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	10												
Alk., Bicarb.	10												
Cl	1.0												

Conc. units: mg/Kg **Associated Samples:** 14-20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	5	0.9											
Alk., Bicarb.	5												
NH3-N	0.28												
Cl	1.2												

Conc. units: mg/Kg **Associated Samples:** 5-20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P	1.6												

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: QR
2nd Reviewer: W

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 16-20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
TOC	40												

Conc. units: mg/Kg **Associated Samples: 3-15**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			10	15								
TOC	50			200 / 300	260 / 290								

Conc. units: mg/Kg **Associated Samples: All Soil**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			10	15								
TOC		116.0 mg/Kg		See PB	See PB								
T-P		0.0064											

Conc. units: mg/Kg **Associated Samples: 3, 7, 8, 12, 13**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.107											

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 3, 4, 13

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.183											

Conc. units: mg/Kg **Associated Samples:** 15-20

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.105											

Conc. units: mg/Kg **Associated Samples:** 16-18

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.124											

Conc. units: mg/Kg **Associated Samples:** 4, 5, 9-11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.120											

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 7, 8, 12, 14, 15, 19, 20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.198											

Conc. units: mg/Kg **Associated Samples: 5, 6, 9-11**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.039											

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, EPA Method See Cover

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target analytes detected in the field blanks?

Blank units: mg/L **Associated sample units: mg/Kg except ClO3 and ClO4 in ug/Kg** Reason Code: be

Sampling date: 9/23/09 Soil factor applied 10x except TOC @1x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Soil

Analyte	Blank ID	Blank ID	Action Limit					Sample Identification											
	1	2		3	4	5	7	8	10	11	12	13	14	15	16	17	18	19	20
Alk., Total	1.2	1.5																	
Alk., Bicarb.	1.2	1.5																	
NH3-N	0.019	0.076	7.6																
TOC	0.3	0.3							200 / 300					260 / 290					
Cl	0.8																		
pH (pH units)	7.48	7.00																	
T-P	0.011	0.012	1.1																
SO4	2.4		240	57.6 J+	30.2 J+		172 J+	174 J+			108 J+	94.0 J+			78.2 J+	25.6 J+	27.3 J+		
Surfactants	0.118	0.021	11.8	0.7 / 2.1	0.7 / 2.1	0.6 / 2.4	1.3 / 2.2	0.9 / 2.1		0.7 / 2.1	1 / 2.1		1.3 / 2.8	1.6 / 3.2	0.6 / 2.1			1.5 / 2.8	0.9 / 2.9
Chlorate (ug/Kg)	6 ug/L			183 / 220															292 / 300
Perchlorate	0.7 ug/L	0.7 ug/L																	

LDC #: 22109D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: ER
2nd Reviewer: LA

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg
Sampling date: 8/3/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other:

Reason Code: bf
Associated Samples: All Soil ~~2-20=All. 23 = NH3-N only.~~

Analyte	Blank ID	Sample Identification																	
	FB080309-SO (SDG# R0904279)	Action Level	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Total alkalinity	3.0	300		238 J+	118 J+		281 J+		139 J+	228 J+	164 J+								129 J+	
Bicarbonate alkalinity	3.0	300		229 J+	118 J+		270 J+	294 J+	139 J+	228 J+	164 J+								129 J+	
Ammonia as N	0.113	11.3																		
TOC (average)	1.2									200 / 300					260 / 290					
Cl	3.9	390	15.8 J+	364 J+			37.4 J+	16.5 J+		331 J+		98.4 J+	79.1 J+	146 J+	143 J+	68.2 J+	3.9 J+	4.1 J+	11.2 J+	34.7 J+
Nitrate as N	0.65	65	1.68 J+	2.41 J+	8.50 J+	10.5 J+	3.20 J+	2.75 J+	35.0 J+	12.9 J+	18.4 J+	3.78 J+	3.25 J+	3.74 J+	4.59 J+	3.47 J+	1.10 J+	1.17 J+	1.37 J+	2.58 J+
pH (pH Units)	6.48																			
Total	0.015																			
TDS	22																			
Sulfate	1.6																			
Surfactants	0.043	4.3	0.7 / 2.1	0.7 / 2.1	0.6 / 2.4		1.3 / 2.2	0.9 / 2.1			0.7 / 2.1	1 / 2.1		1.3 / 2.8	1.6 / 3.2	0.6 / 2.1			1.5 / 2.8	0.9 / 2.9

LDC #: 22109O6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL ~~IV~~ ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	21	Soil	Alk, Total, ~~Frac~~ SO4	~~130~~ 11	~~3 20~~ All Soil	J+ det+ (A Cm) (Total Fraction Blk) / J- (R/A)

Comments:

LDC #: 221906
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Duplicate Analysis

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a duplicate sample analyzed for each matrix in this SDG?

Y (N) N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water and ≤ 35% for soil samples (≤ 10% for Method 300.0)? If no, see qualification below. 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. If field blanks were used for laboratory duplicates, see overall assessment.

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Duplicate ID	Matrix	Analyte	RPD (Limits)	Associated Samples	Qualifications
	22	Soil	T-P	22 (≤20)	~~38 39 40~~ All Soil	J / UJ / A (lod)

Comments: _____

LDC #: 22109B6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a laboratory control sample (LCS) analyzed for each matrix in this SDG?

Y (N) N/A Were all LCS percent recoveries (%R) within the control limits of 80-120% (85-115% for Method 300.0)?

LEVEL IV ONLY:

Y N (N/A) Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	LCS ID	Matrix	Analyte	%R (limits)	Associated Samples	Qualifications
	LCS	Soil	Perchlorate	76 (85-115)	All Soil	J-/UJ/P (1)

Comments:

LDC #: 22109D6
SDG #: seecover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes ✓ or No ____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
		Chlorate		DCA	116 (90-115)	4	J+ (all detects) A (5)
					118 ( )	9	
					119 ( )	10	
					142 ( )	12	
					118 ( )	13	
					116 ( )	14	
					146 ( )	16	
					116 ( )	20	
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC#: 22109D6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: W

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg) 12	Concentration (mg/Kg) 13	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Total Alkalinity	386	412	7			
Bicarbonate Alkalinity	365	388	6			
Carbonate Alkalinity	20	24		4	(≤21)	
Chloride	98.4	79.1	22			
Nitrate as N	3.78	3.25	15			
pH (pH Units)	8.96	9.06	1			
Sulfate	108	94.0	14			
Surfactants	1	0.6U		0.4	(≤2.1)	
TOC	630	490		140	(≤300)	
Total Phosphorus	1040	1020	2			
Chlorate (ug/Kg)	1000	937	7			
Percholorate (ug/Kg)	1430	1490		60	(≤540)	

LDC#: 22109D6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: ✓

Inorganics, Method See Cover

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	17	18				
Total Alkalinity	706	783	10			
Bicarbonate Alkalinity	655	730	11			
Carbonate Alkalinity	51	52		1	(≤22)	
Chloride	3.9	4.1		0.2	(≤2.2)	
Nitrate as N	1.10	1.17		0.07	(≤0.54)	
pH (pH Units)	9.95	9.73	2			
Sulfate	25.6	27.3	6			
TOC	640	440		200	(≤300)	
Total Phosphorus	738	632	15			

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 18, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

EB092909-SO1A4
EB092909-SO2A4
SA213-0.5B
SA213-14B
SA213-30B
SA213-44B
SA110-0.5B
SA110-10B
SA110-25B
SA110-37B
SA110009-37B
SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B
SA193-0.5B
SA193-10B
SA193009-10B
SA193-25B
SA193-42B
SA193-2.5B
SA213-14BMS
SA213-14BDUP
SA213-14BMSD
EB092909-SO1A4MS
EB092909-SO1A4MSD
EB092909-SO1A4DUP

Introduction

This data review covers 23 soil samples and 5 water samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, Lloyd/Kahn Method and EPA SW 846 Method 9060 for Total Organic Carbon, EPA Method 300.1 for Chlorate, and 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) as there are no current guidelines for the method stated above.

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 X.

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
EB092909-SO2A4	Hexavalent chromium	27 & 27.25 hours	24 hours	J- (all detects) UJ (all non-detects)	P
EB092909-SO1A4	Nitrate as N	49.75 hours	48 hours	J- (all detects) UJ (all non-detects)	P

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
10/20/09	CCV	Surfactants	88.8 (90-110)	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	J- (all detects) UJ (all non-detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon Total phosphorus	0.2 mg/L 0.006 mg/L	All water samples in SDG R0905539
ICB/CCB	Alkalinity, total Total organic carbon Ammonia as N Sulfate Total phosphorus	0.5 mg/L 0.118 mg/L 0.0161 mg/L 0.192 mg/L 0.0166 mg/L	All water samples in SDG R0905539
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	5 mg/Kg 5 mg/Kg 1.2 mg/Kg	SA213-0.5B SA213-14B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	11 mg/Kg 11 mg/Kg 1.4 mg/Kg	SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Sulfate	15 mg/Kg 15 mg/Kg 1.9 mg/Kg	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B
PB (prep blank)	Total phosphorus	1.6 mg/Kg	SA213-0.5B SA213-14B SA213-30B SA213-44B
PB (prep blank)	Total phosphorus	1.4 mg/Kg	SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	40 mg/Kg	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B
ICB/CCB	Total organic carbon Total phosphorus	116.0 mg/Kg 0.0064 mg/L	All soil samples in SDG R0905539
ICB/CCB	Alkalinity, total	0.9 mg/L	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B
ICB/CCB	Alkalinity, total	0.5 mg/L	SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B
ICB/CCB	Cyanide	0.00734 mg/L	SA193009-10B
ICB/CCB	Chloride Sulfate	0.100 mg/L 0.125 mg/L	SA213-0.5B
ICB/CCB	Chloride Sulfate	0.105 mg/L 0.124 mg/L	SA213-14B
ICB/CCB	Chloride	0.120 mg/L	SA110-0.5B SA110-25B SA110-37B SA110009-37B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.112 mg/L	SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B
ICB/CCB	Sulfate	0.198 mg/L	SA213-30B SA213-44B SA191-25B
ICB/CCB	Sulfate	0.039 mg/L	SA110-0.5B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB092909-SO1A4	Total organic carbon Ammonia as N Total phosphorus	0.4 mg/L 0.009 mg/L 0.012 mg/L	1.0U mg/L 0.050U mg/L 0.050U mg/L
EB092909-SO2A4	Total organic carbon Ammonia as N Total phosphorus	0.2 mg/L 0.019 mg/L 0.01 mg/L	1.0U mg/L 0.050U mg/L 0.050U mg/L
SA213-44B	Total organic carbon	190 mg/Kg	300U mg/Kg
SA110-10B	Total organic carbon	290 mg/Kg	300U mg/Kg
SA110-25B	Total organic carbon	270 mg/Kg	290U mg/Kg
SA191009-40B	Total organic carbon	280 mg/Kg	300U mg/Kg

Samples EB092909-SO1A4 and EB092909-SO2A4 were identified as equipment blanks. No contaminant concentrations were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB092909-SO1A4	9/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.009 mg/L 0.4 mg/L 1.2 mg/L 0.79 mg/L 5.39 units 0.012 mg/L 2.5 mg/L 0.079 mg/L	All soil samples in SDG R0905539
EB092909-SO2A4	9/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants Chlorate Perchlorate	0.019 mg/L 0.2 mg/L 1.2 mg/L 0.70 mg/L 4.75 units 0.01 mg/L 2.2 mg/L 0.049 mg/L 8 ug/L 1.3 ug/L	All soil samples in SDG R0905539

