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 December 17, 2009. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 22285:

SDG #	Fraction
R0906056/K0910677, R0906081 R0906191, R0906270, R0906403 R0906477	Volatiles, Semivolatiles, Chlorinated Pesticides, Polychlorinated Biphenyls, Metals, Wet Chemistry, TPH as Extractables

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

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

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\TronoxNG\22285COV.wpd

Attachment 1

Stage 2B/4

LDC #22285 (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)		Metals (SW846)		TPH-E (8015B)		Alk. (2320B)		NH_3-N (350.1M)		Br Cl,SO_4 (9056)		NO_2-N (353.2)		NO_3-N (9056)		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	W	S
A	R0906056/K0910677	12/17/09	01/11/10	0	6	0	8	0	8	0	12	0	12	0	8	0	12	0	12	0	12	0	12	0	12	-	-	0	12	0	12						
B	R0906081	12/17/09	01/11/10	4	23	1	17	0	24	1	8	-	-	1	22	1	22	1	22	1	22	1	22	1	22	-	-	-	-	1	22						
C	R0906191	12/21/09	01/13/10	1	4	0	4	0	2	0	2	-	-	0	4	0	4	0	4	0	4	0	4	0	4	0	4	-	-	0	4						
D	R0906270	12/23/09	01/15/10	4	0	3	0	3	0	-	-	3	0	-	-	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0						
E	R0906403	12/22/09	01/14/10	1	3	0	3	-	-	0	1	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	-	-	0	3						
F	R0906477	12/23/09	01/15/10	2	0	1	0	1	0	-	-	2	0	-	-	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0						
Total	T/LR			12	36	5	32	4	34	1	23	5	15	1	37	5	41	5	41	5	41	5	41	5	41	4	7	4	12	5	41	0	0	0	0	0	508

Stage 2B/4

LDC #22285 (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	W	S
A	R0906056/K0910677	12/17/09	01/11/10	0	12	0	12	0	12	0	12	0	12	0	12	0	12	0	12																		
B	R0906081	12/17/09	01/11/10	1	22	1	22	1	22	-	-	-	-	1	22	1	22	1	22																		
C	R0906191	12/21/09	01/13/10	0	4	0	4	0	4	-	-	-	-	0	4	0	4	0	4																		
D	R0906270	12/23/09	01/15/10	3	0	3	0	3	0	3	0	3	0	3	0	3	0	3	0																		
E	R0906403	12/22/09	01/14/10	0	3	0	3	0	3	-	-	-	-	0	3	0	3	0	3																		
F	R0906477	12/23/09	01/15/10	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0																		
Total	T/LR			5	41	5	41	5	41	4	12	4	12	5	41	5	41	5	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	308

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 #: 22285
SDG #: R0906056/K0910677, R0906081, R0906191
R0906270, R0906403, R0906477

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_LDC22285_011510.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 #22285

Volatiles

LDC

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 21 through October 26, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056

Sample Identification

SA52-15BSPLP3
SA52-28BSPLP3
RSAQ8-10BSPLP3
RSAQ8-31BSPLP3
SA34-10BSPLP3
SA34-31BSPLP3

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 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
11/7/09	2-Methyl-2-propanol	0.015 (≥0.05)	All samples in SDG R0906056	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
11/10/09	2-Methyl-2-propanol	0.015 (≥0.05)	All samples in SDG R0906056	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
178668-MB	11/10/09	1,2,3-Trichlorobenzene Naphthalene	0.49 ug/L 0.43 ug/L	All samples in SDG R0906056

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.

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 R0906056	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 R0906056

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906056	SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 SA34-10BSPLP3 SA34-31BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0906056	SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 SA34-10BSPLP3 SA34-31BSPLP3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0906056	SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 SA34-10BSPLP3 SA34-31BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0906056

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0906056

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A1
SDG #: R0906056
Laboratory: Columbia Analytical Services

Date: 12/31/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer: W

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: 10/21 - 26/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD r ✓
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/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
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	SA52-15BSPLP3	+ 11	178668-MB	21		31	
+ 2	SA52-28BSPLP3	− 12	SPLP BLK	22		32	
− 3	RSAQ8-10BSPLP3	13		23		33	
+ 4	RSAQ8-31BSPLP3	14		24		34	
− 5	SA34-10BSPLP3	15		25		35	
+ 6	SA34-31BSPLP3	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22285 A1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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 #: 22285A1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: M
2nd Reviewer: W

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 #: 22285A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: OVG
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 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
	11/07/09	ICAL-MS8	NNNN		0.015	All + Blks	J/UJ/A (c)

LDC #: 22285A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing 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 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
	11/10/09	F4216	NNNN		0.015	All + Blks	J/UJ/A (c)

CONCAL.1SB

LDC #: 22285A1
SDG #: Sw Conv

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV
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: 11/10/09
Conc. units: ug/L
Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	178668-MB									
NNN	0.49									
MMM	0.43									

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22285 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVB
2nd Reviewer: [signature]

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	Recalculated RRF	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS 8	11/07/09	C (1st internal standard)	0.387	0.387	0.388	0.388	3.4	3.4
			S (2nd internal standard)	0.269	0.269	0.280	0.280	7.6	7.6
			AA (3rd internal standard)	0.326	0.326	0.339	0.339	4.2	4.2
2			BB (1st internal standard)	0.383	0.383	0.416	0.416	7.6	7.6
			(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 #: 22285A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JM
2nd Reviewer:

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	F4216	11/10/09	C (1st internal standard)	0.388	0.367	0.367	5.4	5.4
			S (2nd internal standard)	0.280	0.267	0.267	4.6	4.6
			AA (3rd internal standard)	0.339	0.334	0.334	1.5	1.6
2			BB (1st internal standard)	0.416	0.387	0.387	7.0	7.1
			(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 #: 22785 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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	54.73	109	109	0
Bromofluorobenzene		54.03	108	108	
1,2-Dichloroethane-d4					
Dibromofluoromethane		53.75	108	108	✓

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 #: 22295A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVR
2nd Reviewer: [illegible]

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

LCS ID: 178668 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	Recalculated
1,1-Dichloroethene	50.0	50.0	51.4	55.0	103	103	110	110	7	7
Trichloroethene			49.6	51.3	99	99	103	103	3	3
Benzene			48.0	49.9	96	96	100	100	4	4
Toluene			50.9	52.9	102	102	106	106	4	4
Chlorobenzene			49.8	51.3	100	100	103	103	3	3

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 #: 22285 A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JR
2nd reviewer: W

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. #1, F:

Conc. = $\frac{(1561)(50)(\quad)(\quad)}{(52229)(0.061)(\quad)(\quad)}$

= 2.450

≈ 2.5 ng/L

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 22 through October 23, 2009

LDC Report Date: January 11, 2010

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

EB102209-SO1A3
SA112-0.5B
SA112-10B
SA112-20B
SA112-34B
RSAQ8-0.5B
RSAQ8-0.5BRE
RSAQ8-10B
RSAQ8-22B
RSAQ8-31B
RSAQ8-34B
TB102209-SO1
TB102209-SO3
SA132-0.5B
SA132-10B
SA132009-10B
SA132-20B
SA132-34B
RSAR8-0.5B
RSAR8-10B
RSAR8-20B
RSAR8-34B
RSAP8-0.5B
RSAP8-10B
RSAP8-25B
RSAP8-40B
TB102309-SO1
RSAR8-34BMS
RSAR8-34BMSD

Introduction

This data review covers 25 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
10/27/09	2-Methyl-2-propanol	0.017 (≥0.05)	EB102209-SO1A3 TB102209-SO1 TB102209-SO3 177161-MB	J (all detects) UJ (all non-detects)	A
10/31/09	2-Methyl-2-propanol	0.028 (≥0.05)	TB102309-SO1 178301-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
10/30/09 (F3812)	Chloromethane Bromomethane	26.2 28.5	EB102209-SO1A3 TB102209-SO1 TB102209-SO3 177161-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
10/30/09 (H2030)	Chloromethane Acetone	26.9 35.9	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B 177136-MB	J+ (all detects) J+ (all detects)	A
10/30/09 (H2030)	Hexachlorobutadiene	26.1	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B 177136-MB	J- (all detects) UJ (all non-detects)	A
10/31/09	Bromomethane Hexachlorobutadiene	28.4 35.9	RSAQ8-0.5BRE RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-34B RSAR8-34BMS RSAR8-34BMSD 177288-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
11/1/09	Acetone	31.3	RSAR8-10B RSAR8-20B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B 177311-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
10/30/09 (F3812)	2-Methyl-2-propanol	0.017 (≥0.05)	EB102209-SO1A3 TB102209-SO1 TB102209-SO3 177161-MB	J (all detects) UJ (all non-detects)	A
11/6/09 (C2086)	2-Methyl-2-propanol	0.025 (≥0.05)	TB102309-SO1 178301-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
177161-MB	10/30/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene	0.31 ug/L 0.27 ug/L 0.28 ug/L	EB102209-SO1A3 TB102209-SO1 TB102209-SO3
177136-MB	10/30/09	Dichloromethane	0.94 ug/Kg	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B
178301-MB	11/6/09	Hexachlorobutadiene	0.32 ug/L	TB102309-SO1

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
SA112-10B	Dichloromethane	0.93 ug/Kg	0.93U ug/Kg
RSAQ8-10B	Dichloromethane	1.1 ug/Kg	1.1U ug/Kg

Samples TB102209-SO1, TB102209-SO3, and TB102309-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
TB102209-SO3	10/22/09	Acetone Methylene chloride Toluene	1.8 ug/L 0.23 ug/L 0.23 ug/L	EB102209-SO1A3 SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-0.5BRE RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B
TB102309-SO1	10/23/09	Acetone	5.6 ug/L	SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B

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
EB102209-SO1A3	Acetone	3.1 ug/L	3.1U ug/L
RSAQ8-0.5B	Toluene	0.44 ug/Kg	0.44U ug/Kg
SA132-20B	Acetone	9.4 ug/Kg	9.4U ug/Kg
RSAR8-20B	Acetone	2.1 ug/Kg	2.1U ug/Kg
RSAP8-10B	Acetone	8.3 ug/Kg	8.3U ug/Kg

Sample EB102209-SO1A3 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
EB102209-SO1A3	10/22/09	Acetone	3.1 ug/L	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-0.5BRE RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B

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

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Acetone Toluene	9.2 ug/L 0.44 ug/L	All soil samples in SDG R0906081

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
SA112-0.5B	Acetone	16 ug/Kg	16U ug/Kg
SA112-10B	Toluene	0.62 ug/Kg	0.62U ug/Kg
RSAQ8-0.5B	Acetone Toluene	9.6 ug/Kg 0.44 ug/Kg	9.6U ug/Kg 0.44U ug/Kg
RSAQ8-0.5BRE	Acetone Toluene	14 ug/Kg 0.57 ug/Kg	14U ug/Kg 0.57U ug/Kg
RSAQ8-10B	Toluene	0.55 ug/Kg	0.55U ug/Kg
RSAQ8-31B	Toluene	0.74 ug/Kg	0.74U ug/Kg
SA132-20B	Acetone	9.4 ug/Kg	9.4U ug/Kg
RSAR8-10B	Toluene	0.40 ug/Kg	0.40U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAR8-20B	Acetone Toluene	2.1 ug/Kg 0.52 ug/Kg	2.1U ug/Kg 0.52U ug/Kg
RSAR8-34B	Toluene	0.80 ug/Kg	0.80U ug/Kg
RSAP8-10B	Acetone	8.3 ug/Kg	8.3U 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
RSAR8-34BMS/MSD (RSAR8-34B)	Hexachlorobutadiene	36 (70-130)	29 (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
177288LCS	Hexachlorobutadiene	68 (75-125)	RSAQ8-0.5BRE RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-34B 177288-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
RSAQ8-0.5B	1,4-Dichlorobenzene-d4	146546 (188206-752822)	Bromoform 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Isopropylbenzene 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
RSAQ8-0.5BRE	1,4-Dichlorobenzene-d4	102219 (163197-652786)	Bromoform 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Isopropylbenzene 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 R0906081	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
RSAQ8-0.5BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA132-10B and SA132009-10B 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
	SA132-10B	SA132009-10B				
Chloroform	1.1	0.59	-	0.51 (≤6.1)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0906081

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	EB102209-SO1A3 TB102209-SO1 TB102209-SO3 TB102309-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0906081	EB102209-SO1A3 TB102209-SO1 TB102209-SO3	Chloromethane Bromomethane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906081	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B	Chloromethane Acetone	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0906081	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906081	RSAQ8-0.5BRE RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-34B	Bromomethane Hexachlorobutadiene	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906081	RSAR8-10B RSAR8-20B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906081	EB102209-SO1A3 TB102209-SO1 TB102209-SO3 TB102309-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0906081	RSAR8-34B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	RSAQ8-0.5BRE RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-34B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906081	RSAQ8-0.5B RSAQ8-0.5BRE	Bromoform 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Isopropylbenzene 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)
R0906081	EB102209-SO1A3 SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-0.5BRE RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B TB102209-SO1 TB102209-SO3 SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B TB102309-SO1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0906081	RSAQ8-0.5BRE	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 R0906081

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906081	SA112-10B	Dichloromethane	0.93U ug/Kg	A	bl
R0906081	RSAQ8-10B	Dichloromethane	1.1U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0906081

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0906081	EB102209-SO1A3	Acetone	3.1U ug/L	A	bt
R0906081	RSAQ8-0.5B	Toluene	0.44U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0906081	SA132-20B	Acetone	9.4U ug/Kg	A	bt
R0906081	RSAR8-20B	Acetone	2.1U ug/Kg	A	bt
R0906081	RSAP8-10B	Acetone	8.3U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0906081

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0906081	SA112-0.5B	Acetone	16U ug/Kg	A	bf
R0906081	SA112-10B	Toluene	0.62U ug/Kg	A	bf
R0906081	RSAQ8-0.5B	Acetone Toluene	9.6U ug/Kg 0.44U ug/Kg	A	bf
R0906081	RSAQ8-0.5BRE	Acetone Toluene	14U ug/Kg 0.57U ug/Kg	A	bf
R0906081	RSAQ8-10B	Toluene	0.55U ug/Kg	A	bf
R0906081	RSAQ8-31B	Toluene	0.74U ug/Kg	A	bf
R0906081	SA132-20B	Acetone	9.4U ug/Kg	A	bf
R0906081	RSAR8-10B	Toluene	0.40U ug/Kg	A	bf
R0906081	RSAR8-20B	Acetone Toluene	2.1U ug/Kg 0.52U ug/Kg	A	bf
R0906081	RSAR8-34B	Toluene	0.80U ug/Kg	A	bf
R0906081	RSAP8-10B	Acetone	8.3U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B1
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JC
2nd Reviewer: [illegible]

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: 10/22-23/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD ≤ 15%
IV.	Continuing calibration/~~LCV~~	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	D = 15, 16
XVII.	Field blanks	SW	FB = 1 TB = *12, 13, 27 FB=FB082809-50 (R0904844)

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	EB102209-SO1A3	W	11	RSAQ8-34B	S	21	RSAR8-20B	S	+ 31	177161-MB	653
2	SA112-0.5B	S	- 12	TB102209-SO1	W	22	RSAR8-34B		32	178301-	972
3	SA112-10B		+ 13	TB102209-SO3		23	RSAP8-0.5B		+ 33	177136-	635
4	SA112-20B		14	SA132-0.5B	S	24	RSAP8-10B		- 34	177288-	704
5	SA112-34B		15	SA132-10B	D	25	RSAP8-25B		- 35	177311-	713
6	RSAQ8-0.5B		16	SA132009-10B	D	26	RSAP8-40B		36		
7	RSAQ8-0.5B~~DL~~ RE		17	SA132-20B		+ 27	TB102309-SO1	W	37		
8	RSAQ8-10B		18	SA132-34B		28	RSAR8-34BMS	S	38		
9	RSAQ8-22B		19	RSAR8-0.5B		29	RSAR8-34BMSD		39		
10	RSAQ8-31B		20	RSAR8-10B		30			40		

LDC #: 22285B1
SDG #: See Cover

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? $r^2 \geq 0.99$
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
	10/27/09	ICAL-MS8	NNNN		0.017	1, 12, 13, 177161-MB	J/UJ/A (c)
	10/31/09	ICAL-MS10	NNNN		0.028	27, 178301-MB	

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.