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA213-0.5B	Nitrate as N Sulfate Surfactants Chlorate	1.05 mg/Kg 77.2 mg/Kg 0.7 mg/Kg 60 ug/Kg	1.05J+ mg/Kg 77.2J+ mg/Kg 2.2U mg/Kg 230U ug/Kg
SA213-14B	Nitrate as N Sulfate	2.05 mg/Kg 62.1 mg/Kg	2.05J+ mg/Kg 62.1J+ mg/Kg
SA213-30B	Nitrate as N Surfactants	6.91 mg/Kg 0.7 mg/Kg	6.91J+ mg/Kg 2.8U mg/Kg
SA213-44B	Total organic carbon Nitrate as N	190 mg/Kg 5.42 mg/Kg	300U mg/Kg 5.42J+ mg/Kg
SA110-0.5B	Nitrate as N Surfactants	26.6 mg/Kg 1.3 mg/Kg	26.6J+ mg/Kg 2.1U mg/Kg
SA110-10B	Total organic carbon Nitrate as N Sulfate	290 mg/Kg 2.05 mg/Kg 97.3 mg/Kg	300U mg/Kg 2.05J+ mg/Kg 97.3J+ mg/Kg
SA110-25B	Ammonia as N Total organic carbon Nitrate as N	0.11 mg/Kg 270 mg/Kg 3.69 mg/Kg	0.68U mg/Kg 290U mg/Kg 3.69J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA110-37B	Nitrate as N	4.98 mg/Kg	4.98J+ mg/Kg
SA110009-37B	Nitrate as N Surfactants	4.32 mg/Kg 1.4 mg/Kg	4.32J+ mg/Kg 3.0U mg/Kg
SA191-0.5B	Nitrate as N Surfactants	15.5 mg/Kg 1.3 mg/Kg	15.5J+ mg/Kg 2.1U mg/Kg
SA191-10B	Nitrate as N Sulfate	3.88 mg/Kg 153 mg/Kg	3.88J+ mg/Kg 153J+ mg/Kg
SA191-25B	Nitrate as N	3.76 mg/Kg	3.76J+ mg/Kg
SA191-40B	Nitrate as N Surfactants	2.80 mg/Kg 0.9 mg/Kg	2.80J+ mg/Kg 2.5U mg/Kg
SA191009-40B	Total organic carbon Nitrate as N	280 mg/Kg 2.79 mg/Kg	300U mg/Kg 2.79J+ mg/Kg
SA193-0.5B	Nitrate as N	2.64 mg/Kg	2.64J+ mg/Kg
SA193-10B	Nitrate as N Surfactants	1.74 mg/Kg 0.7 mg/Kg	1.74J+ mg/Kg 2.2U mg/Kg
SA193009-10B	Nitrate as N Surfactants	1.78 mg/Kg 0.8 mg/Kg	1.78J+ mg/Kg 2.1U mg/Kg
SA193-25B	Nitrate as N	2.10 mg/Kg	2.10J+ mg/Kg
SA193-42B	Nitrate as N Surfactants	10.1 mg/Kg 1.5 mg/Kg	10.1J+ mg/Kg 2.6U mg/Kg
SA193-2.5B	Nitrate as N Surfactants	5.96 mg/Kg 0.9 mg/Kg	5.96J+ mg/Kg 2.1U mg/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	All soil samples in SDG R0905539

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA213-0.5B	Chloride Nitrate as N Surfactants	4.8 mg/Kg 1.05 mg/Kg 0.7 mg/Kg	4.8J+ mg/Kg 1.05J+ mg/Kg 2.2U mg/Kg
SA213-14B	Chloride Nitrate as N	7.8 mg/Kg 2.05 mg/Kg	7.8J+ mg/Kg 2.05J+ mg/Kg
SA213-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	172 mg/Kg 172 mg/Kg 64.6 mg/Kg 6.91 mg/Kg 0.7 mg/Kg	172J+ mg/Kg 172J+ mg/Kg 64.6J+ mg/Kg 6.91J+ mg/Kg 2.8U mg/Kg
SA213-44B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	87 mg/Kg 87 mg/Kg 190 mg/Kg 58.9 mg/Kg 5.42 mg/Kg	87J+ mg/Kg 87J+ mg/Kg 300U mg/Kg 58.9J+ mg/Kg 5.42J+ mg/Kg
SA110-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	167 mg/Kg 163 mg/Kg 26.6 mg/Kg 1.3 mg/Kg	167J+ mg/Kg 163J+ mg/Kg 26.6J+ mg/Kg 2.1U mg/Kg
SA110-10B	Total organic carbon Chloride Nitrate as N	290 mg/Kg 25.9 mg/Kg 2.05 mg/Kg	300U mg/Kg 25.9J+ mg/Kg 2.05J+ mg/Kg
SA110-25B	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N	131 mg/Kg 131 mg/Kg 0.11 mg/Kg 270 mg/Kg 373 mg/Kg 3.69 mg/Kg	131J+ mg/Kg 131J+ mg/Kg 0.68U mg/Kg 290U mg/Kg 373J+ mg/Kg 3.69J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA110-37B	Nitrate as N	4.98 mg/Kg	4.98J+ mg/Kg
SA110009-37B	Nitrate as N Surfactants	4.32 mg/Kg 1.4 mg/Kg	4.32J+ mg/Kg 3.0U mg/Kg
SA191-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	157 mg/Kg 151 mg/Kg 283 mg/Kg 15.5 mg/Kg 1.3 mg/Kg	157J+ mg/Kg 151J+ mg/Kg 283J+ mg/Kg 15.5J+ mg/Kg 2.1U mg/Kg
SA191-10B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	246 mg/Kg 238 mg/Kg 3.88 mg/Kg	246J+ mg/Kg 238J+ mg/Kg 3.88J+ mg/Kg
SA191-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	109 mg/Kg 109 mg/Kg 270 mg/Kg 3.76 mg/Kg	109J+ mg/Kg 109J+ mg/Kg 270J+ mg/Kg 3.76J+ mg/Kg
SA191-40B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	298 mg/Kg 292 mg/Kg 2.80 mg/Kg 0.9 mg/Kg	298J+ mg/Kg 292J+ mg/Kg 2.80J+ mg/Kg 2.5U mg/Kg
SA191009-40B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Nitrate as N	291 mg/Kg 283 mg/Kg 280 mg/Kg 2.79 mg/Kg	291J+ mg/Kg 283J+ mg/Kg 300U mg/Kg 2.79J+ mg/Kg
SA193-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	126 mg/Kg 126 mg/Kg 9.0 mg/Kg 2.64 mg/Kg	126J+ mg/Kg 126J+ mg/Kg 9.0J+ mg/Kg 2.64J+ mg/Kg
SA193-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	242 mg/Kg 231 mg/Kg 8.5 mg/Kg 1.74 mg/Kg 0.7 mg/Kg	242J+ mg/Kg 231J+ mg/Kg 8.5J+ mg/Kg 1.74J+ mg/Kg 2.2U mg/Kg
SA193009-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	269 mg/Kg 257 mg/Kg 8.6 mg/Kg 1.78 mg/Kg 0.8 mg/Kg	269J+ mg/Kg 257J+ mg/Kg 8.6J+ mg/Kg 1.78J+ mg/Kg 2.1U mg/Kg
SA193-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	172 mg/Kg 167 mg/Kg 14.2 mg/Kg 2.10 mg/Kg	172J+ mg/Kg 167J+ mg/Kg 14.2J+ mg/Kg 2.10J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA193-42B	Nitrate as N Surfactants	10.1 mg/Kg 1.5 mg/Kg	10.1J+ mg/Kg 2.6U mg/Kg
SA193-2.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	112 mg/Kg 112 mg/Kg 40.1 mg/Kg 5.96 mg/Kg 0.9 mg/Kg	112J+ mg/Kg 112J+ mg/Kg 40.1J+ mg/Kg 5.96J+ mg/Kg 2.1U mg/Kg

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA213-14BMS (All soil samples in SDG R0905539)	Total organic carbon Sulfate Perchlorate	73 (75-125) 61 (75-125) 71 (75-125)	- - -	- - -	J- (all detects) UJ (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Analyte	Flag	A or P
SA110-0.5B	Dichloroacetate	131 (90-115)	Perchlorate	J+ (all detects)	A
SA110-10B	Dichloroacetate	117 (90-115)	Perchlorate	J+ (all detects)	A

Sample	Surrogate	%R (Limits)	Affected Analyte	Flag	A or P
SA110-25B	Dichloroacetate	116 (90-115)	Perchlorate	J+ (all detects)	A
SA110-37B	Dichloroacetate	143 (90-115)	Perchlorate	J+ (all detects)	A
SA110009-37B	Dichloroacetate	121 (90-115)	Perchlorate	J+ (all detects)	A
SA191-0.5B	Dichloroacetate	117 (90-115)	Perchlorate	J+ (all detects)	A
SA191-10B	Dichloroacetate	119 (90-115)	Perchlorate	J+ (all detects)	A
SA191-25B	Dichloroacetate	154 (90-115)	Perchlorate	J+ (all detects)	A
SA191-40B	Dichloroacetate	118 (90-115)	Perchlorate	J+ (all detects)	A
SA193-42B	Dichloroacetate	117 (90-115)	Perchlorate	J+ (all detects)	A
SA193-2.5B	Dichloroacetate	141 (90-115)	Perchlorate	J+ (all detects)	A

VIII. 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 R0905539	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples SA110-37B and SA110009-37B, samples SA191-40B and SA191009-40B, and samples SA193-10B and SA193009-10B were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA110-37B	SA110009-37B				
Alkalinity, total	425 mg/Kg	417 mg/Kg	2 (≤50)	-	-	-
Alkalinity, bicarbonate	419 mg/Kg	408 mg/Kg	3 (≤50)	-	-	-
Alkalinity, carbonate	6 mg/Kg	9 mg/Kg	-	3 (≤30)	-	-
Chloride	959 mg/Kg	819 mg/Kg	16 (≤50)	-	-	-
Nitrate as N	4.98 mg/Kg	4.32 mg/Kg	14 (≤50)	-	-	-
Bromide	1.5 mg/Kg	1.4 mg/Kg	-	0.1 (≤1.5)	-	-
pH	8.58 units	8.44 units	2 (≤50)	-	-	-
Sulfate	1280 mg/Kg	932 mg/Kg	31 (≤50)	-	-	-
Surfactants	0.8U mg/Kg	1.4 mg/Kg	-	0.6 (≤3.0)	-	-
Hexavalent chromium	13.9 mg/Kg	0.26U mg/Kg	-	13.64 (≤0.60)	J (all detects) UJ (all non-detects)	A
Hexavalent chromium	13.8 mg/Kg	0.26U mg/Kg	-	13.54 (≤0.60)	J (all detects) UJ (all non-detects)	A
Total organic carbon	380 mg/Kg	590 mg/Kg	-	210 (≤290)	-	-
Total phosphorus	622 mg/Kg	698 mg/Kg	12 (≤50)	-	-	-
Chlorate	8000 ug/Kg	7880 ug/Kg	2 (≤50)	-	-	-
Perchlorate	25100 ug/Kg	23400 ug/Kg	7 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Alkalinity, total	298 mg/Kg	291 mg/Kg	2 (≤50)	-	-	-
Alkalinity, bicarbonate	292 mg/Kg	283 mg/Kg	3 (≤50)	-	-	-
Alkalinity, carbonate	6 mg/Kg	8 mg/Kg	-	2 (≤25)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA191-40B	SA191009-40B				
Chloride	482 mg/Kg	480 mg/Kg	0 (≤50)	-	-	-
Nitrate as N	2.80 mg/Kg	2.79 mg/Kg	0 (≤50)	-	-	-
pH	8.81 units	8.67 units	2 (≤50)	-	-	-
Sulfate	1000 mg/Kg	1270 mg/Kg	24 (≤50)	-	-	-
Surfactants	0.9 mg/Kg	0.7U mg/Kg	-	0.2 (≤2.5)	-	-
Total organic carbon	400 mg/Kg	280 mg/Kg	-	120 (≤300)	-	-
Total phosphorus	720 mg/Kg	716 mg/Kg	1 (≤50)	-	-	-
Chlorate	2580 ug/Kg	4080 ug/Kg	45 (≤50)	-	-	-
Perchlorate	66100 ug/Kg	83900 ug/Kg	24 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
Alkalinity, total	242 mg/Kg	269 mg/Kg	11 (≤50)	-	-	-
Alkalinity, bicarbonate	231 mg/Kg	257 mg/Kg	11 (≤50)	-	-	-
Alkalinity, carbonate	11 mg/Kg	12 mg/Kg	-	1 (≤22)	-	-
Chloride	8.5 mg/Kg	8.6 mg/Kg	-	0.1 (≤2.2)	-	-
Nitrate as N	1.74 mg/Kg	1.78 mg/Kg	-	0.04 (≤0.54)	-	-
pH	9.08 units	9.17 units	1 (≤50)	-	-	-
Sulfate	399 mg/Kg	356 mg/Kg	11 (≤50)	-	-	
Surfactants	0.7 mg/Kg	0.8 mg/Kg	-	0.1 (≤2.2)	-	-
Total organic carbon	460 mg/Kg	460 mg/Kg	-	0 (≤290)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA193-10B	SA193009-10B				
Total phosphorus	824 mg/Kg	895 mg/Kg	8 (≤50)	-	-	-
Chlorate	1430 ug/Kg	939 ug/Kg	-	491 (≤540)	-	-

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Wet Chemistry - Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905539	EB092909-SO2A4	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905539	EB092909-SO1A4	Nitrate as N	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905539	SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Surfactants	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0905539	SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	Total organic carbon Sulfate Perchlorate	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905539	SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA193-42B SA193-2.5B	Perchlorate	J+ (all detects)	A	Surrogate recovery (%R) (s)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905539	SA110-37B SA110009-37B	Hexavalent chromium	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

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Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	EB092909-SO1A4	Total organic carbon Ammonia as N Total phosphorus	1.0U mg/L 0.050U mg/L 0.050U mg/L	A	bl
R0905539	EB092909-SO2A4	Total organic carbon Ammonia as N Total phosphorus	1.0U mg/L 0.050U mg/L 0.050U mg/L	A	bl
R0905539	SA213-44B	Total organic carbon	300U mg/Kg	A	bl
R0905539	SA110-10B	Total organic carbon	300U mg/Kg	A	bl
R0905539	SA110-25B	Total organic carbon	290U mg/Kg	A	bl
R0905539	SA191009-40B	Total organic carbon	300U mg/Kg	A	bl

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Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA213-0.5B	Nitrate as N Sulfate Surfactants Chlorate	1.05J+ mg/Kg 77.2J+ mg/Kg 2.2U ug/Kg 230U mg/Kg	A	be
R0905539	SA213-14B	Nitrate as N Sulfate	2.05J+ mg/Kg 62.1J+ mg/Kg	A	be
R0905539	SA213-30B	Nitrate as N Surfactants	6.91J+ mg/Kg 2.8U ug/Kg	A	be
R0905539	SA213-44B	Total organic carbon Nitrate as N	300U mg/Kg 5.42J+ mg/Kg	A	be
R0905539	SA110-0.5B	Nitrate as N Surfactants	26.6J+ mg/Kg 2.1U mg/Kg	A	be
R0905539	SA110-10B	Total organic carbon Nitrate as N Sulfate	300U mg/Kg 2.05J+ mg/Kg 97.3J+ mg/Kg	A	be
R0905539	SA110-25B	Ammonia as N Total organic carbon Nitrate as N	0.68U mg/Kg 290U mg/Kg 3.69J+ mg/Kg	A	be
R0905539	SA110-37B	Nitrate as N	4.98J+ mg/Kg	A	be
R0905539	SA110009-37B	Nitrate as N Surfactants	4.32J+ mg/Kg 3.0U mg/Kg	A	be
R0905539	SA191-0.5B	Nitrate as N Surfactants	15.5J+ mg/Kg 2.1U mg/Kg	A	be
R0905539	SA191-10B	Nitrate as N Sulfate	3.88J+ mg/Kg 153J+ mg/Kg	A	be
R0905539	SA191-25B	Nitrate as N	3.76J+ mg/Kg	A	be
R0905539	SA191-40B	Nitrate as N Surfactants	2.80J+ mg/Kg 2.5U mg/Kg	A	be
R0905539	SA191009-40B	Total organic carbon Nitrate as N	300U mg/Kg 2.79J+ mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA193-0.5B	Nitrate as N	2.64J+ mg/Kg	A	be
R0905539	SA193-10B	Nitrate as N Surfactants	1.74J+ mg/Kg 2.2U mg/Kg	A	be
R0905539	SA193009-10B	Nitrate as N Surfactants	1.78J+ mg/Kg 2.1U mg/Kg	A	be
R0905539	SA193-25B	Nitrate as N	2.10J+ mg/Kg	A	be
R0905539	SA193-42B	Nitrate as N Surfactants	10.1J+ mg/Kg 2.6U mg/Kg	A	be
R0905539	SA193-2.5B	Nitrate as N Surfactants	5.96J+ mg/Kg 2.1U mg/Kg	A	be

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Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905539

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA213-0.5B	Chloride Nitrate as N Surfactants	4.8J+ mg/Kg 1.05J+ mg/Kg 2.2U mg/Kg	A	bf
R0905539	SA213-14B	Chloride Nitrate as N	7.8J+ mg/Kg 2.05J+ mg/Kg	A	bf
R0905539	SA213-30B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	172J+ mg/Kg 172J+ mg/Kg 64.6J+ mg/Kg 6.91J+ mg/Kg 2.8U mg/Kg	A	bf
R0905539	SA213-44B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	87J+ mg/Kg 87J+ mg/Kg 300U mg/Kg 58.9J+ mg/Kg 5.42J+ mg/Kg	A	bf
R0905539	SA110-0.5B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	167J+ mg/Kg 163J+ mg/Kg 26.6J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA110-10B	Total organic carbon Chloride Nitrate as N	300U mg/Kg 25.9J+ mg/Kg 2.05J+ mg/Kg	A	bf
R0905539	SA110-25B	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N	131J+ mg/Kg 131J+ mg/Kg 0.68U mg/Kg 290U mg/Kg 373J+ mg/Kg 3.69J+ mg/Kg	A	bf
R0905539	SA110-37B	Nitrate as N	4.98J+ mg/Kg	A	bf
R0905539	SA110009-37B	Nitrate as N Surfactants	4.32J+ mg/Kg 3.0U mg/Kg	A	bf
R0905539	SA191-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	157J+ mg/Kg 151J+ mg/Kg 283J+ mg/Kg 15.5J+ mg/Kg 2.1U mg/Kg	A	bf
R0905539	SA191-10B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N	246J+ mg/Kg 238J+ mg/Kg 3.88J+ mg/Kg	A	bf
R0905539	SA191-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	109J+ mg/Kg 109J+ mg/Kg 270J+ mg/Kg 3.76J+ mg/Kg	A	bf
R0905539	SA191-40B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	298J+ mg/Kg 292J+ mg/Kg 2.80J+ mg/Kg 2.5U mg/Kg	A	bf
R0905539	SA191009-40B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Nitrate as N	291J+ mg/Kg 283J+ mg/Kg 300U mg/Kg 2.79J+ mg/Kg	A	bf
R0905539	SA193-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	126J+ mg/Kg 126J+ mg/Kg 9.0J+ mg/Kg 2.64J+ mg/Kg	A	bf
R0905539	SA193-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	242J+ mg/Kg 231J+ mg/Kg 8.5J+ mg/Kg 1.74J+ mg/Kg 2.2U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905539	SA193009-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	269J+ mg/Kg 257J+ mg/Kg 8.6J+ mg/Kg 1.78J+ mg/Kg 2.1U mg/Kg	A	bf
R0905539	SA193-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	172J+ mg/Kg 167J+ mg/Kg 14.2J+ mg/Kg 2.10J+ mg/Kg	A	bf
R0905539	SA193-42B	Nitrate as N Surfactants	10.1J+ mg/Kg 2.6U mg/Kg	A	bf
R0905539	SA193-2.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	112J+ mg/Kg 112J+ mg/Kg 40.1J+ mg/Kg 5.96J+ mg/Kg 2.1U mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E6
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12809
Page: 1 of 1
Reviewer: CR
2nd Reviewer: V

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Cyanide (EPA SW846 Method 9012A), ~~Dissolved~~ Hexavalent Chromium (EPA Method 218.6), Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / EPA SW846 Method 9060), Chlorate (300.1), Perchlorate (314.0)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/29/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	~~Not required~~ CR
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(10,11), (15,16), (18,19)
XI	Field blanks	SW	EB = 1,2. FB = FB080309-SO (SDG# R0904279)

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: all soil except 1,2 = water

1	EB092909-SO1A4	11	SA110009-37B	21	SA193-42B	31	
2	EB092909-SO2A4	12	SA191-0.5B	22	SA193-2.5B	32	
3	SA213-0.5B	13	SA191-10B	23	SA213-14BMS	33	
4	SA213-14B	14	SA191-25B	24	SA213-14BDUP	34	
5	SA213-30B	15	SA191-40B	25	↓ MSD	35	
6	SA213-44B	16	SA191009-40B	26	EB092909-SO1A4MS	36	
7	SA110-0.5B	17	SA193-0.5B	27	↓ MSD	37	
8	SA110-10B	18	SA193-10B	28	↓ DUP	38	
9	SA110-25B	19	SA193009-10B	29		39	
10	SA110-37B	20	SA193-25B	30		40	

Notes: _____

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-22	S/W	Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC: 23		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
↓ 24		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
↓ 25		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC: 26-28		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 24095E6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: AR
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		7199		9056			
Parameters:		Cr6+		NO_3-N			
Technical holding time:		24hrs		48hrs			
Sample ID	**Sampling date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Analysis date**	**Qualifier**
2	9/29/09 0648	9/30/09 09:49	(27 hrs)	10/1/09 13:07	(54.25 hrs)		J-/UJ/P (h)
↓	↓ ↓	↓ 10:00	(27.25 hrs)				↓ ↓
1	9/29/09 11:05			10/1/09 12:52	(49.75 hrs)		J-/UJ/P (h)

LDC #: 22096
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	10/20/09	CCV	Surfactants	88.8	10-22	J-/UJ/P (c)

Comments:

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: LA

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	2								
Alk., Total		0.5											
TOC	0.2	0.118		0.4 / 1.0	0.2 / 1.0								
NH3-N		0.0161		0.009 / 0.050	0.019 / 0.050								
SO4		0.192											
T-P	0.006	0.0166		0.012 / 0.050	0.01 / 0.050								

Conc. units: mg/Kg **Associated Samples:** 3, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	5												
Alk., Bicarb.	5												
Cl	1.2												

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 5-9**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	11												
Alk., Bicarb.	11												
Cl	1.4												

Conc. units: mg/Kg **Associated Samples: 10-22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	15												
Alk., Bicarb.	15												
SO4	1.9												

Conc. units: mg/Kg **Associated Samples: 3-6**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P	1.6												

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 7-22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P	1.4												

Conc. units: mg/Kg **Associated Samples:** 3-14

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			6	8	9							
TOC	40			190 / 300	290 / 300	270 / 290							

Conc. units: mg/Kg **Associated Samples:** All Soil

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			6	8	9	16						
TOC		116.0 (mg/kg)		See PB	See PB	See PB	280 / 300						
T-P		0.0064 (mg/kg)											

Conc. units: mg/Kg **Associated Samples:** 3-8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total		0.9											

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 9-22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total		0.5											

Conc. units: mg/Kg **Associated Samples: 19**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
CN		0.00734											

Conc. units: mg/Kg **Associated Samples: 3**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.100											
SO4		0.125											

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: W

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.105											
SO4		0.124											

Conc. units: mg/Kg **Associated Samples:** 7, 9, 10, 11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.120											

Conc. units: mg/Kg **Associated Samples:** 12-16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.112											

Conc. units: mg/Kg **Associated Samples:** 5, 6, 14

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.198											

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 7, 9-13, 15-22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.039											

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: V

METHOD: Inorganics, EPA Method See Cover

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: mg/L **Associated sample units: mg/Kg except ClO3 in ug/Kg** Reason Code: be
Sampling date: 9/29/09 Soil factor applied 10x except TOC @1x
Field blank type: (circle one) Field Blank / Rinsate / Other (EB) Associated Samples: All Soil

Analyte	Blank ID	Blank ID	Action Limit	Sample Identification																		
	1	2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
NH3-N	0.009	0.019								0.11 / 0.68													
TOC	0.4	0.2					190 / 300		290 / 300	270 / 290							280 / 300						
Cl	1.2	1.2																					
NO3-N	0.79	0.70	79	1.05 J+	2.05 J+	6.91 J+	5.42 J+	26.6 J+	2.05 J+	3.69 J+	4.98 J+	4.32 J+	15.5 J+	3.88 J+	3.76 J+	2.80 J+	2.79 J+	2.64 J+	1.74 J+	1.78 J+	2.10 J+	10.1 J+	5.96 J+
pH (pH units)	5.39	4.75																					
T-P	0.012	0.01																					
SO4	2.5	2.2	250	77.2 J+	62.1 J+				97.3 J+					153 J+									
Surfactants	0.079	0.049	7.9	0.7 / 2.2		0.7 / 2.8		1.3 / 2.1				1.4 / 3.0	1.3 / 2.1			0.9 / 2.5			0.7 / 2.2	0.8 / 2.1		1.5 / 2.6	0.9 / 2.1
Chlorate (ug/Kg)		8 ug/L	CS 60 / 230	60 / 230																			
Perchlorate		1.3ug/L																					

LDC #: 22109E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other:_____ Associated Samples: All Soil