4BCB

LDC #: 22285B1
SDG #: Sea Grove

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JV
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
	10/30/09	F3817	A (-)	26.2		1, 12, 13, 177161-MB	J-/NJ/A (C)
			B (-)	28.5			
			NNNN		0.017		J/NJ/A
	10/30/09	H2030	A (+)	26.9		2-6, 8, 177136-MB	J+ dets/A
			F (+)	35.9			
			LLL (-)	26.1			J-/NJ/A
	10/31/09	H2070	B (-)	28.4		7, 9-11, 14-19, 22, 28, 29, 177288-MB	J-/NJ/A
			LLL (-)	35.9			
	11/01/09	H2099	F (-)	31.3		20, 21, 23-26, 177311-MB	J-/NJ/A
	11/06/09	C2086	NNNN		0.025	27, 178301-MB	J/NJ/A

LDC #: 22285 B1
SDG #: Sw Grav

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 2
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 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: 10/30/09

Conc. units: ug/L Associated Samples: 1, 12, 13 (ND)

Compound	Blank ID	Sample Identification								
	177161-MB									
NNN	0.31									
KKK	0.27									
LLL	0.28									

Blank analysis date: ~~ug/kg~~ 10/30/09

Conc. units: ug/kg Associated Samples: 2-6, 8 (bl)

Compound	Blank ID	Sample Identification								
	177136-MB	3	8							
E	0.94	0.93/U	1.1/U							

LDC #: 22285 B1
SDG #: Sq Cmar

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: 11/06/09
Conc. units: ug/L Associated Samples: 27 (ND)

Compound	Blank ID	Sample Identification								
	178301-MB									
LLL	0.32									

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22285 B1
SDG #: Sep Cmp

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 3
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
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 2-11

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	10/22/09									
6,Y F	3.1		(All results 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: 1-11 (bt)

Compound	Blank ID 13	Blank ID	Sample Identification							
Sampling Date	10/22/09		1	6						
3,6 F	1.8		3.1/U							
0.46 E	0.23									
0,46 CC	0.23			0.44/U						
			(All others either ND or > TB)							

LDC #: 22285 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: 2

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: 14 – 26 (bt)

Compound	Blank ID 27	Blank ID	Sample Identification							
Sampling Date	10/23/09		17	21	24					
F	5.6		9.4/U	2.1/U	8.3/U					
		CA	ll others	either	ND or	> TB)				
CRQL										

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 FB082809-SO	Blank ID	Sample Identification							
Sampling Date	8/28/09		2	3	6	7	8	10	17	20
18.4 F	9.2		16/U		9.6/U	14/U			9.9/U	
0.88 CC	0.44			0.62/U	0.44/U	0.57/U	0.55/U	0.74/U		0.40/U
			(All others	either	ND	or >	FD)			
CRQL										

LDC #: 22285 B1
SDG #: Sa Cruz

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SVG
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 FB082809-SO	Blank ID	Sample Identification							
Sampling Date	8/28/09		21	22	24					
F	9.2		2.1/U		8.3/U					
CC	0.44		0.52/U	0.80/U						
			(All others either ND or > FB)							
CRQL										

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										
CRQL										

LDC #: 27285 B1
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
		28/29	Several	compounds)	outside limits	( )	22	No qual
			(See	attached	summary)	( )		(either MS/MSD or LCS in)
				( )	( )	( )		
			LLL	36 (70-130)	29 (70-130)	( )		J-/NJ/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: R0906081
Date Collected: 10/23/09
Date Received: 10/24/09
Date Analyzed: 11/ 1/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAR8-34B
Lab Code: R0906081-024

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0910704-03 Result	Matrix Spike RQ0910704-03 Amount	Matrix Spike RQ0910704-03 % Rec		Duplicate Matrix Spike RQ0910704-04 Result	Duplicate Matrix Spike RQ0910704-04 Amount	Duplicate Matrix Spike RQ0910704-04 % Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	45.8	71.4	64	*	45.1	70.0	64	*	70 - 130	2	30
1,1,1-Trichloroethane (TCA)	ND	58.9	71.4	82		56.8	70.0	81		70 - 130	4	30
1,1,2,2-Tetrachloroethane	ND	52.5	71.4	73		48.4	70.0	69	*	70 - 130	8	30
1,1,2-Trichloroethane	ND	47.7	71.4	67	*	49.7	70.0	71		70 - 130	4	30
1,1-Dichloroethane (1,1-DCA)	ND	55.7	71.4	78		55.7	70.0	80		70 - 130	0	30
1,1-Dichloroethene (1,1-DCE)	ND	54.0	71.4	76		52.8	70.0	75		70 - 130	2	30
1,1-Dichloropropene	ND	53.5	71.4	75		51.2	70.0	73		70 - 130	4	30
1,2,3-Trichlorobenzene	ND	33.7	71.4	47	*	29.5	70.0	42	*	70 - 130	14	30
1,2,3-Trichloropropane	ND	47.9	71.4	67	*	45.7	70.0	65	*	70 - 130	5	30
1,2,4-Trichlorobenzene	ND	36.3	71.4	51	*	29.8	70.0	43	*	70 - 130	20	30
1,2,4-Trimethylbenzene	ND	39.5	71.4	55	*	34.0	70.0	49	*	70 - 130	15	30
1,2-Dibromo-3-chloropropane (DBC	ND	46.6	71.4	65		44.4	70.0	63		50 - 150	5	30
1,2-Dibromoethane	ND	49.2	71.4	69	*	49.4	70.0	71		70 - 130	1	30
1,2-Dichlorobenzene	ND	41.6	71.4	58	*	37.8	70.0	54	*	70 - 130	9	30
1,2-Dichloroethane	ND	54.8	71.4	77		54.3	70.0	78		70 - 130	1	30
1,2-Dichloropropane	ND	52.2	71.4	73		49.2	70.0	70		70 - 130	6	30
1,3,5-Trimethylbenzene	ND	42.1	71.4	59	*	34.8	70.0	50	*	70 - 130	19	30
1,3-Dichlorobenzene	ND	42.5	71.4	59	*	36.9	70.0	53	*	70 - 130	14	30
1,3-Dichloropropane	ND	49.4	71.4	69	*	49.9	70.0	71		70 - 130	1	30
1,4-Dichlorobenzene	ND	41.0	71.4	57	*	36.1	70.0	52	*	70 - 130	13	30
2,2-Dichloropropane	ND	54.6	71.4	76		51.6	70.0	74		70 - 130	6	30
2-Butanone (MEK)	2.8	52.4	71.4	69		53.7	70.0	73		50 - 150	3	30
2-Chlorotoluene	ND	43.5	71.4	61	*	40.1	70.0	57	*	70 - 130	8	30
2-Hexanone	ND	37.1	71.4	52	*	39.3	70.0	56	*	70 - 130	6	30
2-Methyl-2-propanol	ND	1140	1430	80		1090	1400	78		50 - 150	5	30
4-Chlorotoluene	ND	44.4	71.4	62	*	38.1	70.0	54	*	70 - 130	15	30
4-Isopropyltoluene	ND	38.8	71.4	54	*	32.8	70.0	47	*	70 - 130	17	30
4-Methyl-2-pentanone	ND	50.6	71.4	71		51.1	70.0	73		70 - 130	1	30
Acetone	23	89.2	71.4	93		87.4	70.0	92		50 - 150	2	30
Benzene	ND	48.9	71.4	68	*	49.8	70.0	71		70 - 130	2	30
Bromobenzene	ND	44.3	71.4	62	*	39.3	70.0	56	*	70 - 130	12	30
Bromochloromethane	ND	51.8	71.4	73		48.9	70.0	70		70 - 130	6	30
Bromodichloromethane	ND	51.4	71.4	72		51.2	70.0	73		70 - 130	0	30
Bromoform	ND	48.3	71.4	68	*	48.0	70.0	69	*	70 - 130	1	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0906081
Date Collected: 10/23/09
Date Received: 10/24/09
Date Analyzed: 11/ 1/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAR8-34B
Lab Code: R0906081-024

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0910704-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0910704-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
Bromomethane	ND	37.5	71.4	53		39.1	70.0	56		50 - 150	4	30
Carbon Tetrachloride	ND	56.2	71.4	79		56.7	70.0	81		70 - 130	1	30
Chlorobenzene	ND	44.4	71.4	62	*	41.8	70.0	60	*	70 - 130	6	30
Chloroethane	ND	53.2	71.4	74		50.8	70.0	73		70 - 130	5	30
Chloroform	ND	57.2	71.4	80		56.3	70.0	80		70 - 130	2	30
Chloromethane	ND	64.9	71.4	91		62.4	70.0	89		70 - 130	4	30
Dibromochloromethane	ND	50.7	71.4	71		49.8	70.0	71		70 - 130	2	30
Dibromomethane	ND	50.1	71.4	70		48.3	70.0	69	*	70 - 130	4	30
Dichlorodifluoromethane (CFC 12)	ND	40.1	71.4	56	*	40.5	70.0	58	*	70 - 130	1	30
Dichloromethane	1.3	54.7	71.4	75		54.1	70.0	75		70 - 130	1	30
Diisopropyl Ether	ND	53.1	71.4	74		53.8	70.0	77		70 - 130	1	30
Ethyl tert-Butyl Ether	ND	53.0	71.4	74		52.9	70.0	76		70 - 130	0	30
Ethylbenzene	ND	46.2	71.4	65	*	43.1	70.0	62	*	70 - 130	7	30
Hexachlorobutadiene	ND	25.9	71.4	36	*	20.2	70.0	29	*	70 - 130	25	30
Isopropylbenzene (Cumene)	ND	46.7	71.4	65	*	42.0	70.0	60	*	70 - 130	11	30
Methyl tert-Butyl Ether	ND	55.8	71.4	78		52.4	70.0	75		70 - 130	6	30
Naphthalene	ND	39.4	71.4	55		38.3	70.0	55		50 - 150	3	30
Styrene	ND	46.6	71.4	65	*	43.4	70.0	62	*	70 - 130	7	30
Tetrachloroethene (PCE)	ND	46.3	71.4	65	*	44.9	70.0	64	*	70 - 130	3	30
Toluene	0.80	48.6	71.4	67	*	47.8	70.0	67	*	70 - 130	2	30
Trichloroethene (TCE)	ND	50.6	71.4	71		48.5	70.0	69	*	70 - 130	4	30
Trichlorofluoromethane (CFC 11)	ND	58.8	71.4	82		56.1	70.0	80		70 - 130	5	30
Vinyl Chloride	ND	56.2	71.4	79		53.8	70.0	77		70 - 130	4	30
cis-1,2-Dichloroethene	ND	53.0	71.4	74		50.6	70.0	72		70 - 130	5	30
cis-1,3-Dichloropropene	ND	49.4	71.4	69	*	50.0	70.0	71		70 - 130	1	30
m,p-Xylenes	ND	88.7	143	62	*	81.3	140	58	*	70 - 130	9	30
n-Butylbenzene	ND	37.3	71.4	52	*	30.8	70.0	44	*	70 - 130	19	30
n-Propylbenzene	ND	42.3	71.4	59	*	36.5	70.0	52	*	70 - 130	15	30
o-Xylene	ND	45.4	71.4	64	*	40.6	70.0	58	*	70 - 130	11	30
sec-Butylbenzene	ND	41.3	71.4	58	*	34.0	70.0	49	*	70 - 130	19	30
tert-Amyl Methyl Ether	ND	53.1	71.4	74		52.4	70.0	75		70 - 130	1	30
tert-Butylbenzene	ND	40.9	71.4	57	*	34.8	70.0	50	*	70 - 130	16	30
trans-1,2-Dichloroethene	ND	51.4	71.4	72		49.6	70.0	71		70 - 130	3	30
trans-1,3-Dichloropropene	ND	49.1	71.4	69	*	50.2	70.0	72		70 - 130	2	30

Comments:

LDC #: 22285B7
SDG #: See 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
		177288 LCS	LLL	68 (75-125)	( )	( )	7, 9-11, 14-19, 22,	J-/UJ/P (L)
				( )	( )	( )	177288-MB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22285 B7
SDG #: Sq Cmpx

VALIDATION FINDINGS WORKSHEET
Internal Standards

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 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
		6	4DCB	146546 (188206 - 75282 2)		J/UJ/A (1)
		7	↓	102219 (163197 - 652 786)		↓ ↓
						(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 #: 22285B1
SDG #: SA Cmw

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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
		7	Confirmation run for # 6		X/A (o)
			is outside limits		

Comments: _____

LDC #: 22285 37
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
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
	15	16	
k	1.1	0.59	0.51 (≤ 6.1 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: October 28, 2009

LDC Report Date: January 11, 2010

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-10B
RSAS8-25B
RSAS8-35B
TB102809-SO1
RSAS8-35BMS
RSAS8-35BMSD

Introduction

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

Date	Compound	%D	Associated Samples	Flag	A or P
11/10/09	1,1,2,2-Tetrachloroethane	27.0	All water samples in SDG R0906191	J- (all detects) UJ (all non-detects)	A

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.

Sample TB102809-SO1 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Acetone Toluene	9.2 ug/L 0.44 ug/L	All soil samples in SDG R0906191

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
RSAS8-0.5B	Acetone Toluene	5.9 ug/Kg 0.48 ug/Kg	5.9U ug/Kg 0.48U ug/Kg
RSAS8-10B	Acetone	11 ug/Kg	11U 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
RSAS8-35BMS/MSD (RSAS8-35B)	Dichlorodifluoromethane	39 (70-130)	43 (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
178648LCS	Dichlorodifluoromethane	67 (75-125)	All soil samples in SDG R0906191	J- (all detects) UJ (all non-detects)	P
178532LCS	Trichlorofluoromethane	129 (75-125)	All water samples in SDG R0906191	J+ (all 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 R0906191	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 R0906191

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906191	TB102809-SO1	1,1,2,2-Tetrachloroethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906191	RSAS8-35B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906191	TB102809-SO1	Trichlorofluoromethane	J+ (all detects)	A	Laboratory control samples (%R) (l)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B TB102809-SO1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0906191

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0906191

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0906191

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0906191	RSAS8-0.5B	Acetone Toluene	5.9U ug/Kg 0.48U ug/Kg	A	bf
R0906191	RSAS8-10B	Acetone	11U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C1
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer: W

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: 10/28/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ≤ 25
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25 %
V.	Blanks	A	
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	N	
XVII.	Field blanks	SW	*TB = 5 FB = FB082809-SO (R0904894)

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	RSAS8-0.5B S	11	178648-MB	21		31	
2	RSAS8-10B	12	178532-	22		32	
3	RSAS8-25B	13		23		33	
4	RSAS8-35B	14		24		34	
5	TB102809-SO1 W	15		25		35	
6	RSAS8-35BMS S	16		26		36	
7	RSAS8-35BMSD	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 #: 22285 C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JNG
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 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
	11/10/09	X5761	BB (-)	27.0		5, 178532-MB	J-/UJ/A (c)

LDC #: 22285 C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
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
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: All soils (bf)

Compound	Blank ID FB082809-SO	Blank ID	Sample Identification							
Sampling Date	8/28/09		~~1~~	2						
F	9.2		5.9/4	11/4						
CC	0.44		0.48/4							
			CAN	others	either	ND or	> FB)			
CRQL										

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										
CRQL										

LDC #: 22285C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: VV
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
		6/7	Several	compounds)	out side limits	( )	4	No guce (LCS in)
			(See	attached	summary)	( )		
				( )	( )	( )		
			JJ	39 (70-130)	43 (70-130)	( )	↓	J-/NJ/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: R0906191
Date Collected: 10/28/09
Date Received: 10/29/09
Date Analyzed: 11/10/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAS8-35B
Lab Code: R0906191-005

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0911201-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0911201-04 Result	Amount	% Rec		% Rec Limits		RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	49.9	77.7	64	*	57.9	78.5	74		70 - 130		15		30
1,1,1-Trichloroethane (TCA)	ND	67.4	77.7	87		76.2	78.5	97		70 - 130		12		30
1,1,2,2-Tetrachloroethane	ND	51.4	77.7	66	*	57.8	78.5	74		70 - 130		12		30
1,1,2-Trichloroethane	ND	47.9	77.7	62	*	54.6	78.5	70		70 - 130		13		30
1,1-Dichloroethane (1,1-DCA)	ND	58.2	77.7	75		68.8	78.5	88		70 - 130		17		30
1,1-Dichloroethene (1,1-DCE)	ND	49.3	77.7	64	*	54.2	78.5	69	*	70 - 130		9		30
1,1-Dichloropropene	ND	50.1	77.7	64	*	57.2	78.5	73		70 - 130		13		30
1,2,3-Trichlorobenzene	ND	41.6	77.7	54	*	48.0	78.5	61	*	70 - 130		14		30
1,2,3-Trichloropropane	ND	44.1	77.7	57	*	51.6	78.5	66	*	70 - 130		16		30
1,2,4-Trichlorobenzene	ND	44.8	77.7	58	*	51.4	78.5	65	*	70 - 130		14		30
1,2,4-Trimethylbenzene	ND	52.6	77.7	68	*	60.4	78.5	77		70 - 130		14		30
1,2-Dibromo-3-chloropropane (DBC	ND	41.1	77.7	53		50.1	78.5	64		50 - 150		20		30
1,2-Dibromoethane	ND	46.7	77.7	60	*	53.1	78.5	68	*	70 - 130		13		30
1,2-Dichlorobenzene	ND	51.3	77.7	66	*	58.5	78.5	75		70 - 130		13		30
1,2-Dichloroethane	ND	52.6	77.7	68	*	62.0	78.5	79		70 - 130		16		30
1,2-Dichloropropane	ND	51.3	77.7	66	*	59.6	78.5	76		70 - 130		15		30
1,3,5-Trimethylbenzene	ND	52.8	77.7	68	*	61.2	78.5	78		70 - 130		15		30
1,3-Dichlorobenzene	ND	52.7	77.7	68	*	61.9	78.5	79		70 - 130		16		30
1,3-Dichloropropane	ND	46.0	77.7	59	*	53.8	78.5	69	*	70 - 130		16		30
1,4-Dichlorobenzene	ND	52.3	77.7	67	*	60.1	78.5	77		70 - 130		14		30
2,2-Dichloropropane	ND	65.2	77.7	84		72.2	78.5	92		70 - 130		10		30
2-Butanone (MEK)	ND	54.4	77.7	70		54.1	78.5	69		50 - 150		1		30
2-Chlorotoluene	ND	54.9	77.7	71		61.7	78.5	79		70 - 130		12		30
2-Hexanone	ND	32.1	77.7	41	*	37.8	78.5	48	*	70 - 130		16		30
2-Methyl-2-propanol	ND	1270	1550	82		1330	1570	85		50 - 150		4		30
4-Chlorotoluene	ND	57.2	77.7	74		65.8	78.5	84		70 - 130		14		30
4-Isopropyltoluene	ND	56.1	77.7	72		65.0	78.5	83		70 - 130		15		30
4-Methyl-2-pentanone	ND	42.5	77.7	55	*	51.8	78.5	66	*	70 - 130		20		30
Acetone	20	91.4	77.7	92		155	78.5	172	*	50 - 150		52	*	30
Benzene	ND	47.6	77.7	61	*	56.0	78.5	71		70 - 130		16		30
Bromobenzene	ND	48.5	77.7	62	*	57.3	78.5	73		70 - 130		17		30
Bromochloromethane	ND	50.3	77.7	65	*	56.7	78.5	72		70 - 130		12		30
Bromodichloromethane	ND	56.2	77.7	72		63.4	78.5	81		70 - 130		12		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0906191
Date Collected: 10/28/09
Date Received: 10/29/09
Date Analyzed: 11/10/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAS8-35B
Lab Code: R0906191-005

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0911201-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0911201-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	45.6	77.7	59	*	54.7	78.5	70		70 - 130	18	30
Bromomethane	ND	31.7	77.7	41	*	36.0	78.5	46	*	50 - 150	13	30
Carbon Tetrachloride	ND	57.6	77.7	74		69.4	78.5	88		70 - 130	19	30
Chlorobenzene	ND	48.4	77.7	62	*	54.2	78.5	69	*	70 - 130	11	30
Chloroethane	ND	45.4	77.7	58	*	46.8	78.5	60	*	70 - 130	3	30
Chloroform	ND	65.4	77.7	84		70.5	78.5	90		70 - 130	8	30
Chloromethane	ND	42.4	77.7	55	*	48.4	78.5	62	*	70 - 130	13	30
Dibromochloromethane	ND	50.0	77.7	64	*	57.4	78.5	73		70 - 130	14	30
Dibromomethane	ND	46.6	77.7	60	*	54.0	78.5	69	*	70 - 130	15	30
Dichlorodifluoromethane (CFC 12)	ND	30.3	77.7	39	*	33.9	78.5	43	*	70 - 130	11	30
Dichloromethane	ND	52.0	77.7	67	*	56.8	78.5	72		70 - 130	9	30
Diisopropyl Ether	ND	57.9	77.7	75		65.9	78.5	84		70 - 130	13	30
Ethyl tert-Butyl Ether	ND	61.9	77.7	80		66.8	78.5	85		70 - 130	7	30
Ethylbenzene	ND	53.4	77.7	69	*	63.4	78.5	81		70 - 130	17	30
Hexachlorobutadiene	ND	52.4	77.7	67	*	57.3	78.5	73		70 - 130	9	30
Isopropylbenzene (Cumene)	ND	57.4	77.7	74		66.0	78.5	84		70 - 130	14	30
Methyl tert-Butyl Ether	ND	55.0	77.7	71		64.0	78.5	82		70 - 130	15	30
Naphthalene	ND	42.0	77.7	54		51.2	78.5	65		50 - 150	20	30
Styrene	ND	53.9	77.7	69	*	60.4	78.5	77		70 - 130	11	30
Tetrachloroethene (PCE)	ND	45.1	77.7	58	*	54.8	78.5	70		70 - 130	19	30
Toluene	ND	48.6	77.7	63	*	55.2	78.5	70		70 - 130	13	30
Trichloroethene (TCE)	ND	48.4	77.7	62	*	57.0	78.5	73		70 - 130	16	30
Trichlorofluoromethane (CFC 11)	ND	55.8	77.7	72		61.7	78.5	79		70 - 130	10	30
Vinyl Chloride	ND	42.2	77.7	54	*	46.9	78.5	60	*	70 - 130	10	30
cis-1,2-Dichloroethene	ND	56.6	77.7	73		61.6	78.5	79		70 - 130	9	30
cis-1,3-Dichloropropene	ND	52.2	77.7	67	*	61.5	78.5	78		70 - 130	16	30
m,p-Xylenes	ND	99.4	155	64	*	117	157	74		70 - 130	16	30
n-Butylbenzene	ND	57.8	77.7	74		66.8	78.5	85		70 - 130	14	30
n-Propylbenzene	ND	57.8	77.7	74		67.4	78.5	86		70 - 130	15	30
o-Xylene	ND	ND	77.7	0	*	ND	78.5	0	*	70 - 130	0	30
sec-Butylbenzene	ND	59.1	77.7	76		69.6	78.5	89		70 - 130	16	30
tert-Amyl Methyl Ether	ND	57.1	77.7	73		63.7	78.5	81		70 - 130	11	30
tert-Butylbenzene	ND	54.5	77.7	70		63.2	78.5	81		70 - 130	15	30
trans-1,2-Dichloroethene	ND	46.2	77.7	59	*	52.0	78.5	66	*	70 - 130	12	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0906191
Date Collected: 10/28/09
Date Received: 10/29/09
Date Analyzed: 11/10/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAS8-35B
Lab Code: R0906191-005

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0911201-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0911201-04 Result	Amount	% Rec	% Rec Limits	RPD	RPD Limit
trans-1,3-Dichloropropene	ND	51.2	77.7	66	*	60.0	78.5	76	70 - 130	16	30

Comments:

LDC #: 22✓859
SDG #: See 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
		178648 LCS	JJ	67 (75-125)	( )	( )	All soils + 178648-MB	J-/UJ/P (L)
			LLL	72 ( )	( )	( )		No qual (MSD in)
				( )	( )	( )		
				( )	( )	( )		
		178532 LCS	KK	129 ( )	( )	( )	5, 178532-MB	J+ dets/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: November 2, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906270

Sample Identification

M-147B
M-147009B
EB110209-GWA3
TB110209-GWA3

Introduction

This data review covers 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
11/7/09	2-Methyl-2-propanol	0.015 (≥0.05)	All samples in SDG R0906270	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
11/11/09	2-Methyl-2-propanol	0.018 (≥0.05)	M-147B EB110209-GWA3 178949-MB	J (all detects) UJ (all non-detects)	A
11/12/09	2-Methyl-2-propanol	0.017 (≥0.05)	M-147009B TB110209-GWA3 179136-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
178949-MB	11/11/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Naphthalene	0.29 ug/L 0.27 ug/L 0.31 ug/L	M-147B EB110209-GWA3
179136-MB	11/12/09	1,2,3-Trichlorobenzene Hexachlorobutadiene	0.34 ug/L 0.28 ug/L	M-147009B TB110209-GWA3

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

Sample TB110209-GWA3 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample EB110209-GWA3 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
EB110209-GWA3	11/2/09	Acetone	4.0 ug/L	M-147B M-147009B

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

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No volatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB102309-A3	10/23/09	Acetone Chloroform	5.1 ug/L 0.28 ug/L	M-147B M-147009B

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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 R0906270	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 M-147B and M-147009B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-147B	M-147009B				
Chloroform	43	41	5 (≤30)	-	-	-
Tetrachloroethene	0.48	0.55	-	0.07 (≤1.0)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0906270

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906270	M-147B M-147009B EB110209-GWA3 TB110209-GWA3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0906270	M-147B M-147009B EB110209-GWA3 TB110209-GWA3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0906270	M-147B M-147009B EB110209-GWA3 TB110209-GWA3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Pump Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285D1
SDG #: R0906270
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: JM
2nd Reviewer: [illegible]

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: 11/02/09
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	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	SW	D = 1, 2
XVII.	Field blanks	SW	EB = 3 *TB = 4 PB = PB 102309-A3 (R0906095)

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; PB = Pump Blk

Validated Samples: Water

1	M-147B D	11	178949-MB	21		31	
2	M-147009B D	12	179136-	22		32	
3	EB110209-GWA3	13		23		33	
4	TB110209-GWA3	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 #: 22285D1
SDG #: See Cover

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? $r^2 \geq 0.99$
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
	11/07/09	ICAL-MS8	NNNN		0.015	All + Blks	J/UJ A (C)

LDC #: 22285D1
SDG #: Silver

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVB
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 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
	11/11/09	F4268	NAINN		0.018	1, 3, 178999-MB	J/UJ/A (c)
	11/12/09	F4319	NNNN		0.017	2, 4, 179136-MB	J/UJ/A

CONCAL.1SB

LDC #: 22285D1
SDG #: Sq Cmer

VALIDATION FINDINGS WORKSHEET
Blanks

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: 11/11/09 Associated Samples: 1, 3 (ND)
Conc. units: ug/L

Compound	Blank ID	Sample Identification								
	178949-MB									
NNN	0.29									
KKK	0.27									
MMM	0.31									

Blank analysis date: 11/12/09 Associated Samples: 2, 4 (ND)
Conc. units: ug/L

Compound	Blank ID	Sample Identification								
	179136-MB									
NNN	0.34									
LLL	0.28									

LDC #: 22285D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
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/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1, 2 (ND)

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	11/02/09									
F	4.0									

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1, 2

Compound	PB102309-A3 Blank ID	Blank ID	Sample Identification							
Sampling Date	10/23/09									
F	5.1		(All results either ND or > PB)							
K	0.28									

LDC #: 22285 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVC
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/L)		RPD (Parent only)
	1	2	
K	43	41	5 (≤30% RPD)
AA	0.48	0.55	0.07 (≤1.0 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: November 5, 2009

LDC Report Date: January 11, 2010

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-10B
SA77009-10B
TB110509-SO1

Introduction

This data review covers 3 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 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
10/31/09	2-Methyl-2-propanol	0.028 (≥0.05)	All water samples in SDG R0906403	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
11/17/09	Dichlorodifluoromethane	29.0	All water samples in SDG R0906403	J+ (all detects)	A
11/17/09	2-Butanone	25.9	All water samples in SDG R0906403	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
11/17/09	2-Methyl-2-propanol	0.025 (≥0.05)	All water samples in SDG R0906403	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
179830-MB	11/17/09	Hexachlorobutadiene	0.28 ug/L	All water samples in SDG R0906403

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

Sample TB110509-SO1 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Acetone Toluene	9.2 ug/L 0.44 ug/L	All soil samples in SDG R0906403

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
SA77-10B	Acetone	16 ug/Kg	16U 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

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 R0906403	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 SA77-10B and SA77009-10B 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
	SA77-10B	SA77009-10B				
2-Butanone	1.2	1.2	-	0 (≤10)	-	-
Acetone	16	22	-	6 (≤20)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0906403

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906403	TB110509-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0906403	TB110509-SO1	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0906403	TB110509-SO1	2-Butanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906403	TB110509-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0906403	SA77-0.5B SA77-10B SA77009-10B TB110509-SO1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0906403

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0906403

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0906403

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0906403	SA77-10B	Acetone	16U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E1
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 6/31/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer: W

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: 11/05/09
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	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	SW	D = 2,3
XVII.	Field blanks	SW	~~TB~~ = 4 FB = FB082809-SO (R0904894)

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	SA77-0.5B S	11	178847-MB	21		31		
2	SA77-10B D	12	179830	22		32		
3	SA77009-10B D	13		23		33		
4	TB110509-SO1 W	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 #: 22285F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: DVA
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 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
	10/31/09	ICAL - MS10	NNNN		0.028	4, 179830-MB	J/NJ/A (c)

INICAL.1SB

LDC #: 22285 E1
SDG #: Sq Cmer

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: SVL
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 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
	11/17/09	C2396	NNNN		0.025	4, 179830-MB	J/UJ/A (c)
			JJ (+)	29.0			J+ dets/A
			M (-)	25.9			J-/UJ/A

LDC #: 22285 E1
SDG #: Sun Cross

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: 11/17/09
Conc. units: ug/L
Associated Samples: 4 (ND)

Compound	Blank ID	Sample Identification							
	179830-MB								
LLL	0.28								

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification							

LDC #: 22285F1
SDG #: Sq Cmer

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
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 FB082809-50	Blank ID	Sample Identification							
Sampling Date	8/28/09		2							
F	9.2		16/4							
CC	0.44									
		(All	others	either	ND	or	>	FB)		
CRQL										

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										
CRQL										

LDC #: 22285E1
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 (ug/kg)		RPD (Parent only)
	2	3	
M	1.2	1.2	0 (≤ 10 D) –
F	16	22	6 (≤ 20 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: November 11, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906477

Sample Identification

M-122B
TB111109-GW1

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
10/31/09	2-Methyl-2-propanol	0.028 (≥0.05)	All samples in SDG R0906477	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
11/19/09	Acetone	27.3	All samples in SDG R0906477	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
11/19/09	2-Methyl-2-propanol	0.024 (≥0.05)	All samples in SDG R0906477	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
180234-MB	11/19/09	Hexachlorobutadiene	0.33 ug/L	All samples in SDG R0906477

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

Sample TB111109-GW1 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No volatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB102309-A3	10/23/09	Acetone Chloroform	5.1 ug/L 0.28 ug/L	M-122B

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

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 R0906477	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 R0906477

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906477	M-122B TB111109-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0906477	M-122B TB111109-GW1	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0906477	M-122B TB111109-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0906477	M-122B TB111109-GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Pump Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285F1
SDG #: R0906477
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: ~

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: 11/11/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r ✓
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	SW	*TB = ✓ PB = PB102309-A3 (R0906095)

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

PB = Pump Blk

Validated Samples: Water

1	M-122B	11	180231-MB	21		31	
2	TB111109-GW1	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	

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 #: 22285F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial 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 — 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
	10/31/09	ICAL-MS10	NNNN		0.028	All + Blk	J/UJ/A (C)

INICAL.1SB

LDC #: 22285F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing 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 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
	11/19/09	C2473	F (-)	27.3		All + Blk	J-/UJ/A (c)
			NNNN		0.624	↓	J/UJ/A ↓

CONCAL.1SB

LDC #: 22285 F1
SDG #: Sy Grav

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
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 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: 11/19/09
Conc. units: ug/L
Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	180239-MB									
LLL	0.33									

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 22285 F1
SDG #: Sa Cruz

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/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1

Compound	Blank ID PB102309-AB	Blank ID	Sample Identification							
Sampling Date	10/23/09									
F	5.1		(Results either ND or > PB)							
K	0.28									

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										

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

Semivolatiles

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	October 22 through October 26, 2009
LDC Report Date:	January 8, 2010
Matrix:	Soil
Parameters:	Semivolatiles
Validation Level:	Stage 4
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056

Sample Identification

RSAQ8-10BSPLP2
RSAQ8-31BSPLP2
SA34-10BSPLP2
SA34-10BSPLP3
SA34-31BSPLP2
SA34-31BSPLP3
RSAQ8-10BSPLP3
RSAQ8-31BSPLP3

Sample sin 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 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 with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
11/11/09	1,4-Dioxane	27.6	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-10BSPLP3 SA34-31BSPLP3	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
SPLP3-BLK1	10/29/09	Bis(2-ethylhexyl)phthalate Di-n-butylphthalate	1.2 ug/L 2.9 ug/L	RSAQ8-10BSPLP3 RSAQ8-31BSPLP3
SPLP2-BLK1	11/2/09	Di-n-butylphthalate	3.1 ug/L	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2
SPLP3-BLK2	11/3/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate Di-n-butylphthalate	0.45 ug/L 0.11 ug/L 3.7 ug/L	SA34-10BSPLP3 SA34-31BSPLP3
SPLP2-BLK2	11/4/09	Butylbenzylphthalate Di-n-butylphthalate	0.12 ug/L 2.3 ug/L	SA34-10BSPLP2 SA34-31BSPLP2

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
RSAQ8-10BSPLP3	Bis(2-ethylhexyl)phthalate Di-n-butylphthalate	0.42 ug/L 3.0 ug/L	0.42U ug/L 3.0U ug/L
RSAQ8-31BSPLP3	Bis(2-ethylhexyl)phthalate	0.33 ug/L	0.33U ug/L
SA34-10BSPLP3	Di-n-butylphthalate	2.7 ug/L	2.7U ug/L
SA34-10BSPLP2	Di-n-butylphthalate	3.7 ug/L	3.7U 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
99895-LCS/D (RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-10BSPLP3 SA34-31BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 99895-MB SPLP2-BLK1 SPLP3-BLK1 SPLP3-BLK2)	Pyridine	27 (50-120)	30 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	42 (50-120)	44 (50-120)	-	J- (all detects) UJ (all non-detects)	
100006LCS/D (SA34-10BSPLP2 SA34-31BSPLP2 SPLP2-BLK2 100006-MB)	Pyridine	11 (50-120)	20 (50-120)	58 (≤30)	J (all detects) UJ (all non-detects)	P
100006LCS/D (SA34-10BSPLP2 SA34-31BSPLP2 SPLP2-BLK2 100006-MB)	1,4-Dioxane	32 (50-120)	26 (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