Analyte	Blank ID	Sample Identification																			
	FB080309-SO (SDG# R0904279)	Action Level	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Total alkalinity	3.0	300			172 J+	87 J+	167 J+		131 J+			157 J+	246 J+	109 J+	298 J+	291 J+	126 J+	242 J+	269 J+	172 J+		112 J+
Bicarbonate alkalinity	3.0	300			172 J+	87 J+	163 J+		131 J+			151 J+	238 J+	109 J+	292 J+	283 J+	126 J+	231 J+	257 J+	167 J+		112 J+
Ammonia as N	0.113	11.3							0.11 / 0.68													
TOC (average)	1.2					190 / 300		290 / 300	270 / 290							280 / 300						
Cl	3.9	390	4.8 J+	7.8 J+	64.6 J+	58.9 J+		25.9 J+	373 J+			283 J+		270 J+			9.0 J+	8.5 J+	8.6 J+	14.2 J+		40.1 J+
Nitrate as N	0.65	65	1.05 J+	2.05 J+	6.91 J+	5.42 J+	26.6 J+	2.05 J+	3.69 J+	4.98 J+	4.32 J+	15.5 J+	3.88 J+	3.76 J+	2.80 J+	2.79 J+	2.64 J+	1.74 J+	1.78 J+	2.10 J+	10.1 J+	5.96 J+
pH (pH Units)	6.48																					
Total	0.015																					
TDS	22																					
Sulfate	1.6																					
Surfactants	0.043	4.3	0.7 / 2.2		0.7 / 2.8		1.3 / 2.1				1.4 / 3.0	1.3 / 2.1			0.9 / 2.5			0.7 / 2.2	0.8 / 2.1		1.5 / 2.6	0.9 / 2.1

LDC #: 22409E6
SDG #: see cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes ✓ or No ___.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
		CLO3		DCA	131 (90-115)	7	J+det+LA (S)
					117 ( )	8	
					116 ( )	9	
					143 ( )	10	
					121 ( )	11	
					117 ( )	12	
					119 ( )	13	
					154 ( )	14	
					118 ( )	15	
					117 ( )	21	
					141 ( )	22	
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					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC #: 22109E6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	TOC	73	All Soil	J - /UJ/A (m)
			SO4	61	↓	↓
			Perchlorate	71	↓	↓

Comments:

LDC#: 22109E6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CA
2nd Reviewer: M

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	10	11				
Total Alkalinity	425	417	2			
Bicarbonate Alkalinity	419	408	3			
Carbonate Alkalinity	6	9		3	(≤30)	
Chloride	959	819	16			
Nitrate as N	4.98	4.32	14			
Bromide	1.5	1.4		0.1	(≤1.5)	
pH (pH Units)	8.58	8.44	2			
Sulfate	1280	932	31			
Surfactants	0.8U	1.4		0.6	(≤3.0)	
Hexavalent Chromium	13.9	0.26U		13.64	(≤0.60)	J/UJ/A (fd)
Hexavalent Chromium	13.8	0.26U		13.54	(≤0.60)	J/UJ/A (fd)
TOC	380	590		210	(≤290)	
Total Phosphorus	622	698	12			
Chlorate (ug/Kg)	8000	7880	2			
Perchlorate (ug/Kg)	25100	23400	7			

LDC#: 22109E6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	15	16				
Total Alkalinity	298	291	2			
Bicarbonate Alkalinity	292	283	3			
Carbonate Alkalinity	6	8		2	(≤25)	
Chloride	482	480	0			
Nitrate as N	2.80	2.79	0			
pH (pH Units)	8.81	8.67	2			
Sulfate	1000	1270	24			
Surfactants	0.9	0.7U		~~0.9~~ 0.2	(≤2.5)	
TOC	400	280		120	(≤300)	
Total Phosphorus	720	716	1			
Chlorate (ug/Kg)	2580	4080	45			
Perchlorate (ug/Kg)	66100	83900	24			

LDC#: 22109E6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SR
2nd Reviewer:

Inorganics, Method See Cover

(Y) N NA Were field duplicate pairs identified in this SDG?
Y (N) NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	18	19				
Total Alkalinity	242	269	11			
Bicarbonate Alkalinity	231	257	11			
Carbonate Alkalinity	11	12		1	(≤22)	
Chloride	8.5	8.6		0.1	(≤2.2)	
Nitrate as N	1.74	1.78		0.04	(≤0.54)	
pH (pH Units)	9.08	9.17	1			
Sulfate	399	356	11			
Surfactants	0.7	0.8		0.1	(≤2.2)	
TOC	460	460		0	(≤290)	
Total Phosphorus	824	895	8	71		
Chlorate (ug/Kg)	1430	939		491	(≤540)	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 14, 2009

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

EB093009-SO1A4
RSAQ3-0.5B
RSAQ3009-0.5B
RSAQ3-10B
RSAQ3-25B
RSAQ3-41B
SA190-0.5B
SA190-0.5BRE
SA190-10B
SA190-25B
SA190-38B
RSAR4-0.5B
RSAR4-10B
RSAR4009-10B
RSAR4009-10BRE
RSAR4-25B
RSAR4-37B
RSAR3-0.5B
RSAR3-10B
RSAR3-25B
RSAR3-35B
RSAR3-38B
SA190-38BMS
SA190-38BMSD
SA190-38BDUP

Introduction

This data review covers 21 soil samples and one water sample listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 300.1 for Chlorate, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B and 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Kahn Method and EPA SW 846 Method 9060 for Total Organic Carbon.

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) as there are no current guidelines for the method stated above.

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 X.

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
SA190-0.5BRE RSAR4009-10BRE	Cyanide	16 days	14 days	J- (all detects) UJ (all non-detects)	A

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
10/20/09	CCV	Surfactants	88.8 (90-110)	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B	J- (all detects) UJ (all non-detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon Ammonia as N Sulfate Total phosphorus	0.2 mg/L 0.016 mg/L 0.13 mg/L 0.006 mg/L	All water samples in SDG R0905567

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Alkalinity, total Ammonia as N Chloride Sulfate Total phosphorus	0.5 mg/L 0.0121 mg/L 0.112 mg/L 0.135 mg/L 0.0063 mg/L	All water samples in SDG R0905567
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Sulfate	15 mg/Kg 15 mg/Kg 1.9 mg/Kg	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B
ICB/CCB	Sulfate	0.332 mg/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	12 mg/Kg 12 mg/Kg	RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Bromide Sulfate	5 mg/Kg 5 mg/Kg 0.6 mg/Kg 0.7 mg/Kg	RSAR3-35B RSAR3-38B
PB (prep blank)	Total phosphorus	14 mg/Kg	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B
ICB/CCB	Total phosphorus	0.0064 mg/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B
PB (prep blank)	Total organic carbon	60 mg/Kg	RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Total organic carbon	116.0 mg/Kg	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Alkalinity, total	0.9 mg/L	RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B
ICB/CCB	Alkalinity, total	0.5 mg/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR3-38B
ICB/CCB	Cyanide	0.00981 mg/L	RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Nitrite as N	0.0169 mg/L	RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Total phosphorus	0.0060 mg/L	RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B
ICB/CCB	Sulfate	0.192 mg/L	RSAR4-0.5B RSAR4-10B RSAR4009-10B
ICB/CCB	Bromide Sulfate	0.076 mg/L 0.050 mg/L	RSAQ3-25B RSAQ3-41B SA190-0.5B
ICB/CCB	Bromide	0.063 mg/L	SA190-25B SA190-10B
ICB/CCB	Sulfate	0.057 mg/L	SA190-10B RSAR4-25B
ICB/CCB	Sulfate	0.049 mg/L	RSAR4-37B RSAR3-0.5B
ICB/CCB	Sulfate	0.064 mg/L	RSAR3-10B RSAR3-25B RSAR3-35B
ICB/CCB	Sulfate	0.065 mg/L	RSAR3-38B
ICB/CCB	Chloride	0.094 mg/L	SA190-10B SA190-38B RSAR4-25B
ICB/CCB	Chloride	0.077 mg/L	RSAR4-37B
ICB/CCB	Chloride	0.098 mg/L	RSAR3-25B RSAR3-35B
ICB/CCB	Chloride	0.094 mg/L	RSAQ3-10B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride	0.088 mg/L	RSAQ3-41B SA190-25B RSAR3-25B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
EB093009-SO1A4	Total organic carbon Chloride Total phosphorus	0.2 mg/L 1.9 mg/L 0.011 mg/L	1.0U mg/L 2.0U mg/L 0.050U mg/L
RSAR3-35B	Total organic carbon	160 mg/Kg	300U mg/Kg
RSAR3-38B	Total organic carbon	220 mg/Kg	290U mg/Kg

Sample EB093009-SO1A4 was identified as an equipment blank. No contaminant concentrations were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB093009-SO1A4	9/29/09	Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.182 mg/L 0.2 mg/L 1.9 mg/L 1.67 mg/L 4.17 units mg/L 0.011 mg/L 2.1 mg/L 0.051 mg/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ3-0.5B	Nitrate as N Surfactants	22.4 mg/Kg 1.1 mg/Kg	22.4J+ mg/Kg 2.1U mg/Kg
RSAQ3009-0.5B	Nitrate as N Surfactants	19.7 mg/Kg 0.8 mg/Kg	19.7J+ mg/Kg 2.1U mg/Kg
RSAQ3-10B	Nitrate as N	3.79 mg/Kg	3.79J+ mg/Kg
RSAQ3-25B	Nitrate as N	5.90 mg/Kg	5.90J+ mg/Kg
RSAQ3-41B	Nitrate as N	7.02 mg/Kg	7.02J+ mg/Kg
SA190-0.5B	Nitrate as N Sulfate Surfactants	8.64 mg/Kg 189 mg/Kg 0.7 mg/Kg	8.64J+ mg/Kg 189J+ mg/Kg 2.1U mg/Kg
SA190-10B	Nitrate as N Sulfate Surfactants	8.95 mg/Kg 152 mg/Kg 0.7 mg/Kg	8.95J+ mg/Kg 152J+ mg/Kg 2.2U mg/Kg
SA190-25B	Nitrate as N	19.2 mg/Kg	19.2J+ mg/Kg
SA190-38B	Nitrate as N	6.37 mg/Kg	6.37J+ mg/Kg
RSAR4-0.5B	Nitrate as N Sulfate	1.71 mg/Kg 37.0 mg/Kg	1.71J+ mg/Kg 37.0J+ mg/Kg
RSAR4-10B	Nitrate as N Sulfate	1.12 mg/Kg 24.7 mg/Kg	1.12J+ mg/Kg 24.7J+ mg/Kg
RSAR4009-10B	Nitrate as N Sulfate	1.07 mg/Kg 33.4 mg/Kg	1.07J+ mg/Kg 33.4J+ mg/Kg
RSAR4-25B	Nitrate as N	4.45 mg/Kg	4.45J+ mg/Kg
RSAR4-37B	Nitrate as N	9.81 mg/Kg	9.81J+ mg/Kg

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No contaminant concentrations were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB080309-SO	8/3/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Total dissolved solids Sulfate Surfactants	3.0 mg/L 3.0 mg/L 0.113 mg/L 1.2 mg/L 3.9 mg/L 0.65 mg/L 6.48 units 0.015 mg/L 22 mg/L 1.6 mg/L 0.043 mg/L	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B

Sample concentrations were compared to concentrations detected in the field blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ3-0.5B	Chloride Nitrate as N Surfactants	163 mg/Kg 22.4 mg/Kg 1.1 mg/Kg	163J+ mg/Kg 22.4J+ mg/Kg 2.1U mg/Kg
RSAQ3009-0.5B	Chloride Nitrate as N Surfactants	158 mg/Kg 19.7 mg/Kg 0.8 mg/Kg	158J+ mg/Kg 19.7J+ mg/Kg 2.1U mg/Kg
RSAQ3-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	142 mg/Kg 142 mg/Kg 98.4 mg/Kg 3.79 mg/Kg	142J+ mg/Kg 142J+ mg/Kg 98.4J+ mg/Kg 3.79J+ mg/Kg
RSAQ3-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	77 mg/Kg 77 mg/Kg 92.6 mg/Kg 5.90 mg/Kg	77J+ mg/Kg 77J+ mg/Kg 92.6J+ mg/Kg 5.90J+ mg/Kg
RSAQ3-41B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	36 mg/Kg 30 mg/Kg 372 mg/Kg 7.02 mg/Kg	36J+ mg/Kg 30J+ mg/Kg 372J+ mg/Kg 7.02J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA190-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	293 mg/Kg 284 mg/Kg 22.3 mg/Kg 8.64 mg/Kg 0.7 mg/Kg	293J+ mg/Kg 284J+ mg/Kg 22.3J+ mg/Kg 8.64J+ mg/Kg 2.1 mg/Kg
SA190-10B	Chloride Nitrate as N Surfactants	172 mg/Kg 8.95 mg/Kg 0.7 mg/Kg	172J+ mg/Kg 8.95J+ mg/Kg 2.2 mg/Kg
SA190-25B	Nitrate as N	19.2 mg/Kg	19.2J+ mg/Kg
SA190-38B	Nitrate as N	6.37 mg/Kg	6.37J+ mg/Kg
RSAR4-0.5B	Chloride Nitrate as N	94.3 mg/Kg 1.71 mg/Kg	94.3J+ mg/Kg 1.71J+ mg/Kg
RSAR4-10B	Chloride Nitrate as N	12.4 mg/Kg 1.12 mg/Kg	12.4J+ mg/Kg 1.12J+ mg/Kg
RSAR4009-10B	Chloride Nitrate as N	11.5 mg/Kg 1.07 mg/Kg	11.5J+ mg/Kg 1.07J+ mg/Kg
RSAR4-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	38 mg/Kg 27 mg/Kg 289 mg/Kg 4.45 mg/Kg	38J+ mg/Kg 27J+ mg/Kg 289J+ mg/Kg 4.45J+ mg/Kg
RSAR4-37B	Chloride Nitrate as N	302 mg/Kg 9.81 mg/Kg	302J+ mg/Kg 9.81J+ mg/Kg
RSAR3-0.5B	Chloride Nitrate as N	17.8 mg/Kg 2.04 mg/Kg	17.8J+ mg/Kg 2.04J+ mg/Kg
RSAR3-10B	Chloride Nitrate as N	8.7 mg/Kg 1.52 mg/Kg	8.7J+ mg/Kg 1.52J+ mg/Kg
RSAR3-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	136 mg/Kg 136 mg/Kg 12.7 mg/Kg 1.1 mg/Kg	136J+ mg/Kg 136J+ mg/Kg 12.7J+ mg/Kg 2.7U mg/Kg
RSAR3-35B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	121 mg/Kg 121 mg/Kg 160 mg/Kg 236 mg/Kg 5.62 mg/Kg	121J+ mg/Kg 121J+ mg/Kg 300U mg/Kg 236J+ mg/Kg 5.62J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR3-38B	Total organic carbon Chloride Nitrate as N Surfactants	220 mg/Kg 327 mg/Kg 7.49 mg/Kg 1 mg/Kg	290U mg/Kg 327J+ mg/Kg 7.49J+ mg/Kg 3.2Umg/Kg