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 R0906056	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 R0906056

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906056	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-10BSPLP3 SA34-31BSPLP3	1,4-Dioxane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0906056	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-10BSPLP3 SA34-31BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906056	SA34-10BSPLP2 SA34-31BSPLP2	Pyridine	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l,ld)
R0906056	SA34-10BSPLP2 SA34-31BSPLP2	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906056	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-10BSPLP2 SA34-10BSPLP3 SA34-31BSPLP2 SA34-31BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3	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 R0906056

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906056	RSAQ8-10BSPLP3	Bis(2-ethylhexyl)phthalate Di-n-butylphthalate	0.42U ug/L 3.0U ug/L	A	bl
R0906056	RSAQ8-31BSPLP3	Bis(2-ethylhexyl)phthalate	0.33U ug/L	A	bl
R0906056	SA34-10BSPLP3	Di-n-butylphthalate	2.7U ug/L	A	bl
R0906056	SA34-10BSPLP2	Di-n-butylphthalate	3.7U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0906056

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A2a
SDG #: R0906056
Laboratory: Columbia Analytical Services

Date: 12/31/09
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: 10/22-26/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
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	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
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	RSAQ8-10BSPLP2	11	99895-MB	21		31	
2	RSAQ8-31BSPLP2	12	100006 - ↓	22		32	
3	SA34-10BSPLP2	13	SPLP3 - Blk 1	23	10/29 (1)	33	
4	SA34-10BSPLP3	14	SPLP2 - Blk 1	24	11/02 (1)	34	
5	SA34-31BSPLP2	15	SPLP3 - Blk 2	25	11/03 (1)	35	
6	SA34-31BSPLP3	16	SPLP2 - Blk 2	26	11/04 (2)	36	
7	RSAQ8-10BSPLP3	17		27		37	
8	RSAQ8-31BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22285 A29
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: NV
2nd Reviewer: ✓

Method: Semivolatiles (EPA SW 846 Method 8270C)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation?	✓			
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				✓
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			

LDC #: 27285 A24
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVL
2nd Reviewer: W

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

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

LDC #: 22285 A2a
SDG #: See Cover

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
	11/11/09	AW048	TTT (F)	27.6		1, 2, 4, 6	J+ dets/A (C)

LDC #: 22785 A2a
SDG #: Sa Cmar

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 2
Reviewer: SVG
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:** 10/29/09 **Blank analysis date:** 11/11/09
Conc. units: ug/L Associated Samples: 7, 8 (b1)

Compound	Blank ID	Sample Identification								
	SPLP3-BLK1	7	8							
EEE	1.2	0.42/U	0.33/U							
XX	2.9	3.0/U								

SPLP **Blank extraction date:** 11/02/09 **Blank analysis date:** 11/11/09
Conc. units: ug/L Associated Samples: 1, 2 (ND)

Compound	Blank ID	Sample Identification								
	SPLP2-BLK1									
XX	3.1									

5x Phthalates
2x all others

LDC #: 22285 A29
SDG #: Sulphur

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: OVB
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.

SPLP **Blank extraction date:** 11/03/09 **Blank analysis date:** 11/11/09
Conc. units: ug/L Associated Samples: 4, 6 (bl)

Compound	Blank ID	Sample Identification								
	SPLP3-Blk2	4								
EEE	0.45									
AAA	0.11									
XX	3.7	2.7/U								

SPLP **Blank extraction date:** 11/04/09 **Blank analysis date:** 11/12/09
Conc. units: ug/L Associated Samples: 3, 5 (bl)

Compound	Blank ID	Sample Identification								
	SPLP2-Blk2	3								
AAA	0.12									
XX	2.3	3.7/U								

5x Phthalates
2x all others

LDC #: 22285A2a
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
		99895-LCS/D	RRR	27 (50-120)	30 (50-120)	( )	1, 2, 4, 6-8, 99895-MB,	J-/UJ/P (l)
			TTT	42 ( )	44 ( )	( )	SPLP2-Blk1, SPLP3-Blk1,	
				( )	( )	( )	SPLP3-Blk2	
				( )	( )	( )		
				( )	( )	( )		
		100006 LCS/D	RRR	11 ( )	20 ( )	58 (30)	3, 5, SPLP2-Blk2,	J/UJ/P (l, ld)
			TTT	32 ( )	26 ( )	( )	100006-MB	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 22285A29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard
S = Standard deviation of the RRFs, 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	10/27/09	~~Phenol~~ RRF (1st internal standard)	MR	1.740	1.608	1.608	6.87	6.81
			Naphthalene (2nd internal standard)		1.005	1.096	1.096	5.73	5.73
			Fluorene (3rd internal standard)		1.160	1.137	1.137	4.97	4.97
			~~Pentachlorophenol~~ UU (4th internal standard)		1.119	1.167	1.167	3.71	3.69
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.943	0.944	0.944	12.68	12.60
			Benzo(a)pyrene (6th internal standard)		1.449	1.282	1.282	10.51	10.51
2	ICAL	10/16/09	~~Phenol~~ RRF (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
			~~Pentachlorophenol~~ UU (4th internal standard)		1.051	1.165	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)						

10/27/09 10/16/09

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.

	4.0	5.0	10.0	4.0	5.0	10.0
Pyridine	1.659	1.614	1.740	1.147	1.229	1.246
Naptha	1.121	1.078	1.005	1.022	1.063	1.036
Fluorene	1.212	1.156	1.160	1.256	1.348	1.297
Phenan	1.186	1.161	1.119	1.106	1.094	1.051
Bis(2-eh)ph	1.044	1.032	0.943	0.829	0.901	0.753
Benzo(a)py	1.361	1.370	1.449	1.290	1.298	1.348

LDC #: 22285A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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
1,2,4,6 1	AW 048	11/11/09	~~Phenol~~ RRR (1st internal standard)	1.608	1.857	1.857	15.5	15.5
			Naphthalene (2nd internal standard)	1.096	1.135	1.135	3.6	3.6
			Fluorene (3rd internal standard)	1.137	1.199	1.199	5.5	5.5
			~~Pentachlorophenol~~ NH (4th internal standard)	1.167	1.136	1.136	2.7	2.7
			~~Bis~~(2-ethylhexyl)phthalate (5th internal standard)	0.944	1.107	1.107	17.3	17.3
			Benzo(a)pyrene (6th internal standard)	1.287	1.309	1.309	2.1	2.1
BIK1 BIK7 SMP3-B1 SMP2-B1 SMP3-B2 7,8 3 2	DC 325	11/11/09	~~Phenol~~ RRR (1st internal standard)	1.151	1.137	1.137	1.2	1.2
			Naphthalene (2nd internal standard)	1.044	1.050	1.050	0.6	0.6
			Fluorene (3rd internal standard)	1.286	1.297	1.297	0.9	0.9
			~~Pentachlorophenol~~ NH (4th internal standard)	1.105	1.107	1.107	0.2	0.2
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0787	0.795	0.795	1.0	1.0
			Benzo(a)pyrene (6th internal standard)	1.243	1.319	1.319	6.1	6.1
5 SMP2-B2 3	DC 354	11/12/09	~~Phenol~~ RRR (1st internal standard)		1.099	1.099	4.5	4.6
			Naphthalene (2nd internal standard)		1.047	1.047	0.2	0.2
			Fluorene (3rd internal standard)		1.293	1.293	0.5	0.5
			~~Pentachlorophenol~~ NH (4th internal standard)		1.120	1.120	1.4	1.3
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.855	0.855	8.6	8.6
			Benzo(a)pyrene (6th internal standard)	✓	1.345	1.345	8.2	8.2

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 #: 22265 A2
SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	2.00	1.94	97	97	0
2-Fluorobiphenyl	↓	1.61	81	81	↓
Terphenyl-d14	↓	2.07	101	101	↓
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 #: 22285 A 2a
SDG #: See Cover

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

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

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

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

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

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

LCS/LCSD samples: 99895 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	3.15	3.30	79	79	83	83	5	5
Pentachlorophenol										
Pyrene	4.00	4.00	3.93	4.07	98	98	102	102	4	4

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 #: 22285 A-v
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

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. #3, XX:

Conc. = $\frac{(177833)(1.00)(1\ ml)(1000)(\quad)}{(324447)(1.354)(1060\ ml)(\quad)(\quad)}$

= 3.7 ug/L

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 22 through October 23, 2009

LDC Report Date: January 8, 2010

Matrix: Soil/Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

EB102209-SO1A3
SA112-0.5B
SA112-10B
SA112-20B
SA112-34B
RSAQ8-0.5B
RSAQ8-10B
RSAQ8-22B
RSAQ8-31B
RSAQ8-34B
RSAR8-0.5B
RSAR8-10B
RSAR8-20B
RSAR8-34B
RSAP8-0.5B
RSAP8-10B
RSAP8-25B
RSAP8-40B
RSAQ8-22BMS
RSAQ8-22BMSD
RSAR8-34BMS
RSAR8-34BMSD

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.

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
99188-MB	10/27/09	Di-n-butylphthalate	0.12 ug/L	All water samples in SDG R0906081
99052-MB	10/26/09	Di-n-butylphthalate	40 ug/Kg	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B
99309-MB	10/28/09	Butylbenzylphthalate	6.7 ug/kg	RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B

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
SA112-20B	Di-n-butylphthalate	54 ug/Kg	54U ug/Kg
RSAQ8-10B	Di-n-butylphthalate	57 ug/Kg	57U ug/Kg
RSAQ8-34B	Di-n-butylphthalate	75 ug/Kg	75U ug/Kg
RSAR8-0.5B	Butylbenzylphthalate	8.6 ug/Kg	8.6U ug/Kg
RSAR8-10B	Butylbenzylphthalate	4.7 ug/Kg	4.7U ug/Kg
RSAR8-20B	Butylbenzylphthalate	5.6 ug/Kg	5.6U ug/Kg
RSAR8-34B	Butylbenzylphthalate	4.8 ug/Kg	4.8U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAP8-10B	Butylbenzylphthalate	3.6 ug/Kg	3.6U ug/Kg
RSAP8-25B	Butylbenzylphthalate	3.3 ug/Kg	3.3U ug/Kg
RSAP8-40B	Butylbenzylphthalate	4.2 ug/Kg	4.2U ug/Kg

Sample EB102209-SO1A3 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
EB102209-SO1A3	10/22/09	Bis(2-ethylhexyl)phthalate	0.50 ug/L	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B

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

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Diethylphthalate 1,4-Dioxane	0.37 ug/L 0.16 ug/L	All soil samples in SDG R0906081

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 MS percent recoveries (%R) and MS/MSD relative percent differences (RPD) were not within QC limits for some compounds, the MSD 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
99188-LCS/D (All water samples in SDG R0906081)	Pyridine	37 (50-120)	48 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	32 (50-120)	32 (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 R0906081	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 R0906081

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	EB102209-SO1A3	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906081	EB102209-SO1A3 SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	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 R0906081

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906081	SA112-20B	Di-n-butylphthalate	54U ug/Kg	A	bl
R0906081	RSAQ8-10B	Di-n-butylphthalate	57U ug/Kg	A	bl
R0906081	RSAQ8-34B	Di-n-butylphthalate	75U ug/Kg	A	bl
R0906081	RSAR8-0.5B	Butylbenzylphthalate	8.6U ug/Kg	A	bl
R0906081	RSAR8-10B	Butylbenzylphthalate	4.7U ug/Kg	A	bl
R0906081	RSAR8-20B	Butylbenzylphthalate	5.6U ug/Kg	A	bl
R0906081	RSAR8-34B	Butylbenzylphthalate	4.8U ug/Kg	A	bl
R0906081	RSAP8-10B	Butylbenzylphthalate	3.6U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906081	RSAP8-25B	Butylbenzylphthalate	3.3U ug/Kg	A	bl
R0906081	RSAP8-40B	Butylbenzylphthalate	4.2U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B2a
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: VV
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: 10/22-23/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD rr RRF/rm-SPCC
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 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	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB = 1 FB = FB082809-SO (R0904894)

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	EB102209-SO1A3	W	11	RSAR8-0.5B	S	21	RSAR8-34BMS	S	31	99188-MB	442
2	SA112-0.5B	S	12	RSAR8-10B		22	RSAR8-34BMSD		32	99052-	352
3	SA112-10B		13	RSAR8-20B		23			33	99309-	515
4	SA112-20B		14	RSAR8-34B		24			34		
5	SA112-34B		15	RSAP8-0.5B		25			35		
6	RSAQ8-0.5B		16	RSAP8-10B		26			36		
7	RSAQ8-10B		17	RSAP8-25B		27			37		
8	RSAQ8-22B		18	RSAP8-40B		28			38		
9	RSAQ8-31B		19	RSAQ8-22BMS		29			39		
10	RSAQ8-34B		20	RSAQ8-22BMSD		30			40		

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22285 B2q
SDG #: Sa Cmov

VALIDATION FINDINGS WORKSHEET
Blanks

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 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: 10/27/09 **Blank analysis date:** 10/30/09 Associated Samples: 1 (ND)
Conc. units: ug/L

Compound	Blank ID	Sample Identification								
	99188-MB									
XX	0.12									

Blank extraction date: 10/26/09 **Blank analysis date:** ~~10~~ 11/05/09 Associated Samples: 2 – 18 (b1)
Conc. units: ug/kg

Compound	Blank ID	Sample Identification								
	99052-MB	4	7	10						
XX	40	~~5~~4/U	57/U	75/U						

5x Phthalates
2x all others

LDC #: 22285 #24
SDG #: Sa Conv

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JM
2nd Reviewer: M

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: 10/28/09 **Blank analysis date:** 11/04/09 11 – 18 (6 l)
Conc. units: ug/kg Associated Samples:

Compound	Blank ID	Sample Identification								
	99309-MB	11	12	13	14	16	17	18		
AAA	6.7	8.6/4	4.7/4	5.6/4	4.8/4	3.6/4	3.3/4	4.2/4		

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 27285 B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: MK
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: 10/22/09
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2-10 (ND)

Compound	Blank ID	Sample Identification								
	1									
EEE	0.50									
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Sampling date: 8/28/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All soils (ND)

Compound	Blank ID	Sample Identification								
	FB082809-SD									
LL	0.37									
TTT	0.16									
CRQL										

5x Phthalates
2x all others

LDC #: 02285 B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JV
2nd Reviewer:

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

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

Y N N/A Were 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
		19/20	RRR	43 (50-150)	( )	48 (30)	7	No qual (MSD ↓)
				( )	( )	( )		
				( )	( )	( )		
		21/22	EEE	159 (50-150)	( )	32 (30)	14	No qual (MSD ↑)
			XX	158 (↓)	( )	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 22285 B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVL
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 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
		99188-LCS/D	RRR	37 (50-120)	48 (50-120)	( )	1, 99188-MB	J-/UJ/p (L)
			TTT	32 ( )	32 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		99052-LCS/D	XX	( )	( )	32 (30)	2-10, 99052-MB	No qual (MS/MSD m)
			TTT	42 ( )	48 ( )	( )	↓	(MS/D m)
				( )	( )	( )		
				( )	( )	( )		
		99309 LCS/D	TTT	39 ( )	42 ( )	( )	11-18, 99309-MB	↓ (MS/D m)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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: October 28, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-10B
RSAS8-25B
RSAS8-35B
RSAS8-35BMS
RSAS8-35BMSD

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
11/11/09	1,4-Dioxane	27.6	All samples in SDG R0906191	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
99725-MB	11/3/09	Butylbenzylphthalate Di-n-octylphthalate	3.0 ug/Kg 15 ug/Kg	All samples in SDG R0906191

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
RSAS8-10B	Butylbenzylphthalate	3.3 ug/Kg	3.3U ug/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Diethylphthalate 1,4-Dioxane	0.37 ug/L 0.16 ug/L	All samples in SDG R0906191

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 MS/MSD percent recoveries (%R) were not within QC limits for one compound, the 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. Although the LCSD percent recovery (%R) was not within QC limits for one compound, the LCS percent recovery (%R) was within QC limits and no data were qualified.

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 R0906191	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 R0906191

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	1,4-Dioxane	J+ (all detects)	A	Continuing calibration (%D) (C)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	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 R0906191

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906191	RSAS8-10B	Butylbenzylphthalate	3.3U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R0906191

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C2a
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JV6
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: 10/28/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ✓ RRF/non-SPCC ↓
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 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	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = FB082809-SO (R0904894)

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	RSAS8-0.5B	11	99725-MB	21		31	
2	RSAS8-10B	12		22		32	
3	RSAS8-25B	13		23		33	
4	RSAS8-35B	14		24		34	
5	RSAS8-35BMS	15		25		35	
6	RSAS8-35BMSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

Reviewer: JVG
2nd Reviewer: [illegible]

LDC #: 22285C29
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
	11/11/09	AW048	TTT (+)	27.6		All + Blk	J+ dets/A (C)

CONCAL.2S

LDC #: 27285 C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MB
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: 11/03/09 **Blank analysis date:** 11/11/09 Associated Samples: All (b1)
Conc. units: ug/kg

Compound	Blank ID	Sample Identification								
	99725-MB	2								
AAA	3.0	3.3/4								
FFF	15									
		(All	others	ND)						

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 22285 C29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VC
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: 8/28/09
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	FB082809-SO									
LL	0.37									
TTT	0.16									
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x all others

LDC #: 27285 C29
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer JYG
2nd Reviewer:

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

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
		5/6	XX	23 (50-150)	21 (50-150)	( )	4	No qual (LCS/MSD)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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%						

Reviewer: JVG
2nd Reviewer: [illegible]

LDC #: 22285C2a
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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
		99725 LCS/D	TTT	( )	48 (50-120)	( )	All + Blk	No qual (LCS in
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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: November 2, 2009

LDC Report Date: January 12, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906270

Sample Identification

M-147B
M-147009B
EB110209-GWA3

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
11/11/09	1,4-Dioxane	27.6	EB110209-GWA3 99893-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
99893-MB	11/4/09	Butylbenzylphthalate	0.11 ug/L	All samples in SDG R0906270

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

Sample EB110209-GWA3 was identified as an equipment blank. No semivolatile contaminants were found in this blank.