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Analyte	Flag	A or P
SA190-38BMS (RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B)	Alkalinity, total Surfactants	57 (75-125) 73 (75-125)	- -	- -	Alkalinity, total Alkalinity, bicarbonate Surfactants	J- (all detects) UJ (all non-detects)	A

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
RSAQ3-41B	Dichloroacetate	123 (90-115)	Chlorate	J+ (all detects)	A
RSAR4-10B	Dichloroacetate	82 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAR4009-10B	Dichloroacetate	138 (90-115)	Chlorate	J+ (all detects)	A

VIII. 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 R0905567	All analytes reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

IX. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
SA190-0.5BRE RSAR4009-10BRE	Cyanide	X	A

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B, samples RSAR4-10B and RSAR4009-10B, and samples RSAR4-10B and RSAR4009-10BRE were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
Alkalinity, total	1070 mg/Kg	1190 mg/Kg	11 (≤50)	-	-	-
Alkalinity, bicarbonate	1010 mg/Kg	1120 mg/Kg	10 (≤50)	-	-	-
Alkalinity, carbonate	68 mg/Kg	74 mg/Kg	-	6 (≤21)	-	-
Chloride	163 mg/Kg	158 mg/Kg	3 (≤50)	-	-	-
Nitrate as N	22.4 mg/Kg	19.7 mg/Kg	13 (≤50)	-	-	-
Cyanide	0.72 mg/Kg	0.42U mg/Kg	-	0.3 (≤0.99)	-	-
pH	10.00 units	9.98 units	0 (≤50)	-	-	-
Sulfate	337 mg/Kg	221 mg/Kg	42 (≤50)	-	-	-
Surfactants	1.1 mg/Kg	0.8 mg/Kg	-	0.3 (≤2.1)	-	-
Hexavalent chromium	0.40 mg/Kg	0.63 mg/Kg	-	0.23 (≤0.43)	-	-
Hexavalent chromium	0.40 mg/Kg	0.64 mg/Kg	-	0.24 (≤0.43)	-	-
Total organic carbon	4210 mg/Kg	3270 mg/Kg	25 (≤50)	-	-	-
Total phosphorus	761 mg/Kg	600 mg/Kg	24 (≤50)	-	-	-
Chlorate	1440 ug/Kg	1690 ug/Kg	16 (≤50)	-	-	-
Perchlorate	90600 ug/Kg	112000 ug/Kg	21 (≤50)	-	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Alkalinity, total	460 mg/Kg	407 mg/Kg	12 (≤50)	-	-	-
Alkalinity, bicarbonate	439 mg/Kg	386 mg/Kg	13 (≤50)	-	-	-
Alkalinity, carbonate	22 mg/Kg	21 mg/Kg	-	1 (≤21)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10B				
Chloride	12.4 mg/Kg	11.5 mg/Kg	8 (≤50)	-	-	-
Nitrate as N	1.12 mg/Kg	1.07 mg/Kg	-	0.05 (≤0.54)	-	-
Cyanide	0.47 mg/Kg	0.90 mg/Kg	-	0.43 (≤0.96)	-	-
pH	9.84 units	9.75 units	1 (≤50)	-	-	-
Sulfate	24.7 mg/Kg	33.4 mg/Kg	30 (≤50)	-	-	-
Total organic carbon	600 mg/Kg	440 mg/Kg	-	160 (≤300)	-	-
Total phosphorus	901 mg/Kg	886 mg/Kg	2 (≤50)	-	-	-
Chlorate	1030 ug/Kg	1000 ug/Kg	3 (≤50)	-	-	-
Perchlorate	1060 ug/Kg	1130 ug/Kg	-	70 (≤540)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAR4-10B	RSAR4009-10BRE				
Cyanide	0.47 mg/Kg	0.42U mg/Kg	-	0.05 (≤0.96)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905567	SA190-0.5BRE RSAR4009-10BRE	Cyanide	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B	Surfactants	J- (all detects) UJ (all non-detects)	P	Calibration (CCV %R) (c)
R0905567	RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	Alkalinity, total Alkalinity, bicarbonate Surfactants	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905567	RSAQ3-41B RSAR4009-10B	Chlorate	J+ (all detects)	A	Surrogate spikes (%R) (s)
R0905567	RSAR4-10B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905567	EB093009-SO1A4 RSAQ3-0.5B RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-0.5BRE SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4009-10BRE RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0905567	SA190-0.5BRE RSAR4009-10BRE	Cyanide	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	EB093009-SO1A4	Total organic carbon Chloride Total phosphorus	1.0U mg/L 2.0U mg/L 0.050U mg/L	A	bl
R0905567	RSAR3-35B	Total organic carbon	300U mg/Kg	A	bl
R0905567	RSAR3-38B	Total organic carbon	290U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-0.5B	Nitrate as N Surfactants	22.4J+ mg/Kg 2.1U mg/Kg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAQ3009-0.5B	Nitrate as N Surfactants	19.7J+ mg/Kg 2.1U mg/Kg	A	be
R0905567	RSAQ3-10B	Nitrate as N	3.79J+ mg/Kg	A	be
R0905567	RSAQ3-25B	Nitrate as N	5.90J+ mg/Kg	A	be
R0905567	RSAQ3-41B	Nitrate as N	7.02J+ mg/Kg	A	be
R0905567	SA190-0.5B	Nitrate as N Sulfate Surfactants	8.64J+ mg/Kg 189J+ mg/Kg 2.1U mg/Kg	A	be
R0905567	SA190-10B	Nitrate as N Sulfate Surfactants	8.95J+ mg/Kg 152J+ mg/Kg 2.2U mg/Kg	A	be
R0905567	SA190-25B	Nitrate as N	19.2J+ mg/Kg	A	be
R0905567	SA190-38B	Nitrate as N	6.37J+ mg/Kg	A	be
R0905567	RSAR4-0.5B	Nitrate as N Sulfate	1.71J+ mg/Kg 37.0J+ mg/Kg	A	be
R0905567	RSAR4-10B	Nitrate as N Sulfate	1.12J+ mg/Kg 24.7J+ mg/Kg	A	be
R0905567	RSAR4009-10B	Nitrate as N Sulfate	1.07J+ mg/Kg 33.4J+ mg/Kg	A	be
R0905567	RSAR4-25B	Nitrate as N	4.45J+ mg/Kg	A	be
R0905567	RSAR4-37B	Nitrate as N	9.81J+ mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905567

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAQ3-0.5B	Chloride Nitrate as N Surfactants	163J+ mg/Kg 22.4J+ mg/Kg 2.1U mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAQ3009-0.5B	Chloride Nitrate as N Surfactants	158J+ mg/Kg 19.7J+ mg/Kg 2.1U mg/Kg	A	bf
R0905567	RSAQ3-10B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	142J+ mg/Kg 142J+ mg/Kg 98.4J+ mg/Kg 3.79J+ mg/Kg	A	bf
R0905567	RSAQ3-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	77J+ mg/Kg 77J+ mg/Kg 92.6J+ mg/Kg 5.90J+ mg/Kg	A	bf
R0905567	RSAQ3-41B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	36J+ mg/Kg 30J+ mg/Kg 372J+ mg/Kg 7.02J+ mg/Kg	A	bf
R0905567	SA190-0.5B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N Surfactants	293J+ mg/Kg 284J+ mg/Kg 22.3J+ mg/Kg 8.64J+ mg/Kg 2.1 mg/Kg	A	bf
R0905567	SA190-10B	Chloride Nitrate as N Surfactants	172J+ mg/Kg 8.95J+ mg/Kg 2.2 mg/Kg	A	bf
R0905567	SA190-25B	Nitrate as N	19.2J+ mg/Kg	A	bf
R0905567	SA190-38B	Nitrate as N	6.37J+ mg/Kg	A	bf
R0905567	RSAR4-0.5B	Chloride Nitrate as N	94.3J+ mg/Kg 1.71J+ mg/Kg	A	bf
R0905567	RSAR4-10B	Chloride Nitrate as N	12.4J+ mg/Kg 1.12J+ mg/Kg	A	bf
R0905567	RSAR4009-10B	Chloride Nitrate as N	11.5J+ mg/Kg 1.07J+ mg/Kg	A	bf
R0905567	RSAR4-25B	Alkalinity, total Alkalinity, bicarbonate Chloride Nitrate as N	38J+ mg/Kg 27J+ mg/Kg 289J+ mg/Kg 4.45J+ mg/Kg	A	bf
R0905567	RSAR4-37B	Chloride Nitrate as N	302J+ mg/Kg 9.81J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905567	RSAR3-0.5B	Chloride Nitrate as N	17.8J+ mg/Kg 2.04J+ mg/Kg	A	bf
R0905567	RSAR3-10B	Chloride Nitrate as N	8.7J+ mg/Kg 1.52J+ mg/Kg	A	bf
R0905567	RSAR3-25B	Alkalinity, total Alkalinity, bicarbonate Nitrate as N Surfactants	136J+ mg/Kg 136J+ mg/Kg 12.7J+ mg/Kg 2.7U mg/Kg	A	bf
R0905567	RSAR3-35B	Alkalinity, total Alkalinity, bicarbonate Total organic carbon Chloride Nitrate as N	121J+ mg/Kg 121J+ mg/Kg 300U mg/Kg 236J+ mg/Kg 5.62J+ mg/Kg	A	bf
R0905567	RSAR3-38B	Total organic carbon Chloride Nitrate as N Surfactants	290U mg/Kg 327J+ mg/Kg 7.49J+ mg/Kg 3.2Umg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F6
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12-8-09
Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), ~~Dissolved Hexavalent Chromium (EPA Method 218.6)~~, Hexavalent Chromium (EPA SW846 Method 7199), Nitrite-N (EPA Method 353.2), pH (EPA SW846 Method 9040B/9045D), Surfactants (SM5540C), Perchlorate (EPA Method 314.0), Total Phosphorus (EPA Method 365.1), TOC (Lloyd/Kahn / EPA SW846 Method 9060),

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	SW	Sampling dates: 9/30/09 - 10/1/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	SW	
V	Matrix Spike/Matrix Spike Duplicates	SW	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N ~~SW~~ N	
IX.	Overall assessment of data	SW	
X.	Field duplicates	SW	(2,3), (13,14), (13,15)
XI	Field blanks	SW	EB = 1, FB = FB080309-SC CS06MR0904279)

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: all soil except 1 = water

1	EB093009-SO1A4	11	SA190-38B	21	RSAR3-35B	31	PBW
2	RSAQ3-0.5B	12	RSAR4-0.5B	22	RSAR3-38B	32	PBS
3	RSAQ3009-0.5B	13	RSAR4-10B	23	SA190-38BMS	33	
4	RSAQ3-10B	14	RSAR4009-10B	24	SA190-38BMSD	34	
5	RSAQ3-25B	15	RSAR4009-10BRE	25	SA190-38BDUP	35	
6	RSAQ3-41B	16	RSAR4-25B	26		36	
7	SA190-0.5B	17	RSAR4-37B	27		37	
8	SA190-0.5BRE	18	RSAR3-0.5B	28		38	
9	SA190-10B	19	RSAR3-10B	29		39	
10	SA190-25B	20	RSAR3-25B	30		40	

Notes: _____

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-7,9-14,16-22	S/W	[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
8,15		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC [✓ CN] Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
QC:23		[✓ Alk] pH [✓ Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
24		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond [✓ ClO_3 ClO_4]
25		[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS] TDS TSS Cond [✓ ClO_3 ClO_4]
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: CR
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9012					
Parameters:		CN					
Technical holding time:		14 days					
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
8, 15	9/30/09	10/16/09	(16 days)				J-/UJ/R (h)

*Reanalysis

LDC #: 22109F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
Y N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N N/A Was a balance check conducted prior to the TDS analysis.?
Y N N/A Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
	10/20/09	CCV	Surfactants	88.8	2-4	J- (UJ/P (c)

Comments:

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** All Water

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1									
Alk., Total		0.5											
TOC	0.2			0.2 / 1.0									
NH3-N	0.016	0.0121											
Cl		0.112		1.9 / 2.0									
SO4	0.13	0.135											
T-P	0.006	0.0063		0.011 / 0.050									

Conc. units: mg/Kg **Associated Samples:** 2-4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	15												
Alk., Bicarb.	15												
SO4	1.9	0.332	33.2										

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 5-7, 9-14, 16-20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	12												
Alk., Bicarb.	12												

Conc. units: mg/Kg **Associated Samples: 21, 22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	5												
Alk., Bicarb.	5												
Br	0.6												
SO4	0.7												

Conc. units: mg/Kg **Associated Samples: 2-5**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P	1.4	0.0064											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: QR
2nd Reviewer: W

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 12-14, 16-22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			21	22								
TOC	60			160 / 300	220 / 290								

Conc. units: mg/Kg **Associated Samples:** 1-7, 9-14, 16-22

Analyte	Blank ID	Maximum ICB/CCB (mg/Kg)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			21	22								
TOC		116.0		See PB	See PB								

Conc. units: mg/Kg **Associated Samples:** 16-19

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total		0.9											

Conc. units: mg/Kg **Associated Samples:** 2, 3, 6, 7, 9-14, 22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total		0.5											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 18-22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
CN		0.00981											

Conc. units: mg/Kg **Associated Samples: 12-14, 16-20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
NO2-N		0.0169	0.169										

Conc. units: mg/Kg **Associated Samples: 6, 7, 9-14, 16-22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
T-P		0.0060											

Conc. units: mg/Kg **Associated Samples: 12-14**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.192											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples:** 5-7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Br		0.076											
SO4		0.050											

Conc. units: mg/Kg **Associated Samples:** 8, 8, 10, 9

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Br		0.063											

Conc. units: mg/Kg **Associated Samples:** 9, 16

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.057											

Conc. units: mg/Kg **Associated Samples:** 17, 18

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.049											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: M

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 19-21**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.064											

Conc. units: mg/Kg **Associated Samples: 22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.065											

Conc. units: mg/Kg **Associated Samples: 9, 11, 16**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.094											

Conc. units: mg/Kg **Associated Samples: 17**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.077											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/Kg **Associated Samples: 20, 21**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.098											

Conc. units: mg/Kg **Associated Samples: 4**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.094											

Conc. units: mg/Kg **Associated Samples: 6, 10, 20**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.088											

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See Cover

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?

Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: be

Sampling date: 9/29/09 Soil factor applied 10x except TOC @1x

Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1-7, 9-14, 16, 17

Analyte	Blank ID	Action Limit	Sample Identification													
	1		2	3	4	5	6	7	9	10	11	12	13	14	16	17
NH3-N	0.182	18.2														
TOC	0.2															
Cl	1.9															
NO3-N	1.67	167	22.4 J+	19.7 J+	3.79 J+	5.90 J+	7.02 J+	8.64 J+	8.95 J+	19.2 J+	6.37 J+	1.71 J+	1.12 J+	1.07 J+	4.45 J+	9.81 J+
pH (pH units)	4.17															
T-P	0.011															
SO4	2.1	210						189 J+	152 J+			37.0 J+	24.7 J+	33.4 J+		
Surfactants	0.051	5.1	1.1 / 2.1	0.8 / 2.1				0.7 / 2.1	0.7 / 2.2							

LDC #: 22109F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: W

METHOD: Inorganics, Method See Cover
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target analytes detected in the field blanks?
Blank units: mg/L **Associated sample units:** mg/Kg Reason Code: bf
Sampling date: 8/3/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: 1-7, 9-14, 16-22

Analyte	Blank ID	Sample Identification																		
	FB080309-SO (SDG# R0904279)	Action Level	2	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21	22
Total alkalinity	3.0	300			142 J+	77 J+	36 J+	293 J+							38 J+				136 J+	121 J+	
Bicarbonate alkalinity	3.0	300			142 J+	77 J+	~~36~~ 30 J+	284 J+							27 J+				136 J+	121 J+	
Ammonia as N	0.113	11.3																			
TOC (average)	1.2																			160 / 300	220 / 290
Cl	3.9	390	163 J+	158 J+	98.4 J+	92.6 J+	372 J+	22.3 J+	172 J+			94.3 J+	12.4 J+	11.5 J+	289 J+	302 J+	17.8 J+	8.7 J+		236 J+	327 J+
Nitrate as N	0.65	65	22.4 J+	19.7 J+	3.79 J+	5.90 J+	7.02 J+	8.64 J+	8.95 J+	19.2 J+	6.37 J+	1.71 J+	1.12 J+	1.07 J+	4.45 J+	9.81 J+	2.04 J+	1.52 J+	12.7 J+	5.62 J+	7.49 J+
pH (pH Units)	6.48																				
Total -P	0.015																				
TDS	22																				
Sulfate	1.6																				
Surfactants	0.043	4.3	1.1 / 2.1	0.8 / 2.1				0.7 / 2.1	0.7 / 2.2										1.1 / 2.7		1 / 3.2

LDC #: 22109F6
SDG #: See case

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CR
2nd Reviewer: LW

METHOD: Inorganics, Method See case

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125 (85-115% for Method 300.0)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
	23	Soil	Alk, Total	57	All Soil except reextracts	J- (all detects) / UJ (all nondetects) / A (m) (Total + Bicarb only)
			Surfactants	73	↓	↓

Comments:

MS.e

LDC #: 22109F6
SDG #: See cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: Chlorate (EPA 300.1)
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
[✓ Y] N N/A Were surrogates spiked into all samples and blanks?
Y [✓ N] N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
		ClO3		DCA	123 (90-115)	6	J+det/A (S)
					82 (↓)	~~12~~ 13	J-UJ/A ↓
					138 (↓)	14	J+det/A ↓
					( )		
					( )		
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Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC #: 22109F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Analyte ~~Finding~~	Finding ~~Associated Samples~~	Qualifications
		8,15	CN	Reanalysis was not necessary	X B / A (o)

Comments: _____

LDC#: 22109F6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [illegible]

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg)		RPD (≤50)	Difference	Limits	Qualification (Parent only)
	2	3				
Total Alkalinity	1070	1190	11			
Bicarbonate Alkalinity	1010	1120	10			
Carbonate Alkalinity	68	74		6	(≤21)	
Chloride	163	158	3			
Nitrate as N	22.4	19.7	13			
Cyanide	0.72	0.42U		0.3	(≤0.99)	
pH (pH Units)	10.00	9.98	0			
Sulfate	337	221	42			
Surfactants	1.1	0.8		0.3	(≤2.1)	
Hexavalent Chromium	0.40	0.63		0.23	(≤0.43)	
Hexavalent Chromium	0.40	0.64		0.24	(≤0.43)	
TOC	4210	3270	25			
Total Phosphorus	761	600	24			
Chlorate (ug/Kg)	1440	1690	16			
Perchlorate (ug/Kg)	90600	112000	21			

LDC#: 22109F6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer:

Inorganics, Method See Cover

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/Kg) 13	Concentration (mg/Kg) 14	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Total Alkalinity	460	407	12			
Bicarbonate Alkalinity	439	386	13			
Carbonate Alkalinity	22	21		1	(≤21)	
Chloride	12.4	11.5	8			
Nitrate as N	1.12	1.07		0.05	(≤0.54)	
Cyanide	0.47	0.90		0.43	(≤0.96)	
pH (pH Units)	9.84	9.75	1			
Sulfate	24.7	33.4	30			
TOC	600	440		160	(≤300)	
Total Phosphorus	901	886	2			
Chlorate (ug/Kg)	1030	1000	3			
Perchlorate (ug/Kg)	1060	1130		70	(≤540)	

Analyte	Concentration (mg/Kg) 13	Concentration (mg/Kg) 15	RPD (≤50)	Difference	Limits	Qualification (Parent only)
Cyanide	0.47	0.42U		0.05	(≤0.96)	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: November 1 through November 5, 2009

LDC Report Date: December 14, 2009

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905626

Sample Identification

RSAR3-0.5BSPLP2
RSAR3-0.5BSPLP3
RSAR3-35BSPLP2
RSAR3-35BSPLP3
RSAQ4-10BSPLP2
RSAQ4-10BSPLP3
RSAQ4-32BSPLP2
RSAQ4-32BSPLP3

Introduction

This data review covers 8 soil samples listed on the cover sheet. The analyses were per Standard Method 2320B for Alkalinity, EPA Method 350.1 for Ammonia as Nitrogen, EPA SW 846 Method 9056 for Bromide, Chloride, Nitrate as Nitrogen, and Sulfate, EPA Method 353.2 for Nitrite as Nitrogen, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 365.1 for Total Phosphorus, Standard Method 2540C for Total Dissolved Solids, EPA SW 846 Method 9060 for Total Organic Carbon, EPA Method 300.1 for Chlorate, EPA Method 314.0 for Perchlorate, and Standard Method 2540D for Total Suspended Solids.

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) as there are no current guidelines for the method stated above.

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 X.

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 with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
RSAR3-0.5BSPLP2 RSAR3-35BSPLP2	Hexavalent chromium	28.5 & 29.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P
RSAQ4-10BSPLP2	Hexavalent chromium	28.75 & 30.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P
RSAQ4-32BSPLP2	Hexavalent chromium	29 & 30.5 hours	24 hours	J- (all detects) UJ (all non-detects)	P

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 of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Conductivity Ammonia as N Nitrate as N Nitrite as N pH Chloride Sulfate Total phosphorus	1.0 mg/L 1.0 mg/L 8.05 umhos/cm 0.036 mg/L 0.125 mg/L 0.008 mg/L 4.98 units 0.09 mg/L 0.72 mg/L 0.01 mg/L	RSAR3-0.5BSPLP2 RSAR3-35BSPLP2 RSAQ4-10BSPLP2 RSAQ4-32BSPLP2

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Conductivity Ammonia as N pH Chloride Total phosphorus	1.1 mg/L 1.1 mg/L 1.83 umhos/cm 0.038 mg/L 6.61 units 0.1 mg/L 0.009 mg/L	RSAR3-0.5BSPLP3 RSAR3-35BSPLP3 RSAQ4-10BSPLP3 RSAQ4-32BSPLP3
ICB/CCB	Chloride Sulfate	0.085 mg/L 0.193 mg/L	RSAQ4-32BSPLP3
ICB/CCB	Sulfate	0.192 mg/L	RSAR3-0.5BSPLP2 RSAQ4-10BSPLP2
ICB/CCB	Chloride Sulfate	0.105 mg/L 0.124 mg/L	RSAR3-0.5BSPLP3 RSAQ4-10BSPLP3
ICB/CCB	Sulfate	0.069 mg/L	RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-32BSPLP2

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAR3-0.5BSPLP2	Ammonia as N Nitrate as N Nitrite as N Total phosphorus	0.031 mg/L 0.275 mg/L 0.01 mg/L 0.026 mg/L	0.050U mg/L 0.275J+ mg/L 0.01U mg/L 0.050U mg/L
RSAR3-35BSPLP2	Nitrate as N Nitrite as N Total phosphorus	0.382 mg/L 0.009 mg/L 0.007 mg/L	0.382J+ mg/L 0.010U mg/L 0.050U mg/L
RSAQ4-10BSPLP2	Nitrate as N Sulfate	0.216 mg/L 6.64 mg/L	0.216J+ mg/L 6.64J+ mg/L
RSAQ4-32BSPLP2	Ammonia as N Nitrate as N Nitrite as N Total phosphorus	0.043 mg/L 0.489 mg/L 0.009 mg/L 0.007 mg/L	0.050U mg/L 0.489J+ mg/L 0.010U mg/L 0.050U mg/L
RSAR3-0.5BSPLP3	Ammonia as N Total phosphorus	0.024 mg/L 0.020 mg/L	0.050U mg/L 0.050U mg/L
RSAR3-35BSPLP3	Ammonia as N Total phosphorus	0.035 mg/L 0.008 mg/L	0.050U mg/L 0.050U mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ4-10BSPLP3	Total phosphorus	0.007 mg/L	0.050U mg/L
RSAQ4-32BSPLP3	Ammonia as N Total phosphorus	0.021 mg/L 0.009 mg/L	0.050U mg/L 0.050U mg/L

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by method 300.1. All surrogate recoveries (%R) were within QC limits.