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No semivolatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB102309-A3	10/23/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	1.5 ug/L 0.11 ug/L	All samples in SDG R0906270

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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
99893-LCS/D (All samples in SDG R0906270)	Pyridine	27 (50-120)	30 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	42 (50-120)	44 (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 R0906270	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 M-147B and M-147009B were identified as field duplicates. No semivolatiles were detected in any of the samples.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0906270

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906270	EB110209-GWA3	1,4-Dioxane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0906270	M-147B M-147009B EB110209-GWA3	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906270	M-147B M-147009B EB110209-GWA3	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 R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Equipment Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Pump Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285D2a
SDG #: R0906270
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: JVC
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: 11/02/09
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	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	ND	D = 1, 2
XVII.	Field blanks	SW	*EB = 3 PB = PB102309-A3 (R0906095)

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

1	M-147B	+11	99893-MB	21		31	
2	M-147009B	12		22		32	
3	EB110209-GWA3	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22285 D2a
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 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
	11/11/09	AW048	TTT (+)	27.6		3, + BlK	J + dets/A (C)

LDC #: 22285 D2A
SDG #: Eq Cmor

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: NG
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: 11/04/09 **Blank analysis date:** 11/11/09 Associated Samples: All (ND)
Conc. units: ug/L

Compound	Blank ID	Sample Identification								
	49893-MB									
AAA	0,11									

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 22285 D29
SDG #: Eq Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: DVL
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/L
Sampling date: 10/23/09
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: 1, 2 (ND)

Compound	Blank ID	Sample Identification							
	PB102309-A3								
EEE	1.5								
AAA	0.11								
CRQL									

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

Compound	Blank ID	Sample Identification							
CRQL									

5x Phthalates
2x all others

LDC #: 22285D29
SDG #: See Cover

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

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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
		99893 LCS/D	RRR	27 (50-120)	30 (50-120)	( )	All + Blks	J-/UJ/P (l)
			TTT	42 (↓)	44 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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: November 5, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-10B
SA77009-10B
SA77-10BMS
SA77-10BMSD

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 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
100482-MB	11/11/09	Butylbenzylphthalate Di-n-butylphthalate	3.3 ug/Kg 54 ug/Kg	All samples in SDG R0906403

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
SA77-10B	Butylbenzylphthalate	11 ug/Kg	11U ug/Kg
SA77009-10B	Butylbenzylphthalate	5.7 ug/Kg	5.7U ug/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Diethylphthalate 1,4-Dioxane	0.37 ug/L 0.16 ug/L	All samples in SDG R0906403

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 MS/MSD percent recoveries (%R) and relative percent difference (RPD) were not within QC limits for one compound, the LCS/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. Although the LCSD percent recovery (%R) was not within QC limits for one compound, the LCS percent recovery (%R) was within QC limits and no data were qualified.

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 R0906403	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 SA77-10B and SA77009-10B 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
	SA77-10B	SA77009-10B				
Butylbenzylphthalate	11	5.7	-	5.3 (≤180)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R0906403

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906403	SA77-0.5B SA77-10B SA77009-10B	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 R0906403

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0906403	SA77-10B	Butylbenzylphthalate	11U ug/Kg	A	bl
R0906403	SA77009-10B	Butylbenzylphthalate	5.7U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Field Blank Data Qualification Summary - SDG R0906403

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E2a
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 12/30/09
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: 11/05/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ✓ RRF/nm-SPCC ↓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 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	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 = 2, 3
XVII.	Field blanks	SW	FB = FB082809-SO (R0904894)

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	SA77-0.5B	11	100482-MB	21		31	
2	SA77-10B	12		22		32	
3	SA77009-10B	13		23		33	
4	SA77-10BMS	14		24		34	
5	SA77-10BMSD	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 22255 E2G
SDG #: Eurofins

VALIDATION FINDINGS WORKSHEET
Blanks

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 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: 11/11/09 **Blank analysis date:** 11/20/09
Conc. units: ug/Kg Associated Samples: All (61)

Compound	Blank ID	Sample Identification								
	100482-MB	2	3							
AAA	3.3	11/U	5.7/U							
XX	54									

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

Compound	Blank ID	Sample Identification								

5x Phthalates
2x all others

LDC #: 22285 E2a
SDG #: Sv Cmar

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SV6
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: 8/28/09
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	FB082809-SO									
LL	0.37									
TTT	0.16									
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x all others

LDC #: 22265 E2G
SDG #: Sq Cmax

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVB
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
		4/5	RRR	33 (50-150)	46 (50-150)	32 (30)	2	No qual (~~MS/MSD~~ LCS/D in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 22285E2a
SDG #: See Cover

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

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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
		100982-LCS/D	TTT	( )	46 (50-120)	( )	All + Blk	No qual (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22285 E29
SDG #: Su Cmy

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JV6
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)
	2	3	
AAA	11	5.7	5.3 (≤ 180D) —

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: November 11, 2009

LDC Report Date: January 8, 2010

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906477

Sample Identification

M-122B

Introduction

This data review covers 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.

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.

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No semivolatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB102309-A3	10/23/09	Bis(2-ethylhexyl)phthalate Butylbenzylphthalate	1.5 ug/L 0.11 ug/L	All samples in SDG R0906477

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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
100898-LCS/D (All samples in SDG R0906477)	Pyridine	32 (50-120)	28 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	1,4-Dioxane	39 (50-120)	39 (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 R0906477	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 R0906477

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906477	M-122B	Pyridine 1,4-Dioxane	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906477	M-122B	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 R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Semivolatiles - Pump Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285F2a
SDG #: R0906477
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: JM
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: 11/11/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RFD r ✓ RRF/non-SPCC's ↓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	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	SW	PB = PB102309-A3 (R0906095)

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	M-122B	11		21		31	
2	100898-MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

LDC #: 22285F2g
SDG #: Sa Lmov

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV6
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/L
Sampling date: 10/23/09
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: 1

Compound	Blank ID	Sample Identification								
	PB102309-A3									
EEE	1.5									
AAA	0.11									
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5x Phthalates
2x all others

LDC #: 22285 F2a
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
		100898-LCS/D	RRR	32 (50-120)	28 (50-120)	( )	All + Blks	J-/UJ/P (L)
			TTT	39 (↓)	39 (↓)	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

Chlorinated Pesticides

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 21 through October 22, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056

Sample Identification

SA52-15BSPLP2
SA52-15BSPLP3
SA52-28BSPLP2
SA52-28BSPLP3
RSAQ8-10BSPLP2
RSAQ8-10BSPLP3
RSAQ8-31BSPLP2
RSAQ8-31BSPLP3

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
SPLP3-BLK	STX-CLP1	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
99758-LCS/D (SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 99758-BLK SPLP3-BLK)	Endrin aldehyde	19 (50-130)	19 (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

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 R0906056	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 R0906056

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906056	SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3	Endrin aldehyde	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906056	SA52-15BSPLP2 SA52-15BSPLP3 SA52-28BSPLP2 SA52-28BSPLP3 RSAQ8-10BSPLP2 RSAQ8-10BSPLP3 RSAQ8-31BSPLP2 RSAQ8-31BSPLP3	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 R0906056

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0906056

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A3a
SDG #: R0906056
Laboratory: Columbia Analytical Services

Date: 12/31/09
Page: 1 of 1
Reviewer: SVG
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: 10/21 - 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	SW	LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	
XII.	Compound quantitation and reported CRQLs	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	SA52-15BSPLP2	11	100224-MB	21		31	
2	SA52-15BSPLP3	12	99758 - ↓	22		32	
3	SA52-28BSPLP2	13	SPLP2 - Blk	23		33	
4	SA52-28BSPLP3	14	SPLP3 - Blk	24		34	
5	RSAQ8-10BSPLP2	15		25		35	
6	RSAQ8-10BSPLP3	16		26		36	
7	RSAQ8-31BSPLP2	17		27		37	
8	RSAQ8-31BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 22785A39
SDG #: San Cove

VALIDATION FINDINGS CHECKLIST

Reviewer: MC
2nd Reviewer: W

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
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 #: 22785 A34
SDG #: Sun Cove

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer: V

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 #: 22285 A39
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JVC
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
10/28		SPLP3-B1K	STX-CLP1	B	31 (40-140)	J- /UJ /P (S)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

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.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_____

LDC #: 22285 A39

SDG #: Su 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
		99758 LCS/D	R	19 (50-130)	19 (50-130)	( )	2, 4, 6, 8, 99758Blk,	J-/UJ/P
				( )	( )	( )	SPLP3-Blk	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

(1)

LDC #: 22285 A34
SDG #: Sy Cmv

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVL
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 std)	Recalculated CF (10 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAV	11/11/09	H STX-CLP 1	2.727 e7	27270 000	2.790 e7	2.790 e7	4.17	9.17
			P 1	1.237	12 374 000	1.227	1.227	1.68	1.61
			H 2	7.440	74 400 000	6.856	6.856	7.81	7.80
			P 2	2.870	286 990 000	2.787	2.787	6.79	6.79
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 #: 22285 A39
SDG #: Sq Cmpy

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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

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
1	CCV1A	11/12/09	H	STX-CLP1	27.900 eG	28.541 eG	28540000	2.3	2.3
			P	1	12.270	12.536	12536000	2.2	2.2
			H	2	68.559	73.465	73415000	7.2	7.2
			P	2	27.869	28.934	28434500	2.0	2.0
2	CCV2A	11/12/09	H	1		27.996	27995000	0.3	0.3
			P	1		11.878	11878500	3.2	3.2
			H	2		71.638	71640000	4.5	4.5
			P	2		26.421	26 42050	5.2	5.2
3	CCV7A	11/14/09	H	1		29.005	29005000	4.0	4.0
			P	1		12,815	12814500	4.4	4.4
			H	2		74.636	74 635000	8.9	8.9
			P	2		28.668	28 668 000	2.9	2.9
4	CCV8A	11/14/09	H	1		29.287	29285000	5.0	5.0
			P	1		12.723	12 723000	3.7	3.7
			H	2		77.343	77345000	12.8	12.8
			P	2		27.693	27 692500	0.6	0.6

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 #: 22285 A3a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer:
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	STX-CLP1	100	76.013	76	76	0
Decachlorobiphenyl	↓	↓	89.588	90	90	↓
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 22285 A2a
SDG #: Sq Cmv

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

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

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

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

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

LCS/LCSD samples: 99758 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	0.164	0.163	82	82	82	82	0	0
4,4'-DDT	↓	↓	0.153	0.154	76	76.5	77	77	1	1
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 #: 22285A39
SDG #: Eu Cmv

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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: 8TX - LLP 2

Sample I.D. # 1 EE:

Conc. = $\frac{(5826.4e6)(10\,ml)}{(1.019e8)(1060\,ml)}$

= 0,54 ug/L

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

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 22 through October 23, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

RSAQ8-0.5B
RSAQ8-10B
RSAQ8-10BRE
RSAQ8-22B
RSAQ8-22BRE
RSAQ8-31B
RSAQ8-31BRE
RSAQ8-34B
RSAQ8-34BRE
SA132-0.5B
SA132-10B
SA132009-10B
SA132-20B
SA132-20BRE
SA132-34B
SA132-34BRE
RSAR8-0.5B
RSAR8-10B
RSAR8-20B
RSAR8-34B
RSAP8-0.5B
RSAP8-10B
RSAP8-25B
RSAP8-40B
RSAQ8-0.5BMS
RSAQ8-0.5BMSD
RSAR8-34BMS
RSAR8-34BMSD

Introduction

This data review covers 28 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
RSAQ8-10BRE RSAQ8-22BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE	All TCL compounds	27	14	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. 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.

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAQ8-10B	Not specified	Tetrachloro-m-xylene	39 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
RSAQ8-10BRE	Not specified	Tetrachloro-m-xylene	31 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
RSAQ8-31B	Not specified	Tetrachloro-m-xylene Decachlorobiphenyl	20 (40-140) 27 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
RSAQ8-31BRE	Not specified	Tetrachloro-m-xylene	5 (40-140)	All TCL compounds	J- (all detects) R (all non-detects)	A
RSAQ8-34B	Not specified	Tetrachloro-m-xylene	22 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
SA132-20BRE	Not specified	Tetrachloro-m-xylene	36 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
SA132-34B	Not specified	Tetrachloro-m-xylene Decachlorobiphenyl	6 (40-140) 14 (40-140)	All TCL compounds	J- (all detects) R (all non-detects)	A
SA132-34BRE	Not specified	Tetrachloro-m-xylene	5 (40-140)	All TCL compounds	J- (all detects) R (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 with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
99356-LCS/D (RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B 99356-MB)	Endrin aldehyde	45 (50-130)	47 (50-130)	-	J- (all detects) UJ (all non-detects)	P
	Hexachlorobenzene	43 (50-130)	41 (50-130)	-	J- (all detects) UJ (all non-detects)	
101045-LCS/D (RSAQ8-10BRE RSAQ8-22BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE 101045-MB)	Hexachlorobenzene	46 (50-130)	45 (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 R0906081	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
RSAQ8-10BRE RSAQ8-22BRE RSAQ8-31BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE	All TCL compounds	X	A

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

XIV. Field Duplicates

Samples SA132-10B and SA132009-10B 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 R0906081

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	RSAQ8-10BRE RSAQ8-22BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0906081	RSAQ8-10B RSAQ8-10BRE RSAQ8-31B RSAQ8-34B SA132-20BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0906081	RSAQ8-31BRE SA132-34B SA132-34BRE	All TCL compounds	J- (all detects) R (all non-detects)	A	Surrogate spikes (%R) (s)
R0906081	RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	Endrin aldehyde Hexachlorobenzene	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906081	RSAQ8-10BRE RSAQ8-22BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE	Hexachlorobenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906081	RSAQ8-0.5B RSAQ8-10B RSAQ8-10BRE RSAQ8-22B RSAQ8-22BRE RSAQ8-31B RSAQ8-31BRE RSAQ8-34B RSAQ8-34BRE SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-20BRE SA132-34B SA132-34BRE RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	RSAQ8-10BRE RSAQ8-22BRE RSAQ8-31BRE RSAQ8-34BRE SA132-20BRE SA132-34BRE	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 R0906081

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B3a
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: W

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	SW	Sampling dates: 10/22-23/09
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	SW	
VIII.	Laboratory control samples	SW	LCS ID
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 = 11, 12
XV.	Field blanks	ND	FB = FB032809-SO (R0904894)

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	RSAQ8-0.5B	11	SA132-10B D	21	RSAP8-0.5B	31	99215-MB	455
2	RSAQ8-10B	12	SA132009-10B D	22	RSAP8-10B	32	99356-	540
3	RSAQ8-10BRE	13	SA132-20B	23	RSAP8-25B	33	99194-	444
4	RSAQ8-22B	14	SA132-20BRE	24	RSAP8-40B	34	99779-	821
5	RSAQ8-22BRE	15	SA132-34B	25	RSAQ8-0.5BMS	35	101045-	590
6	RSAQ8-31B	16	SA132-34BRE	26	RSAQ8-0.5BMSD	36		
7	RSAQ8-31BRE	17	RSAR8-0.5B	27	RSAR8-34BMS	37		
8	RSAQ8-34B	18	RSAR8-10B	28	RSAR8-34BMSD	38		
9	RSAQ8-34BRE	19	RSAR8-20B	29		39		
10	SA132-0.5B	20	RSAR8-34B	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 #: 22285 B31
SDG #: Sun Cove

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

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

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
3 5 9 14 16	S	N	10/22/09	11/18/09	11/24/09	27	J-/UJ/A (h)

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 22285 B34
SDG #: Lu Creek

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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
		2	NS	A	39 (40-140)	J-/UJ/A (S)
					( )	
		3			31 ( )	
					( )	
		6		A	20 ( )	
				B	27 ( )	
					( )	
		7		A	5 ( )	J-/R/A
					( )	
		8		A	22 ( )	J-/UJ/A
					( )	
		14		A	36 ( )	
					( )	
		16		A	6 ( )	J-/R/A
				B	14 ( )	
					( )	
		16	✓	A	5 (✓)	
					( )	
					( )	
					( )	

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

(4, 13 = surr outside limits in 2nd col.)