VIII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905626	All analytes reported below the PQL.	J (all detects)	A

IX. Overall Assessment

Data flags are summarized at the end of this report if data has been qualified.

X. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0905626

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0905626	RSAR3-0.5BSPLP2 RSAR3-35BSPLP2 RSAQ4-10BSPLP2 RSAQ4-32BSPLP2	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0905626	RSAR3-0.5BSPLP2 RSAR3-0.5BSPLP3 RSAR3-35BSPLP2 RSAR3-35BSPLP3 RSAQ4-10BSPLP2 RSAQ4-10BSPLP3 RSAQ4-32BSPLP2 RSAQ4-32BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0905626

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905626	RSAR3-0.5BSPLP2	Ammonia as N Nitrate as N Nitrite as N Total phosphorus	0.050U mg/L 0.275J+ mg/L 0.01U mg/L 0.050U mg/L	A	bl
R0905626	RSAR3-35BSPLP2	Nitrate as N Nitrite as N Total phosphorus	0.382J+ mg/L 0.010U mg/L 0.050U mg/L	A	bl
R0905626	RSAQ4-10BSPLP2	Nitrate as N Sulfate	0.216J+ mg/L 6.64J+ mg/L	A	bl
R0905626	RSAQ4-32BSPLP2	Ammonia as N Nitrate as N Nitrite as N Total phosphorus	0.050U mg/L 0.489J+ mg/L 0.010U mg/L 0.050U mg/L	A	bl
R0905626	RSAR3-0.5BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0905626	RSAR3-35BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0905626	RSAQ4-10BSPLP3	Total phosphorus	0.050U mg/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0905626	RSAQ4-32BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0905626

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B4

LDC #: 22109G6
SDG #: R0905626
Laboratory: Columbia Analytical Services

Date: 12/8/09
Page: 1 of 1
Reviewer: CR
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, ~~Nitrite-N~~ Nitrate-N, Sulfate (EPA SW846 Method 9056), Nitrite-N (EPA Method 353.2), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Hexavalent Chromium (EPA SW846 Method 7199), pH (EPA SW846 Method 9040B), Surfactants (SM5540C), Total Phosphorus (EPA Method 365.1), TDS (SM2540C), TSS (SM2540D), TOC (9060), Chlorate (300.1), Perchlorate (314.0)
The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 11/1/09 - 11/5/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Client specified
VI.	Duplicates	N	
VII.	Laboratory control samples	A	LCS
VIII.	Sample result verification	A	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: 50.1

1	RSAR3-0.5BSPLP2	11	PBS	21		31	
2	RSAR3-0.5BSPLP3	12		22		32	
3	RSAR3-35BSPLP2	13		23		33	
4	RSAR3-35BSPLP3	14		24		34	
5	RSAQ4-10BSPLP2	15		25		35	
6	RSAQ4-10BSPLP3	16		26		36	
7	RSAQ4-32BSPLP2	17		27		37	
8	RSAQ4-32BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 2210966
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method see cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)	✓			
Were balance checks performed as required? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/matrix spike duplicate/laboratory duplicate				
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.		✓		client specified
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 anaytzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 22109G6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓	✓		
Were detection limits < RL?	✓	✓		
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		✓
Target analytes were detected in the field blanks.			✓	

LDC #: 2210966
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1-8	S	[✓ Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4]
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4
		Alk pH Br Cl NO_3 NO_2 SO_4 NH_3 TOC CN Cr^{6+} T-P MBAS TDS TSS Cond ClO_3 ClO_4

Comments:

LDC #: 22109G6
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CR
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		7199					
Parameters:		Cr6+					
Technical holding time:		24hrs					
Sample ID	Leaching Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	10/13/09 06:30	10/14/09 11:59	(29.5hrs)				J-/UJ/P (h)
↓	↓	10:57	(28.5hrs)				↓
3		12:09	(29.5hrs)				
↓		11:07	(28.5hrs)				
5		12:58	(30.5hrs)				
↓		11:17	(28.75hrs)				
7		13:09	(30.5hrs)				
↓	↓	↓ 11:28	(29hrs)				↓

LDC #: 22109G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 1, 3, 5, 7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1	3	5	7						
Alk., Total	1.0												
Alk., Bicarb.	1.0												
Conductivity (umhos/cm)	8.05		80.5										
NH3-N	0.036			0.031 / 0.050			0.043 / 0.050						
NO3-N	0.125		1.25	0.275 J+	0.382 J+	0.216 J+	0.489 J+						
NO2-N	0.008			0.01 / 0.010	0.009 / 0.010		0.009 / 0.010						
pH (pH units)	4.98												
Cl	0.09												
SO4	0.72		7.2			6.64 J+							
T-P	0.01			0.026 / 0.050	0.007 / 0.050		0.007 / 0.050						

LDC #: 22109G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CE
2nd Reviewer: W

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all samples associated with a given method blank?
Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples:** 2, 4, 6, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			2	4	6	8						
Alk., Total	1.1												
Alk., Bicarb.	1.1												
Conductivity (umhos/cm)	1.83		18.3										
NH3-N	0.038			0.024 / 0.050	0.035 / 0.050		0.021 / 0.050						
pH (pH units)	6.61												
Cl	0.1												
T-P	0.009			0.020 / 0.050	0.008 / 0.050	0.007 / 0.050	0.009 / 0.050						

Conc. units: mg/L **Associated Samples:** 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl	~~0.085~~ CR	0.085											
SO4	~~0.193~~ CR	0.193											

LDC #: 22109G6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method See Cover

Reason Code: bl

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a given method blank?

Y N N/A Were any inorganic contaminants detected above the reporting limit in the method blanks? If yes, please see qualifications below.

Conc. units: mg/L **Associated Samples: 1, 5**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
SO4		0.192											

Conc. units: mg/L **Associated Samples: 2, 6**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.105											
SO4		0.124											

Conc. units: mg/L **Associated Samples: 3, 4, 7**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
SO4		0.069											

LDC #: 22109G6
SDG #: seecael

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: CR
2nd Reviewer: [illegible]

Method: Inorganics, Method seecael

The correlation coefficient (r) for the calibration of Cr6+ was recalculated. Calibration date: 9/17/09

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cr6+	s1	0	0	*0.999421*	0.999421	Y
		s2	0.01	158419			
		s3	0.1	2668552			
		s4	0.5	13571573			
		s5	0.7	19370126			
		s6	1	26647639			
Calibration verification	CN	CCV	0.5	0.53778	108	—	
Calibration verification	NO_2-N	CCV	0.45	0.43403	96	—	
Calibration verification	Phosphorus	CCV	0.80	0.7729	97		

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 #: 22086
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: GR
2nd Reviewer: [illegible]

METHOD: Inorganics, Method seecover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units) mg/L	True / D (units) mg/L	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Br	0.949	1.000	95	95	Y
N	Matrix spike sample		(SSR-SR)				
N	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 226966
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of
Reviewer: CE
2nd reviewer:

METHOD: Inorganics, Method seecover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Area(0.0355762)+0.12966

Recalculation: (212.634)(0.0355762) +0.12966 = 7.69 mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	Alk, Total	55.3	55.3	Y
		Alk, Bicarb.	35.8	35.7	
		Alk, Carb	19.5	19.6	
		NH_3-N	0.031	0.031	
		TOC	0.7	0.7	
		Cl	1.43	1.43	
		Cond (umhos/cm)	232	232	
		NO_3-N	0.275	0.275	
		NO_2-N	0.01	0.01	
		pH (pH units)	9.80	9.80	
		Phosphorus	0.026	0.026	
		TDS	81	81	
		TSS	8.8	8.8	
		SO_4	7.69	7.69	
		Surfactants	0.013	0.016	Y
		ClO_4 (ug/L)	95.3	95.3	Y
		ClO_3 (ug/L)	12	12	Y

Note:

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

TPH as Extractables

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 9, 2009

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

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 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for all compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts 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.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. 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.

c. 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.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

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, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A8
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/06/09
Page: 1 of 1
Reviewer: SVL
2nd Reviewer: [signature]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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: 8/05/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	Client Spec
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil

1	RSAU5-0.5BSPLP2	11		21		31	
2	RSAU5-0.5BSPLP3	12		22		32	
3	93764-MB	13		23		33	
4	SPLP2-BLK	14		24		34	
5	SPLP3-1	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, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 22 through September 23, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905402

Sample Identification

RSAT7-0.5B
RSAT7-10B
RSAT7-25B
RSAT7-44B
RSAT8-0.5B
RSAT8-10B
RSAT8-25B
RSAT8009-25B
RSAT8-44B
SA203-0.5B
SA203-10B
SA203-30B
SA203-46B
EB092309-SO1A4
SA148-0.5B
SA148-10B
SA148-30B
SA148-45B
RSAT7-44BMS
RSAT7-44BMSD

Introduction

This data review covers 19 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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) as there are no current guidelines for the method stated above.

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Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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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

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for all compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts 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.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample EB092309-SO1A4 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092309-SO1A4	9/23/09	Diesel range organics	120 ug/L	SA148-0.5B SA148-10B SA148-30B SA148-45B

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified.

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. 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.

c. 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.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905402	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples RSAT8-25B and RSAT8009-25B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905402

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905402	RSAT7-0.5B RSAT7-10B RSAT7-25B RSAT7-44B RSAT8-0.5B RSAT8-10B RSAT8-25B RSAT8009-25B RSAT8-44B SA203-0.5B SA203-10B SA203-30B SA203-46B EB092309-SO1A4 SA148-0.5B SA148-10B SA148-30B SA148-45B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905402

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109B8
SDG #: R0905402
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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: 9/22-23/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CA/ICV ≤20 %
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D = 7, 8
X.	Field blanks	SW	EB = 14 FB = FB080309-SO (R0904279) *

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

* ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Soil + Water

1	RSAT7-0.5B S	11	SA203-10B S	21	96872-MB	31	
2	RSAT7-10B	12	SA203-30B	22	97009-MB	32	
3	RSAT7-25B	13	SA203-46B	23		33	
4	RSAT7-44B	14	EB092309-SO1A4 W	24		34	
5	RSAT8-0.5B	15	SA148-0.5B S	25		35	
6	RSAT8-10B	16	SA148-10B	26		36	
7	RSAT8-25B D	17	SA148-30B	27		37	
8	RSAT8009-25B D	18	SA148-45B	28		38	
9	RSAT8-44B	19	RSAT7-44BMS	29		39	
10	SA203-0.5B	20	RSAT7-44BMSD	30		40	

Notes: _____

LDC #: 22109 B8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV
2nd Reviewer:

METHOD: ✓ GC ___ HPLC

Y N N/A Were field blanks identified in this SDG?

Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/kg

Sampling date: 9/23/09

Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank
Rinsate / Equipment Rinsate / (Equipment Blank) / Source Blank / Other:

Associated Samples: 15-18 (ND)

Compound	Blank ID	Blank ID	Sample Identification							
	14									
DRO	120									
CRQL										

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank
Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:

Associated Samples: _____

Compound	Blank ID	Blank ID	Sample Identification							
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound 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, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 28, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905524

Sample Identification

EB092809-SO1A4
EB092809-SO2A4
SA29-0.5B
SA29-10B
SA29-25B
SA29-40B
SA120-0.5B
SA120-10B
SA120-25B
SA120-43B
SA209-0.5B
SA209-10B
SA209009-10B
SA209-25B
SA209-35B
SA212-0.5B
SA212-13B
SA212009-13B
SA212-30B
SA212-44B
SA29-40BMS
SA29-40BMSD

Introduction

This data review covers 20 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for all compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts 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.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples EB092809-SO1A4 and EB092809-SO2A4 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. 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.

c. 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.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905524	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SA209-10B and SA209009-10B and samples SA212-13B and SA212009-13B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA209-10B	SA209009-10B				
Diesel range organics	37000	72000	-	35000 (≤43000)	-	-
Oil range organics	43000U	48000	-	5000 (≤43000)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905524

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905524	EB092809-SO1A4 EB092809-SO2A4 SA29-0.5B SA29-10B SA29-25B SA29-40B SA120-0.5B SA120-10B SA120-25B SA120-43B SA209-0.5B SA209-10B SA209009-10B SA209-25B SA209-35B SA212-0.5B SA212-13B SA212009-13B SA212-30B SA212-44B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905524

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109D8
SDG #: R0905524
Laboratory: Columbia Analytical Services

Date: 12/05/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer:

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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: 9/28/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D1 = 12, 13 *D2 = 17, 18
X.	Field blanks	ND	EB = 1, 2 FB = FB080309-SO (R0904274)

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

*ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: water + Soil

1	EB092809-SO1A4	W	11	SA209-0.5B	S	21	SA29-40BMS	S	31	97237-MB
2	EB092809-SO2A4		12	SA209-10B	D1	22	SA29-40BMSD		32	97335-
3	SA29-0.5B	S	13	SA209009-10B	D1	23			33	
4	SA29-10B		14	SA209-25B		24			34	
5	SA29-25B		15	SA209-35B		25			35	
6	SA29-40B		16	SA212-0.5B		26			36	
7	SA120-0.5B		17	SA212-13B	D2	27			37	
8	SA120-10B		18	SA212009-13B	D2	28			38	
9	SA120-25B		19	SA212-30B		29			39	
10	SA120-43B		20	SA212-44B		30			40	

Notes:

LDC #: 22109D8
SDG #: Sq Cmv

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer:

METHOD: ✓ GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?

Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit _____	Qualification Parent only / All Samples
	12	13		
DRO	37000	72000	35000 (≤ 43000 D)	-
ORO	43000 U	48000	5000 ↓	-

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 29, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905539

Sample Identification

EB092909-SO1A4
EB092909-SO2A4
SA213-0.5B
SA213-14B
SA213-30B
SA213-44B
SA110-0.5B
SA110-10B
SA110-25B
SA110-37B
SA110009-37B
SA191-0.5B
SA191-10B
SA191-25B
SA191-40B
SA191009-40B
SA193-0.5B
SA193-10B
SA193009-10B
SA193-25B
SA193-42B
SA193-2.5B
SA213-14BMS
SA213-14BMSD

Introduction

This data review covers 22 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for all compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts 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.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Samples EB092909-SO1A4 and EB092909-SO2A4 were identified as equipment blanks. No total petroleum hydrocarbons as extractable contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092909-SO1A4	9/29/09	Diesel range organics	77 ug/L	All soil samples in SDG R0905539
EB092909-SO2A4	9/29/09	Diesel range organics	110 ug/L	All soil samples in SDG R0905539

Sample concentrations were compared to concentrations detected in the equipment blanks as required by the QAPP. No sample data was qualified.

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. 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.

c. 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.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905539	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples SA110-37B and SA110009-37B, samples SA191-40B and SA191009-40B, and samples SA193-10B and SA193009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905539

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905539	EB092909-SO1A4 EB092909-SO2A4 SA213-0.5B SA213-14B SA213-30B SA213-44B SA110-0.5B SA110-10B SA110-25B SA110-37B SA110009-37B SA191-0.5B SA191-10B SA191-25B SA191-40B SA191009-40B SA193-0.5B SA193-10B SA193009-10B SA193-25B SA193-42B SA193-2.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905539

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109E8
SDG #: R0905539
Laboratory: Columbia Analytical Services

Date: 12/04/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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: 9/29/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV/ICV ≤ 20%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D_1 = 10, 11 D_2 = 15, 16 D_3 = 18, 19
X.	Field blanks	SW	EB = 1, 2 FB = FD080309-SO (R0904279)

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Water + Soil

1	EB092909-SO1A4	W	11	SA110009-37B	D_1 S	21	SA193-42B	S	31	97634 - MB
2	EB092909-SO2A4		12	SA191-0.5B		22	SA193-2.5B		32	97336 -
3	SA213-0.5B	S	13	SA191-10B		23	SA213-14BMS		33	
4	SA213-14B		14	SA191-25B		24	SA213-14BMSD		34	
5	SA213-30B		15	SA191-40B	D_2	25			35	
6	SA213-44B		16	SA191009-40B	D_2	26			36	
7	SA110-0.5B		17	SA193-0.5B		27			37	
8	SA110-10B		18	SA193-10B	D_3	28			38	
9	SA110-25B		19	SA193009-10B	D_3	29			39	
10	SA110-37B	D_1	20	SA193-25B		30			40	

Notes:

LDC #: 22109 E8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VG
2nd Reviewer:

METHOD: (GC) HPLC
Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?
Blank units: ug/L Associated sample units: ug/kg
Sampling date: 9/29/09
Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank
Rinsate / Equipment Rinsate / (Equipment Blank) / Source Blank / Other:
Associated Samples: All Soils

Compound	Blank ID	Blank ID	Sample Identification							
	1	2								
DRO	77	110	(All results either ND or > EB)							
CRQL										

Blank units: Associated sample units:
Sampling date:
Field blank type: (circle one) Field Blank / Trip Blank/ Atmospheric Blank/ Ambient Blank
Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:
Associated Samples:

Compound	Blank ID	Blank ID	Sample Identification							
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound 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, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: September 30 through October 1, 2009

LDC Report Date: December 9, 2009

Matrix: Soil/Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905567

Sample Identification

EB093009-SO1A4
RSAQ3-0.5B
RSAQ3-0.5BRE
RSAQ3009-0.5B
RSAQ3-10B
RSAQ3-25B
RSAQ3-41B
SA190-0.5B
SA190-10B
SA190-25B
SA190-38B
RSAR4-0.5B
RSAR4-10B
RSAR4009-10B
RSAR4-25B
RSAR4-37B
RSAR3-0.5B
RSAR3-10B
RSAR3-25B
RSAR3-35B
RSAR3-38B
SA190-38BMS
SA190-38BMSD

Introduction

This data review covers 22 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015B for Total Petroleum Hydrocarbons (TPH) as Extractables.

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) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for all compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts 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.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample EB093009-SO1A4 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

Sample FB080309-SO (from SDG R0904279) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAQ3-0.5B	ortho-Terphenyl	126 (55-116)	TPH as extractables	J+ (all detects)	A

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SA190-25B	ortho-Terphenyl	121 (55-116)	TPH as extractables	J+ (all detects)	P

b. 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.

c. 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.

V. Target Compound Identification

Raw data were not reviewed for this SDG.

VI. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905567	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

VII. System Performance

Raw data were not reviewed for this SDG.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
RSAQ3-0.5B	TPH as extractables	X	A

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples RSAQ3-0.5B and RSAQ3009-0.5B, samples RSAQ3-0.5BRE and RSAQ3009-0.5B, and samples RSAR4-10B and RSAR4009-10B were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5B	RSAQ3009-0.5B				
Diesel range organics	240000	140000	-	100000 (≤43000)*	-	-
Oil range organics	250000	130000	-	120000 (≤43000)*	-	-

*Although the difference limit was exceeded for DRO and ORO for field duplicate samples RSAQ3-0.5BRE and RSAQ3009-0.5B in the table above, no data required qualification since sample RSAQ3-0.5B is considered not usable and the differences for field duplicate samples RSAQ3-0.5BRE and RSAQ3009-0.5B were within the QC limits.

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAQ3-0.5BRE	RSAQ3009-0.5B				
Diesel range organics	90000	140000	-	50000 (≤43000)	-	-
Oil range organics	120000	130000	-	10000 (≤43000)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG R0905567

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905567	RSAQ3-0.5B	TPH as extractables	J+ (all detects)	A	Surrogate recovery (%R) (s)
R0905567	SA190-25B	TPH as extractables	J+ (all detects)	P	Surrogate recovery (%R) (s)
R0905567	EB093009-SO1A4 RSAQ3-0.5B RSAQ3-0.5BRE RSAQ3009-0.5B RSAQ3-10B RSAQ3-25B RSAQ3-41B SA190-0.5B SA190-10B SA190-25B SA190-38B RSAR4-0.5B RSAR4-10B RSAR4009-10B RSAR4-25B RSAR4-37B RSAR3-0.5B RSAR3-10B RSAR3-25B RSAR3-35B RSAR3-38B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905567	RSAQ3-0.5B	TPH as extractables	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Equipment Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG R0905567

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109F8
SDG #: R0905567
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: L

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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: 9/30 - 10/01/09
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	CCV/ICV < 20%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/D
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	D_1 = 2, 4 D_2 = 3, 4 D_3* = 13, 14
X.	Field blanks	ND	EB = 1 FB = FB080309-SO (R0904279)

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
*ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Water + Soil

1	EB093009-SO1A4	W	11	SA190-38B	S	21	RSAR3-38B	S	31	97634 - MB
2	RSAQ3-0.5B	D_1 S	12	RSAR4-0.5B		22	SA190-38BMS		32	97554 -
3	RSAQ3-0.5BRE	D_2	13	RSAR4-10B	D_3	23	SA190-38BMSD		33	98286 -
4	RSAQ3009-0.5B	D_1, D_2	14	RSAR4009-10B	D_3	24			34	
5	RSAQ3-10B		15	RSAR4-25B		25			35	
6	RSAQ3-25B		16	RSAR4-37B		26			36	
7	RSAQ3-41B		17	RSAR3-0.5B		27			37	
8	SA190-0.5B		18	RSAR3-10B		28			38	
9	SA190-10B		19	RSAR3-25B		29			39	
10	SA190-25B		20	RSAR3-35B		30			40	

Notes: _____

LDC #: 22109F8
SDG #: See Cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: LA

METHOD: ✓ GC ___ HPLC

Are surrogates required by the method? Yes ✓ or No ___.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	2	ZB-5	H	126 (55-116)	J+ dets / A (S)
		↓	↓	(↓)	↓
	10	↓	↓	121 (↓)	J+ dets / P
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 22109F8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: / **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	2	Surr outside limits		B X/A (O)

Comments: _____

LDC #: 22109F8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/kg)		%RPD Limit ____	Qualification (Parent only / All Samples)
	2	4		
DRO	240 000	140 000	100 000 (≤ 43 000 D)	J dets/A (fd)
ORO	250 000	130 000	120 000	

Compound	Concentration (ug/kg)		%RPD Limit ____	Qualification (Parent only / All Samples)
	3	4		
DRO	90 000	140 000	50000 (≤ 43000 D)	-
ORO	120 000	130000	10 000	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22109

Dioxins/Dibenzofurans

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada

Collection Date: August 5, 2009

LDC Report Date: December 8, 2009

Matrix: Soil

Parameters: Dioxins/Dibenzofurans

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904370

Sample Identification

RSAU5-0.5BSPLP2
RSAU5-0.5BSPLP3

Samples in this SDG underwent SPLP extraction

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 8290 for Polychlorinated Dioxins/Dibenzofurans.

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 USEPA Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Dibenzofurans Data Review (September 2005) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.

J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.

J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.

JK The analytical result is an estimated maximum possible concentration (EMPC).

X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.

J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.

J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.

J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25% .

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated dioxin/dibenzofuran contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900367-04	9/9/09	OCDD	11.2 pg/L	All samples in SDG R0904370

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAU5-0.5BSPLP3	OCDD	5.52 pg/L	5.52U pg/L

No field blanks were identified in this SDG.

VI. 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.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
EQ0900367-05/06 (All samples in SDG R0904370)	1,2,3,4,6,7,8-HpCDF	84 (86-151)	84 (86-151)	-	J- (all detects) UJ (all non-detects)	P

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported below the PQL.	J (all detects)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0904370	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

XII. System Performance

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, 2009 Phase B Investigation, Henderson, Nevada Dioxins/Dibenzofurans - Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	1,2,3,4,6,7,8-HpCDF	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0904370	RSAU5-0.5BSPLP2 RSAU5-0.5BSPLP3	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG R0904370

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0904370	RSAU5-0.5BSPLP3	OCDD	5.52U pg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG R0904370

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22109A21
SDG #: R0904370
Laboratory: Columbia Analytical Services

Date: 12/8/09
Page: 1 of 1
Reviewer: 1
2nd Reviewer: 1

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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: 8/5/09
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ICV	A	
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client specified
VII.	Laboratory control samples	SW	LCS/D
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	N	All EMPC - J (K)
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	RSAU5-0.5BSPLP2 S	11	U133301 J	21		31	
2	RSAU5-0.5BSPLP3	12	U133302	22		32	
3		13		23		33	
4	380900367-04	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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 22109A21
SDG #: 22C2W

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 9/9/09 **Blank analysis date:** 9/13/09 Associated Samples: [illegible] (bl)
Conc. units: pg/L

Compound	Blank ID	Sample Identification								
	220900367-04		2							
4	11.2		5.52/U							

Blank extraction date: _____ **Blank analysis date:** _____ Associated Samples: _____
Conc. units: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Reviewer: [handwritten initials]
2nd Reviewer: [handwritten initials]

LDC #: 22109A1
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a LCS required?
(Y) N N/A Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	Date	Lab ID/Reference	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		ZQ0900367054/06	O	84 (86-15)	84 (86-15)	( )	All	J/UJ/A (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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