LDC #: 22285B3a
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
		25/26	J	233 (56-125)	260 (56-125)	( )		No qual (LCS/D in)
			O	211 (9-149)	222 (9-149)	( )		
			EE	238 (20-150)	211 (20-150)	( )		
				( )	( )	( )		
				( )	( )	( )		
		2/28	several compounds	outside	limits	( )	20	No qual (either LCS
			(See attached	summary)	)	( )		LCSD, MS or MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0906081
Date Collected: 10/23/09
Date Received: 10/24/09
Date Analyzed: 11/17/09

Matrix Spike Summary
Organochlorine Pesticides by Gas Chromatography

Sample Name: RSAR8-34B
Lab Code: R0906081-024

Units: µg/Kg
Basis: Dry

Analytical Method: 8081A
Prep Method: EPA 3541

Analyte Name	Sample Result	Matrix Spike RQ0910455-04 Result	Matrix Spike Amount	% Rec		Duplicate Matrix Spike RQ0910455-05 Result	Duplicate Matrix Spike Amount	% Rec		% Rec Limits	RPD		RPD Limit
4,4'-DDD	ND	3.20	9.52	34	*	0.814	9.52	9	*	58 - 121	119	*	30
4,4'-DDE	ND	3.56	9.52	37	*	0.805	9.52	8	*	56 - 125	126	*	30
4,4'-DDT	ND	3.50	9.52	37		0.800	9.52	8	*	9 - 149	126	*	30
Aldrin	ND	2.20	9.52	23		0.576	9.52	6	*	15 - 135	117	*	30
Dieldrin	ND	3.17	9.52	33		1.02	9.52	11	*	25 - 150	103	*	30
Endosulfan I	ND	3.17	9.52	33	*	1.12	9.52	12	*	56 - 119	95	*	30
Endosulfan II	ND	3.41	9.52	36	*	1.20	9.52	13	*	65 - 127	96	*	30
Endosulfan Sulfate	ND	3.14	9.52	33	*	1.22	9.52	13	*	37 - 122	88	*	30
Endrin	ND	3.38	9.52	35		1.07	9.52	11	*	28 - 143	104	*	30
Endrin Aldehyde	ND	2.12	9.52	22		0.924	9.52	10	*	18 - 135	79	*	30
Endrin Ketone	ND	3.19	9.52	33	*	1.37	9.52	14	*	57 - 123	80	*	30
Heptachlor	ND	2.40	9.52	25	*	0.814	9.52	9	*	35 - 127	99	*	30
Heptachlor Epoxide	ND	3.03	9.52	32	*	1.20	9.52	13	*	61 - 120	86	*	30
Hexachlorobenzene	ND	3.30	23.8	14	*	1.58	23.8	7	*	20 - 150	70	*	30
Methoxychlor	ND	20.2	47.6	42		6.56	47.6	14	*	38 - 149	102	*	30
alpha-BHC	ND	1.59	9.52	17	*	1.19	9.52	13	*	53 - 130	29		30
alpha-Chlordane	ND	2.97	9.52	31		0.733	9.52	8	*	27 - 130	121	*	30
beta-BHC	ND	3.29	9.52	35		1.53	9.52	16	*	35 - 142	73	*	30
delta-BHC	ND	2.42	9.52	25	*	1.03	9.52	11	*	44 - 119	80	*	30
gamma-BHC (Lindane)	ND	1.93	9.52	20	*	1.21	9.52	13	*	37 - 124	46	*	30
gamma-Chlordane	ND	3.28	9.52	34	*	1.09	9.52	11	*	38 - 127	101	*	30

Comments:

LDC #: 22285 B3a
SDG #: Sq Cmv

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples

Page: 1 of 1
Reviewer: JVG
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".

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
		99215 LCS/D	F	( )	( )	10 (30)	2,4,6,8,10-13,15,	No qual (LCS/Dir)
			R	( )	47 (50-130)	( )	17-20, 99215-MB	(LCS in)
			EE	( )	47 ( )	47 ( )		
			E	( )	( )	38 ( )		(LCS/Dir)
			A	( )	( )	46 ( )		
			C	( )	( )	31 ( )		
			D	( )	( )	36 ( )		
			T	( )	( )	34 ( )		
				( )	( )	( )		
				( )	( )	( )		
		99356-LCS/D	R	45 (50-130)	47 (50-130)	( )	21-24, 99356-MB	J-/NJ/P (l)
			EE	43 ( )	41 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		101045 LCS/D	EE	46 ( )	45 ( )	( )	3,5,9,14,16,1010 45-MB	J-/NJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22285 #34
SDG #: Eq Conv

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JV
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
		3, 5, 9, 14, 16	outside H.T.		X / A (Co)
		7	surr outside limits		

Comments: _____

OVR.3S

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 28, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-35B
RSAS8-35BMS
RSAS8-35BMSD

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.

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. 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 R0906191	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 R0906191

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906191	RSAS8-0.5B RSAS8-35B	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 R0906191

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0906191

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C3a
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 12/29/09
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: 10/28/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CA/ICA ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
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 = FB082809-50 (R0904894)

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	RSAS8-0.5B	11	99779-MB	21		31	
2	RSAS8-35B	12		22		32	
3	RSAS8-35BMS	13		23		33	
4	RSAS8-35BMSD	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: November 2, 2009

LDC Report Date: January 8, 2010

Matrix: Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906270

Sample Identification

M-147B
M-147009B
EB110209-GWA3

Introduction

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

Sample EB110209-GWA3 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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 R0906270	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 M-147B and M-147009B 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 R0906270

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906270	M-147B M-147009B EB110209-GWA3	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 R0906270

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285D3a
SDG #: R0906270
Laboratory: Columbia Analytical Services

Date: 12/30/09
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: 11/02/09
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	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	ND	D = 1, 2
XV.	Field blanks	ND	EB = 3 PB = PB102309-A3 (R0906095)

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	M-147B	11	99996-MB	21		31	
2	M-147009B	12		22		32	
3	EB110209-GWA3	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: November 11, 2009

LDC Report Date: January 8, 2010

Matrix: Water

Parameters: Chlorinated Pesticides

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906477

Sample Identification

M-122B

Introduction

This data review covers 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.

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 PB102309-SO (from SDG R0906095) was identified as a pump blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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
100766-LCS/D (All samples in SDG R0906477)	Endrin aldehyde	26 (50-130)	24 (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 R0906477	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 R0906477

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906477	M-122B	Endrin aldehyde	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906477	M-122B	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 R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Chlorinated Pesticides - Pump Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285F3a
SDG #: R0906477
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: SW
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: 11/11/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	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	ND	PB = PB102309-SO (R0906095)

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	M-122B	11		21		31	
2	100766-MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

METHOD: 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.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_____

LDC #: 22285 F3a
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
		100766-LCS/D	K	26 (50-130)	24 (50-130)	( )	All + Blk	J-/UJ/P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

Polychlorinated Biphenyls

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 21 through October 26, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056

Sample Identification

SA52-15BSPLP2
SA52-15BSPLP3
SA52-28BSPLP2
SA52-28BSPLP3
RSAQ8-10BSPLP2
RSAQ8-10BSPLP3
RSAQ8-31BSPLP2
RSAQ8-31BSPLP3
SA34-10BSPLP2
SA34-10BSPLP3
SA34-31BSPLP2
SA34-31BSPLP3

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 12 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
SPLP3-BLK2	DB-1701	Decachlorobiphenyl	36 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP2-BLK2	DB-1701	Decachlorobiphenyl	31 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	P
SPLP3-BLK1	DB-1701	Decachlorobiphenyl	33 (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 R0906056	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 R0906056

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906056	SA52-15BSPLP2 SA52-15BSPLP3 SA52-28BSPLP2 SA52-28BSPLP3 RSAQ8-10BSPLP2 RSAQ8-10BSPLP3 RSAQ8-31BSPLP2 RSAQ8-31BSPLP3 SA34-10BSPLP2 SA34-10BSPLP3 SA34-31BSPLP2 SA34-31BSPLP3	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 R0906056

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0906056

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A3b
SDG #: R0906056
Laboratory: Columbia Analytical Services

Date: 12/31/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer: W

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: 10/21-26/09
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	A	
XII.	Compound quantitation and reported CRQLs	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	SA52-15BSPLP2	11	SA34-31BSPLP2	21	100224-MB	31	11/02
2	SA52-15BSPLP3	12	SA34-31BSPLP3	22	99758-↓	32	10/28
3	SA52-28BSPLP2	13		23	SPLP2-Blk1	33	11/04
4	SA52-28BSPLP3	14		24	SPLP3-Blk1	34	11/03
5	RSAQ8-10BSPLP2	15		25	SPLP2-Blk2	35	
6	RSAQ8-10BSPLP3	16		26	SPLP3-Blk2	36	
7	RSAQ8-31BSPLP2	17		27		37	
8	RSAQ8-31BSPLP3	18		28		38	
9	SA34-10BSPLP2	19		29		39	
10	SA34-10BSPLP3	20		30		40	

LDC #: 22285A3b
SDG #: Cu Cmer

VALIDATION FINDINGS CHECKLIST

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

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
Were the required standard concentrations analyzed in the initial calibration?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ____%R	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?			✓	
Were endrin and 4,4'-DDT breakdowns ≤ 15%.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 #: 22285 A3b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: W

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 #: 22285 #36
SDG #: Su Conv

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
11/63		SPLP3-Blk2	DB-1701	B	36 (40-140)	J- (all detects) (5)
					( )	
11/64		SPLP2-Blk2		B	31 ( )	
					( )	
11/28		SPLP3-Blk1	✓	B	33 ( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22285A3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JV
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 (1st std)	Recalculated CF (1st std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	11/1/09	1260-1	6.747 e2	676.74	5.746 e2	5.746 e2	14.55	14.56
			DB1701 ↓ 17	5.994 ↓	599.43	5.173 ↓	5.173 ↓	12.23	12.22
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 #: 22285A36
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JW6
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 11	11/16/09	1260-1	574.583	581.263	581.264	1.2	1.2
		DB 1701	517.291	504.915	504.916	2.4	2.4
		17					
CCV 12	11/17/09			527.241	527.242	8.2	8.2
		1701		464.123	464.124	10.3	10.3
		17					
CCV 13	11/17/09			604.930	604.93	5.3	5.3
		1701		533.940	533.940	3.2	3.2
		17					

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 #: 22285A3b
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)

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
1	CCV14	11/17/09	1260-1	574.583	563.977	563.976	1.8	1.8
			DB 1701	517.291	501.653	501.653	3.0	3.0
			↓	↓				
			17					
2								
3								
4								

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 #: 22285 A3b
SDG #: Sec 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	72.898	73	73	0
Decachlorobiphenyl	↓ -1701	↓	83.11	83	83	↓
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 #: 22285A3b
SDG #: Baker

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

Reviewer: SV
2nd Reviewer:

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

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

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

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

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

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

LCS/LCSD samples: 100224 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										
4,4'-DDT										
Aroclor ~~1260~~ 1242	5.00	5.00	2.99	3.05	60	60	61	61	2	

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 #: 22285 #36
SDG #: Su Cov

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer: [signature]

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

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

Example:

Sample I.D. _____ ND :

Conc. = (_____)
( )

=

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

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 22 through October 23, 2009

LDC Report Date: January 8, 2010

Matrix: Soil/Water

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

EB102209-SO1A3
SA112-0.0B
SA112-0.5B
SA112-34B
RSAQ8-10B
RSAQ8-31B
RSAQ8-31BRE
RSAR8-0.5B
RSAR8-34B
RSAR8-34BMS
RSAR8-34BMSD

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 EB102209-SO1A3 was identified as an equipment blank. No polychlorinated biphenyl contaminants were found in this blank.

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No polychlorinated biphenyl contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAQ8-31B	Not specified	Tetrachloro-m-xylene Decachlorobiphenyl	27 (40-140) 30 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
RSAQ8-31BRE	Not specified	Tetrachloro-m-xylene	9 (40-140)	All TCL compounds	J- (all detects) R (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 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 R0906081	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
RSAQ8-31BRE	All TCL compounds	X	A

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 R0906081

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	RSAQ8-31B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0906081	RSAQ8-31BRE	All TCL compounds	J- (all detects) R (all non-detects)	A	Surrogate spikes (%R) (s)
R0906081	EB102209-SO1A3 SA112-0.0B SA112-0.5B SA112-34B RSAQ8-10B RSAQ8-31B RSAQ8-31BRE RSAR8-0.5B RSAR8-34B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0906081	RSAQ8-31BRE	All TCL compounds	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Equipment Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0906081

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B3b
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JM
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: 10/22-23/09
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	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	N	
XV.	Field blanks	ND	EB = 1 FB = FB082809-SO (R0919894)

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	EB102209-SO1A3	W	11	RSAR8-34BMSD	S	21	98873-MB	31	
2	SA112-0.0B	S	12			22	99194-	32	
3	SA112-0.5B		13			23	99215-	33	
4	SA112-34B		14			24	99779-	34	
5	RSAQ8-10B		15			25		35	
6	RSAQ8-31B		16			26		36	
7	RSAQ8-31BRE		17			27		37	
8	RSAR8-0.5B		18			28		38	
9	RSAR8-34B		19			29		39	
10	RSAR8-34BMS		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.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:_____

LDC #: 22285 B3b
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: VR
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	27 (10-140)	J-/NJ/A (S)
				B	30 ( )	
					( )	
		7		A	9 ( )	J-/R/A
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

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

LDC #: 22285 B 3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: I
2nd Reviewer: 1

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
		10 / 11	Y	( )	19 (50-150)	120 (30)	9	No qual (MS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 22285 B3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JM
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
		7	Confirmation for #6 surr outside limits		X/A (Co)

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 28, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-35B
RSAS8-35BMS
RSAS8-35BMSD

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.

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No polychlorinated biphenyl contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0906191	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 R0906191

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906191	RSAS8-0.5B RSAS8-35B	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 R0906191

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0906191

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C3b
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: W

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: 10/28/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV 6202
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Regional quality assurance and quality control	N	
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 = FB082809-SO (R0904894)

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	RSAS8-0.5B	11	99779-MB	21		31	
2	RSAS8-35B	12		22		32	
3	RSAS8-35BMS	13		23		33	
4	RSAS8-35BMSD	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: November 5, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-0.5BMS
SA77-0.5BMSD

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 FB082809-SO (from SDG R0904894) was identified as a field blank. No polychlorinated biphenyl contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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 R0906403	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 R0906403

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906403	SA77-0.5B	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 R0906403

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG R0906403

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E3b
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 12/30/09
Page: 1 of 1
Reviewer: JVG
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: 11/05/09
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	A	
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	FB = FB082809-SO (R0904894)

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	SA77-0.5B	11		21		31	
2	SA77-0.5BMS	12		22		32	
3	SA77-0.5BMSD	13		23		33	
4	100582-MB	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	

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

Metals

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 21 through October 26, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056/K0910677

Sample Identification

SA52-28BSPLP2
SA52-28BSPLP3
SA52-15BSPLP2
SA52-15BSPLP3
RSAQ8-10BSPLP2
RSAQ8-10BSPLP3
RSAQ8-31BSPLP2
RSAQ8-31BSPLP3
SA34-31BSPLP2
SA34-31BSPLP3
SA34-10BSPLP2
SA34-10BSPLP3
SA52-28BSPLP2MS
SA52-28BSPLP2DUP
SA52-28BSPLP3MS
SA52-28BSPLP3DUP
SA52-15BSPLP3MS
SA52-15BSPLP3DUP

Samples in this SDG underwent SPLP extraction

Introduction

This data review covers 18 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
SPLP PB (prep blank)	Barium Boron Strontium Zinc	0.082 mg/L 0.04 mg/L 0.0008 mg/L 0.075 mg/L	SA52-28BSPLP2 SA52-15BSPLP2 RSAQ8-10BSPLP2 RSAQ8-31BSPLP2 SA34-31BSPLP2 SA34-10BSPLP2
SPLP PB (prep blank)	Barium Boron Strontium Sodium Zinc	0.059 mg/L 0.12 mg/L 0.0011 mg/L 0.3 mg/L 0.020 mg/L	SA52-28BSPLP3 SA52-15BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3 SA34-31BSPLP3 SA34-10BSPLP3

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
SA52-28BSPLP2	Barium Boron Zinc	0.092 mg/L 0.39 mg/L 0.005 mg/L	0.092J+ mg/L 0.39J+ mg/L 0.005J+ mg/L
SA52-15BSPLP2	Barium Zinc	0.078 mg/L 0.002 mg/L	0.078J+ mg/L 0.002J+ mg/L
RSAQ8-10BSPLP2	Barium Boron	0.122 mg/L 0.03 mg/L	0.122J+ mg/L 0.03J+ mg/L
RSAQ8-31BSPLP2	Barium Boron Zinc	0.064 mg/L 0.11 mg/L 0.012 mg/L	0.064J+ mg/L 0.11J+ mg/L 0.012J+ mg/L
SA34-31BSPLP2	Barium Zinc	0.136 mg/L 0.012 mg/L	0.136J+ mg/L 0.012J+ mg/L
SA34-10BSPLP2	Barium Zinc	0.361 mg/L 0.003 mg/L	0.361J+ mg/L 0.003J+ mg/L
SA52-28BSPLP3	Barium Boron Zinc	0.200 mg/L 0.40 mg/L 0.003 mg/L	0.200J+ mg/L 0.40J+ mg/L 0.003J+ mg/L
SA52-15BSPLP3	Barium Zinc	0.103 mg/L 0.002 mg/L	0.103J+ mg/L 0.002J+ mg/L
RSAQ8-10BSPLP3	Barium Boron	0.142 mg/L 0.04 mg/L	0.142J+ mg/L 0.04J+ mg/L
RSAQ8-31BSPLP3	Barium Boron Zinc	0.038 mg/L 0.10 mg/L 0.011 mg/L	0.038J+ mg/L 0.10J+ mg/L 0.011J+ mg/L
SA34-31BSPLP3	Barium Zinc	0.141 mg/L 0.002 mg/L	0.141J+ mg/L 0.002J+ mg/L
SA34-10BSPLP3	Barium Boron Zinc	0.350 mg/L 0.50 mg/L 0.003 mg/L	0.350J+ mg/L 0.50J+ 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) 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

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

X. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

XI. ICP Serial Dilution

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

XII. Sample Result Verification and Project Quantitation Limit

All sample result verifications were acceptable.

All analytes reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0906056/K0910677	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 R0906056/K0910677

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906056/ K0910677	SA52-28BSPLP2 SA52-28BSPLP3 SA52-15BSPLP2 SA52-15BSPLP3 RSAQ8-10BSPLP2 RSAQ8-10BSPLP3 RSAQ8-31BSPLP2 RSAQ8-31BSPLP3 SA34-31BSPLP2 SA34-31BSPLP3 SA34-10BSPLP2 SA34-10BSPLP3	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 R0906056/K0910677

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906056/ K0910677	SA52-28BSPLP2	Barium Boron Zinc	0.092J+ mg/L 0.39J+ mg/L 0.005J+ mg/L	A	bl
R0906056/ K0910677	SA52-15BSPLP2	Barium Zinc	0.078J+ mg/L 0.002J+ mg/L	A	bl
R0906056/ K0910677	RSAQ8-10BSPLP2	Barium Boron	0.122J+ mg/L 0.03J+ mg/L	A	bl
R0906056/ K0910677	RSAQ8-31BSPLP2	Barium Boron Zinc	0.064J+ mg/L 0.11J+ mg/L 0.012J+ mg/L	A	bl
R0906056/ K0910677	SA34-31BSPLP2	Barium Zinc	0.136J+ mg/L 0.012J+ mg/L	A	bl
R0906056/ K0910677	SA34-10BSPLP2	Barium Zinc	0.361J+ mg/L 0.003J+ mg/L	A	bl
R0906056/ K0910677	SA52-28BSPLP3	Barium Boron Zinc	0.200J+ mg/L 0.40J+ mg/L 0.003J+ mg/L	A	bl
R0906056/ K0910677	SA52-15BSPLP3	Barium Zinc	0.103J+ mg/L 0.002J+ mg/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906056/ K0910677	RSAQ8-10BSPLP3	Barium Boron	0.142J+ mg/L 0.04J+ mg/L	A	bl
R0906056/ K0910677	RSAQ8-31BSPLP3	Barium Boron Zinc	0.038J+ mg/L 0.10J+ mg/L 0.011J+ mg/L	A	bl
R0906056/ K0910677	SA34-31BSPLP3	Barium Zinc	0.141J+ mg/L 0.002J+ mg/L	A	bl
R0906056/ K0910677	SA34-10BSPLP3	Barium Boron Zinc	0.350J+ mg/L 0.50J+ mg/L 0.003J+ mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0906056/K0910677

No Sample Data Qualified in this SDG

LDC #: 22285G4 (A)

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

SDG #: ~~R0910677~~ R0906056/K0910677 Stage 4

Laboratory: Columbia Analytical Services

Date: 1-5-10
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: 10/21/09 - 10/26/09
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	SA52-28BSPLP2	11	SA34-10BSPLP2	21		31	PBS
2	SA52-28BSPLP3	12	SA34-10BSPLP3	22		32	PBS
3	SA52-15BSPLP2	13	SA52-28BSPLP2MS	23		33	
4	SA52-15BSPLP3	14	SA52-28BSPLP2DUP	24		34	
5	RSAQ8-10BSPLP2	15	SA52-28BSPLP3MS	25		35	
6	RSAQ8-10BSPLP3	16	SA52-28BSPLP3DUP	26		36	
7	RSAQ8-31BSPLP2	17	SA52-15BSPLP3MS	27		37	
8	RSAQ8-31BSPLP3	18	SA52-15BSPLP3DUP	28		38	
9	SA34-31BSPLP2	19		29		39	
10	SA34-31BSPLP3	20		30		40	

Notes:

LDC #: 22285A4
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: CR
2nd Reviewer: L

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 #: 22285A4
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 #: 22285A4
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)
1-12	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
QC13,14		[✓ Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mo, Mn, Hg, Ni, Pt, K, Se, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn]
15,16		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
17,18		[✓ Al], Sb, [✓ As, Ba, Be, B, Cd, 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	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
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 #: 22285A4
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 Code: bl

Reviewer: CP
2nd Reviewer:

Sample Concentration units, unless otherwise noted: mg/L
Associated Samples: 1, 3, 5, 7, 9, 11

Analyte	Extraction Blank (mg/L)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1	3	5	7	9	11				
Ba	0.082			0.82	0.092 J+	0.078 J+	0.122 J+	0.064 J+	0.136 J+	0.361 J+				
B	0.04			0.4	0.39 J+		0.03 J+	0.11 J+						
Sr	0.0008			0.008										
Zn	0.075			0.75	0.005 J+	0.002 J+		0.012 J+	0.012 J+	0.003 J+				

Sample Concentration units, unless otherwise noted: mg/L
Associated Samples: 2, 4, 6, 8, 10, 12

Analyte	Extraction Blank (mg/L)	Maximum PB[a] (mg/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	2	4	6	8	10	12				
Ba	0.059			0.59	0.200 J+	0.103 J+	0.142 J+	0.038 J+	0.141 J+	0.350 J+				
B	0.12			1.2	0.40 J+		0.04 J+	0.10 J+		0.50 J+				
Sr	0.0011			0.011										
Na	0.3			3										
Zn	0.020			0.2	0.003 J+	0.002 J+		0.011 J+	0.002 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 #: 22285A9
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

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

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

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

%R = Found / True x 100 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	5.185	5.00	104	104	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	ICV Hg	0.0051	0.0050	102	102	Y
CCV3	ICP (Continuing calibration)	Sr	0.99	1.00	99	99	Y
	GFAA (Continuing calibration)						
CCV6	CVAA (Continuing calibration)	Hg	0.0050	0.0050	100	100	Y
ICV	ICP/MS (Initial calibration)	Pb	0.0247	0.0250	99	99	Y
CCV4	ICP/MS (Continuing calibation)	U	0.024	0.025	96	96	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 #: 72289A9
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	Cd	0.8887	1.0000	89	89	Y
LCS	Laboratory control sample	Ti	10.13	10.00	101	101	
13	Matrix spike	Fe	(SSR-SR) 1.00	1.01	101	100	
14	Duplicate	Ba	0.092	0.093	1.1	1.1	
1	ICP serial dilution	Na	45.100	45.515	0.9	0.9	

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 #: 22285A4
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 Zn/W 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:
1: Zn = Raw Data = 0.0049 mg/L
2: W = Raw Data = 10.05 ug/L / 1000 = 0.01005 mg/L

Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	Ba	0.092	0.092	Y
	B	0.39	0.39	
	Ca	5.30	5.30	
	Cr	0.016	0.016	
	Mg	2.54	2.54	
	Mo	0.002	0.003	
	K	0.9	0.9	
	Na	45.1	45.1	
	Sr	0.1819	0.1819	
	V	0.013	0.013	
	Zn	0005	0.005	
2	Ba	0.200	0.200	
	B	0.40	0.40	
	Ca	5.32	5.32	
	Cr	0.016	0.016	
	Fe	0.01	0.01	
	Mg	2.69	2.69	
	K	1.0	1.0	
	Na	45.8	45.8	
	Sr	0.1827	0.1827	
	W	0.0107	0.0101	
	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: November 2, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906270

Sample Identification

M-147B
M-147009B
EB110209-GWA3
M-147BMS
M-147BDUP

Introduction

This data review covers 5 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
ICB/CCB	Barium Beryllium Boron Iron Manganese Strontium Tin Antimony Tungsten	0.7 ug/L 0.10 ug/L 5.2 ug/L 3.8 ug/L 0.5 ug/L 0.1 ug/L 2.4 ug/L 0.021 ug/L 0.04 ug/L	All samples in SDG R0906270
ICB/CCB	Calcium Molybdenum	6.8 ug/L 0.8 ug/L	M-147B
ICB/CCB	Molybdenum Sodium	1.4 ug/L 29 ug/L	M-147009B EB110209-GWA3

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
EB110209-GWA3	Boron	11.4 ug/L	50.0U ug/L
	Iron	3.4 ug/L	20.0U ug/L
	Strontium	0.4 ug/L	10.0U ug/L
	Molybdenum	0.8 ug/L	2.0U ug/L
	Sodium	154 ug/L	300U ug/L

Sample EB110209-GWA3 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
EB110209-GWA3	11/2/09	Aluminum	3.5 ug/L	M-147B
		Boron	11.4 ug/L	M-147009B
		Calcium	43 ug/L	
		Iron	3.4 ug/L	
		Lead	0.015 ug/L	
		Magnesium	12.2 ug/L	
		Manganese	6.8 ug/L	
		Molybdenum	0.8 ug/L	
		Sodium	154 ug/L	
		Strontium	0.4 ug/L	
		Titanium	0.4 ug/L	
		Tungsten	0.16 ug/L	
		Uranium	0.007 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
M-147B	Manganese	31.5 ug/L	31.5J+ ug/L
	Titanium	7.8 ug/L	10.0U ug/L
M-147009B	Manganese	29.1 ug/L	29.1J+ ug/L
	Titanium	7.8 ug/L	10.0U ug/L

Sample PB102309-A3 (from SDG R0906095) 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
PB102309-A3	10/23/09	Boron Calcium Chromium Copper Magnesium Manganese Sodium Strontium Thallium Tungsten Uranium	7.0 ug/L 73 ug/L 0.6 ug/L 1.3 ug/L 4.8 ug/L 1.1 ug/L 103 ug/L 0.5 ug/L 0.005 ug/L 0.02 ug/L 0.038 ug/L	M-147B M-147009B

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-147009B	Thallium	0.051 ug/L	0.200U 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) 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 R0906270	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-147B and M-147009B 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-147B	M-147009B				
Aluminum	98.3	98.5	-	0.2 (≤50.0)	-	-
Barium	18.1	18.3	1 (≤30)	-	-	-
Boron	2600	2670	3 (≤30)	-	-	-
Calcium	514000	529000	3 (≤30)	-	-	-
Chromium	140	142	1 (≤30)	-	-	-
Cobalt	0.4	0.4U	-	0 (≤10.0)	-	-
Copper	12.1	10.6	-	1.5 (≤10.0)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-147B	M-147009B				
Iron	57	75.1	-	18.1 (≤20.0)	-	-
Lead	0.252	0.178	-	0.074 (≤0.200)	-	-
Magnesium	201000	206000	2 (≤30)	-	-	-
Manganese	31.5	29.1	8 (≤30)	-	-	-
Mercury	0.02	0.02U	-	0 (≤0.20)	-	-
Molybdenum	52.9	55.2	4 (≤30)	-	-	-
Nickel	2.6	3.3	-	0.7 (≤2.0)	-	-
Potassium	11000	11300	3 (≤30)	-	-	-
Sodium	480000	498000	4 (≤30)	-	-	-
Strontium	10300	10900	6 (≤30)	-	-	-
Thallium	0.040U	0.051	-	0.011 (≤0.200)	-	-
Titanium	7.8	7.8	-	0 (≤10.0)	-	-
Tungsten	59.6	63.1	6 (≤30)	-	-	-
Uranium	53.8	55.5	3 (≤30)	-	-	-
Vanadium	105	107	2 (≤30)	-	-	-
Zinc	14.9	14.9	-	0 (≤10.0)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906270	M-147B M-147009B EB110209-GWA3	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 R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	EB110209-GWA3	Boron Iron Strontium Molybdenum Sodium	50.0U ug/L 20.0U ug/L 10.0U ug/L 2.0U ug/L 300U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Equipment Blank Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	M-147B	Manganese Titanium	31.5J+ ug/L 10.0U ug/L	A	be
R0906270	M-147009B	Manganese Titanium	29.1J+ ug/L 10.0U ug/L	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Pump Blank Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	M-147009B	Thallium	0.200U ug/L	A	bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285D4
SDG #: R0906270
Laboratory: Columbia Analytical Services

Date: 1-5-10
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: 11/2/09
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	(1,2)
XV	Field Blanks	SW	EB=3. Pump Blank = PB102309-A3 (R0906095)

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	M-147B	11	PBW	21		31	
2	M-147009B	12		22		32	
3	EB110209-GWA3	13		23		33	
4	M-147BMS	14		24		34	
5	M-147BDUP	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 #: 22285D4
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)
1-3	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:4,5		[✓ 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]
		Al, Sb, As, Ba, Be, B, Cd, 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	✓	Al, [✓ Sb], As, Ba, Be, B, Cd, 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 #: 22285D4
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

Reason Code: bl

Reviewer: CR
2nd Reviewer: MV

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	3								
Ba			0.7										
Be			0.10										
B			5.2		11.4 / 50.0								
Fe			3.8		3.4 / 20.0								
Mn			0.5										
Sr			0.1		0.4 / 10.0								
Sn			2.4										
Sb			0.021										
W			0.04										

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									
Ca			6.8											
Mo			0.8											

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 2, 3

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	3									
Mo			1.4		0.8 / 2.0									
Na			29		154 / 300									

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

LDC #: 22285D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

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: be

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 11/2/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Equipment Blank Associated Samples: 1, 2

Analyte	Blank ID	Sample Identification										
	3	Action Level	1	2								
Al	3.5											
B	11.4											
Ca	43											
Fe	3.4											
Pb	0.015											
Mg	12.2											
Mn	6.8	680	31.5 J+	29.1 J+								
Mo	0.8											
Na	154											
Sr	0.4											
Ti	0.4		7.8 / 10.0	7.8 / 10.0								
W	0.16	16										
U	0.007											

LDC #: 22285D4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: [illegible]

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: 10/23/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 1, 2

Analyte	Blank ID	Sample Identification										
	PB102309-A3 (SDG#: R0906095)	Action Level	2									
B	7.0											
Ca	73	730										
Cr	0.6											
Cu	1.3											
Mg	4.8											
Mn	1.1											
Na	103											
Sr	0.5											
Tl	0.005		0.051 / 0.200									
W	0.02											
U	0.038	0.38										

LDC 22285D4
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 (ug/L)		(≤30) RPD	Difference	Limits	Qualifications (Parent Only)
	1	2				
Aluminum	98.3	98.5		0.2	(≤50.0)	
Barium	18.1	18.3	1			
Boron	2600	2670	3			
Calcium	514000	529000	3			
Chromium	140	142	1			
Cobalt	0.4	0.4U		0	(≤10.0)	
Copper	12.1	10.6		1.5	(≤10.0)	
Iron	57.0	75.1		18.1	(≤20.0)	
Lead	0.252	0.178		0.074	(≤0.200)	
Magnesium	201000	206000	2			
Manganese	31.5	29.1	8			
Mercury	0.02	0.02U		0	(≤0.20)	
Molybdenum	52.9	55.2	4			
Nickel	2.6	3.3		0.7	(≤2.0)	
Potassium	11000	11300	3			
Sodium	480000	498000	4			
Strontium	10300	10900	6			
Thallium	0.040U	0.051		0.011	(≤0.200)	
Titanium	7.8	7.8		0	(≤10.0)	

LDC 22285D4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CW
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 (ug/L) 1	Concentration (ug/L) 2	(≤30) RPD	Difference	Limits	Qualifications (Parent Only)
Tungsten	59.6	63.1	6			
Uranium	53.8	55.5	3			
Vanadium	105	107	2			
Zinc	14.9	14.9		0	(≤10.0)	

V:\FIELD DUPLICATES\FD_inorganic\22285D4.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 5, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-10B
SA77009-10B
SA77-0.5BMS
SA77-0.5BDUP

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 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)	Chromium Iron Manganese Strontium Tin	0.05 mg/Kg 1.0 mg/Kg 0.02 mg/Kg 0.03 mg/Kg 4.1 mg/Kg	All samples in SDG R0906403
ICB/CCB	Barium Boron Cadmium Iron Magnesium Manganese Molybdenum Strontium Tungsten	0.60 ug/L 6.0 ug/L 0.30 ug/L 6.0 ug/L 2.0 ug/L 0.10 ug/L 0.50 ug/L 0.10 ug/L 0.057 ug/L	All samples in SDG R0906403
ICB/CCB	Selenium	4.0 ug/L	SA77-0.5B

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
SA77-0.5B	Boron Tin	4.6 mg/Kg 4.9 mg/Kg	10.0U mg/Kg 10.0U mg/Kg
SA77-10B	Boron Molybdenum Tin	7.2 mg/Kg 0.29 mg/Kg 4.7 mg/Kg	10.2U mg/Kg 0.31U mg/Kg 10.2U mg/Kg
SA77009-10B	Boron Tin	7.1 mg/Kg 4.8 mg/Kg	9.8U mg/Kg 9.8U mg/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Aluminum Calcium Lead Magnesium Manganese Sodium Strontium Zinc	3.3 ug/L 17 ug/L 0.006 ug/L 5.0 ug/L 0.2 ug/L 39.2 ug/L 0.1 ug/L 1.0 ug/L	All samples in SDG R0906403

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
SA77-0.5BMS (All samples in SDG R0906403)	Antimony Tungsten	53.2 (75-125) 46.1 (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.

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
SA77-0.5BL	Nickel Sodium	10.5 (≤10) 11.3 (≤10)	All samples in SDG R0906403	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 R0906403	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 SA77-10B and SA77009-10B 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
	SA77-10B	SA77009-10B				
Aluminum	11000	10200	8 (≤50)	-	-	-
Arsenic	1.69	2	-	0.31 (≤0.53)	-	-
Barium	223	182	20 (≤50)	-	-	-
Beryllium	0.516	0.629	20 (≤50)	-	-	-
Boron	7.2	7.1	-	0.1 (≤10.2)	-	-
Calcium	33500	28300	17 (≤50)	-	-	-
Chromium	7.21	7	-	0.21 (≤2.0)	-	-
Cobalt	8.3	7.7	-	0.6 (≤2.0)	-	-
Copper	19.4	20.4	5 (≤50)	-	-	-
Iron	17400	17400	0 (≤50)	-	-	-
Lead	10.7	9.2	15 (≤50)	-	-	-
Magnesium	10300	10300	0 (≤50)	-	-	-
Manganese	493	365	30 (≤50)	-	-	-
Mercury	0.011	0.015	-	0.004 (≤0.017)	-	-
Molybdenum	0.29	0.34	-	0.05 (≤0.31)	-	-
Nickel	15.6	16	3 (≤50)	-	-	-
Platinum	0.006	0.006	-	0 (≤0.10)	-	-
Potassium	1800	1820	1 (≤50)	-	-	-

Compound	Concentration (mg/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA77-10B	SA77009-10B				
Sodium	927	820	12 (≤50)	-	-	-
Strontium	329	281	16 (≤50)	-	-	-
Thallium	0.082	0.101	-	0.019 (≤0.021)	-	-
Tin	4.7	4.8	-	0.1 (≤10.2)	-	-
Titanium	981	987	1 (≤50)	-	-	-
Tungsten	0.11	0.11	-	0 (≤0.10)	-	-
Uranium	1.39	1.49	7 (≤50)	-	-	-
Vanadium	53.8	52	3 (≤50)	-	-	-
Zinc	38.5	40	4 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Data Qualification Summary - SDG R0906403

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906403	SA77-0.5B SA77-10B SA77009-10B	Antimony Tungsten	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0906403	SA77-0.5B SA77-10B SA77009-10B	Nickel Sodium	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	ICP serial dilution (%D) (sd)
R0906403	SA77-0.5B SA77-10B SA77009-10B	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 R0906403

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906403	SA77-0.5B	Boron Tin	10.0U mg/Kg 10.0U mg/Kg	A	bl
R0906403	SA77-10B	Boron Molybdenum Tin	10.2U mg/Kg 0.31U mg/Kg 10.2U mg/Kg	A	bl
R0906403	SA77009-10B	Boron Tin	9.8U mg/Kg 9.8U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Field Blank Data Qualification Summary - SDG R0906403

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E4
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 1-5-10
Page: 1 of 1
Reviewer: CF
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: 11/5/09
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	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	(2,3)
XV	Field Blanks	SW	FB= FB082809-SO (R0904894)

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	SA77-0.5B	11	BBS	21		31	
2	SA77-10B	12		22		32	
3	SA77009-10B	13		23		33	
4	SA77-0.5BMS	14		24		34	
5	SA77-0.5BDUP	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 #: 22285E4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

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

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3	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: 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
		Al, Sb, As, Ba, Be, B, Cd, 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	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
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 #: 22285E4
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

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/l)	Maximum ICB/CCB[a] (ug/l)	Action Limit	1	2	3							
Ba			0.60											
B			6.0		4.6 / 10.0	7.2 / 10.2	7.1 / 9.8							
Cd			0.30											
Cr	0.05													
Fe	1.0		6.0											
Mg			2.0											
Mn	0.02		0.10											
Mo			0.50			0.29 / 0.31								
Sr	0.03		0.10											
Sn	4.1				4.9 / 10.0	4.7 / 10.2	4.8 / 9.8							
W			0.057											

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									
Se			4.0											

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

LDC #: 22285E4
SDG #:

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: VC

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:** mg/Kg

Sampling date: 8/28/09 Soil factor applied 100x

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

Analyte	Blank ID	Sample Identification										
	FB082809-SO (SDG#: R0904894)	Action Level	No Qualifiers									
Al	3.3											
Ca	17											
Pb	0.006											
Mg	5.0											
Mn	0.2											
Na	39.2											
Sr	0.1											
Zn	1.0											

LDC #: 22285E4
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: CF
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
	4	Soil	Sb	53.2	All	J-/UJ/A (m)
			W	46.1	↓	↓

Comments: _____

MS.4S2

LDC #: 27285E4
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: CE
2nd Reviewer: JA

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
	1	Soil	Ni	6.5	All	J/UJ/A (sd)
			Na	11.3	J	J

Comments:

LDC 22285E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 2
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	11000	10200	8			
Arsenic	1.69	2.00		0.31	(≤0.53)	
Barium	223	182	20			
Beryllium	0.516	0.629	20			
Boron	7.2	7.1		0.1	(≤10.2)	
Calcium	33500	28300	17			
Chromium	7.21	7.00		0.21	(≤2.0)	
Cobalt	8.3	7.7		0.6	(≤2.0)	
Copper	19.4	20.4	5			
Iron	17400	17400	0			
Lead	10.7	9.2	15			
Magnesium	10300	10300	0			
Manganese	493	365	30			
Mercury	0.011	0.015		0.004	(≤0.017)	
Molybdenum	0.29	0.34		0.05	(≤0.31)	
Nickel	15.6	16.0	3			
Platinum	0.006	0.006		0	(≤0.10)	
Potassium	1800	1820	1			
Sodium	927	820	12			

LDC#: 22285E4
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CC
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 (mg/Kg) 2	Concentration (mg/Kg) 3	(≤50) RPD	(mg/Kg) Difference	(mg/Kg) Limits	Qualifications (Parent Only)
Strontium	329	281	16			
Thallium	0.082	0.101		0.019	(≤0.021)	
Tin	4.7	4.8		0.1	(≤10.2)	
Titanium	981	987	1			
Tungsten	0.11	0.11		0	(≤0.10)	
Uranium	1.390	1.490	7			
Vanadium	53.8	52.0	3			
Zinc	38.5	40.0	4			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 11, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Metals

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906477

Sample Identification

M-122B
M-122BDISS

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 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
ICB/CCB	Barium	0.7 ug/L	All samples in SDG R0906477
	Beryllium	0.10 ug/L	
	Boron	5.2 ug/L	
	Iron	3.8 ug/L	
	Manganese	0.5 ug/L	
	Molybdenum	1.4 ug/L	
	Sodium	29 ug/L	
	Strontium	0.1 ug/L	
	Tin	2.4 ug/L	
	Antimony	0.021 ug/L	
	Tungsten	0.04 ug/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	Analyte	Reported Concentration	Modified Final Concentration
M-122BDISS	Beryllium	0.10 ug/L	0.30U ug/L
	Iron	8.3 ug/L	20.0U ug/L
M-122B	Tin	2.1 ug/L	50.0U ug/L

Sample PB102309-A3 (from SDG R0906095) 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
PB102309-A3	10/23/09	Boron Calcium Chromium Copper Magnesium Manganese Sodium Strontium Thallium Tungsten Uranium	7.0 ug/L 73 ug/L 0.6 ug/L 1.3 ug/L 4.8 ug/L 1.1 ug/L 103 ug/L 0.5 ug/L 0.005 ug/L 0.02 ug/L 0.038 ug/L	M-122B

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

Sample FiltB092509-A2 (from SDG R0905462) was identified as a filter blank. No metal contaminants were found in this blank with the following exceptions:

Filter Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FiltB092509-A2	9/25/09	Boron Calcium Lead Magnesium Manganese Sodium Strontium Tungsten Zinc	11.0 ug/L 34 ug/L 0.006 ug/L 3.8 ug/L 0.6 ug/L 398 ug/L 0.2 ug/L 0.02 ug/L 3.6 ug/L	M-122BDISS

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

Sample	Analyte	Reported Concentration	Modified Final Concentration
M-122BDISS	Lead Zinc	0.018 ug/L 1.8 ug/L	0.020U 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) 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 R0906477	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 R0906477

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906477	M-122B M-122BDISS	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 R0906477

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906477	M-122BDISS	Beryllium Iron	0.30U ug/L 20.0U ug/L	A	bl
R0906477	M-122B	Tin	50.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Pump Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Metals - Filter Blank Data Qualification Summary - SDG R0906477

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906447	M-122BDISS	Lead Zinc	0.020U ug/L 10.0U ug/L	A	br

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285F4
SDG #: R0906477
Laboratory: Columbia Analytical Services

Date: 1-5-10
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: 11/11/09
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 (SDGxx R0906270)
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	(SDGx R0906270)
XII.	Sample Result Verification	N	
XIII.	Overall Assessment of Data	A	
XIV.	Field Duplicates	N	
XV	Field Blanks	SW	PB=PB102309-A3 (R0906095), Filter Blank=FilterB092509-A3 (R0905462)

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
PB=Pump Blank

Validated Samples:
water

1	M-122B	11	PBW	21		31	
2	M-122BDISS	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 22285 4
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		[✓ Al, Sb] As, [✓ Ba, Be, B, Cd, 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
		Al, Sb, As, Ba, Be, B, Cd, 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		[✓ Al], Sb, As, [✓ Ba, Be, B, Cd, 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 #: 22285F4
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

Reason Code: bl

Reviewer: CR
2nd Reviewer: VC

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Action Limit	1 2	2 1							
Ba			0.7										
Be			0.10		0.10 / 0.30								
B			5.2										
Fe			3.8		8.3 / 20.0								
Mn			0.5										
Mo			1.4										
Na			29										
Sr			0.1										
Sn			2.4			2.1 / 50.0							
Sb			0.021										
W			0.04										

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

LDC #: 22285F4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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: 10/23/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: ~~All~~ #1

Analyte	Blank ID	Sample Identification										
	PB102309-A3 (SDG#: R0906095)	Action Level	No Quals									
B	7.0											
Ca	73	730										
Cr	0.6											
Cu	1.3											
Mg	4.8											
Mn	1.1											
Na	103											
Sr	0.5											
Tl	0.005		~~0.012 / 0.020~~									
W	0.02											
U	0.038	0.38										

LDC #: 22285F4
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: VN

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: bf bl
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 9/25/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: (Filter Blank) Associated Samples: 2

Analyte	Blank ID	Sample Identification											
	FiltB092509-A2 (SDG#: R0905462)	Action Level	~~No Qualifiers~~ 2										
B	11.0												
Ca	34												
Pb	0.006		0.018/0.020										
Mg	3.8												
Mn	0.6												
Na	398	3980											
Sr	0.2												
W	0.02												
Zn	3.6		1.8/10.0										

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

Wet Chemistry

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 21 through October 26, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056/K0910677

Sample Identification

SA52-15BSPLP2
SA52-15BSPLP3
SA52-28BSPLP2
SA52-28BSPLP3
RSAQ8-10BSPLP2
RSAQ8-10BSPLP3
RSAQ8-31BSPLP2
RSAQ8-31BSPLP3
SA34-10BSPLP2
SA34-10BSPLP3
SA34-10BSPLP3RE
SA34-31BSPLP2
SA34-31BSPLP3
RSAQ8-10BSPLP2MS
RSAQ8-10BSPLP2MSD
RSAQ8-10BSPLP2DUP

Introduction

This data review covers 16 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 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2540C for Total Dissolved Solids, 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.

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 pH Total phosphorus Sulfate	1.8 mg/L 1.8 mg/L 0.027 mg/L 0.06 mg/L 1.45 umhos/cm 5.60 units 0.008 mg/L 0.16 mg/L	SA52-15BSPLP3 SA52-28BSPLP3 RSAQ8-10BSPLP3 RSAQ8-31BSPLP3
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Conductivity pH Total phosphorus Nitrate as N	1.2 mg/L 1.2 mg/L 0.012 mg/L 0.1 mg/L 0.08 mg/L 7.25 umhos/cm 4.98 units 0.006 mg/L 0.121 mg/L	SA52-15BSPLP2 SA52-28BSPLP2 RSAQ8-10BSPLP2 RSAQ8-31BSPLP2

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Conductivity pH Total phosphorus Sulfate Nitrate as N	0.9 mg/L 0.9 mg/L 0.009 mg/L 0.08 mg/L 7.35 umhos/cm 5.02 units 0.006 mg/L 1.22 mg/L 0.143 mg/L	SA34-10BSPLP2 SA34-31BSPLP2
PB (prep blank)	Chloride Conductivity pH Total phosphorus Sulfate	0.32 mg/L 1.53 umhos/cm 5.62 units 0.007 mg/L 0.78 mg/L	SA34-10BSPLP3 SA34-31BSPLP3
PB (prep blank)	Chloride	0.07 mg/L	SA34-10BSPLP3RE
ICB/CCB	Chloride	0.063 mg/L	RSAQ8-10BSPLP3 RSAQ8-31BSPLP3
ICB/CCB	Chloride	0.098 mg/L	SA52-15BSPLP3 SA52-28BSPLP3
ICB/CCB	Chloride	0.085 mg/L	RSAQ8-10BSPLP2 RSAQ8-31BSPLP2
ICB/CCB	Chloride	0.081 mg/L	SA34-10BSPLP3 SA34-31BSPLP3
ICB/CCB	Chloride	0.077 mg/L	SA34-10BSPLP2 SA34-31BSPLP2
ICB/CCB	Sulfate	0.132 mg/L	SA34-31BSPLP2
ICB/CCB	Chloride	0.074 mg/L	SA34-10BSPLP3RE

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
SA52-15BSPLP3	Total phosphorus	0.022 mg/L	0.050U mg/L
SA52-28BSPLP3	Ammonia as N Total phosphorus	0.047 mg/L 0.01 mg/L	0.050U mg/L 0.050U mg/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAQ8-10BSPLP3	Ammonia as N Total phosphorus	0.032 mg/L 0.007 mg/L	0.050U mg/L 0.050U mg/L
RSAQ8-31BSPLP3	Ammonia as N Total phosphorus	0.049 mg/L 0.009 mg/L	0.050U mg/L 0.050U mg/L
SA52-15BSPLP2	Ammonia as N Total organic carbon Total phosphorus Nitrate as N	0.049 mg/L 0.3 mg/L 0.035 mg/L 0.565 mg/L	0.050U mg/L 1.0U mg/L 0.050U mg/L 0.565J+ mg/L
SA52-28BSPLP2	Ammonia as N Total organic carbon Nitrate as N	0.018 mg/L 0.2 mg/L 0.409 mg/L	0.050U mg/L 1.0U mg/L 0.409J+ mg/L
RSAQ8-10BSPLP2	Ammonia as N Total organic carbon Nitrate as N	0.014 mg/L 0.1 mg/L 0.229 mg/L	0.050U mg/L 1.0U mg/L 0.229J+ mg/L
RSAQ8-31BSPLP2	Ammonia as N Total organic carbon Total phosphorus Nitrate as N	0.041 mg/L 0.2 mg/L 0.009 mg/L 0.831 mg/L	0.050U mg/L 1.0U mg/L 0.050U mg/L 0.831J+ mg/L
SA34-10BSPLP2	Ammonia as N Total phosphorus Sulfate Nitrate as N	0.025 mg/L 0.016 mg/L 6.11 mg/L 0.250 mg/L	0.050U mg/L 0.050U mg/L 6.11J+ mg/L 0.250J+ mg/L
SA34-31BSPLP2	Ammonia as N Total phosphorus Nitrate as N	0.024 mg/L 0.007 mg/L 0.346 mg/L	0.050U mg/L 0.050U mg/L 0.346J+ mg/L
SA34-10BSPLP3	Chloride Sulfate	1.30 mg/L 5.10 mg/L	1.30J+ mg/L 5.10J+ mg/L
SA34-31BSPLP3	Total phosphorus	0.006 mg/L	0.050U mg/L

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

VII. 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 R0906056/K0910677	All analytes reported below the PQL.	J (all detects)	A

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
SA34-10BSPLP3	Chloride	X	A

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 R0906056/K0910677

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906056/ K0910677	SA52-15BSPLP2 SA52-15BSPLP3 SA52-28BSPLP2 SA52-28BSPLP3 RSAQ8-10BSPLP2 RSAQ8-10BSPLP3 RSAQ8-31BSPLP2 RSAQ8-31BSPLP3 SA34-10BSPLP2 SA34-10BSPLP3 SA34-10BSPLP3RE SA34-31BSPLP2 SA34-31BSPLP3	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0906056/ K0910677	SA34-10BSPLP3	Chloride	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG R0906056/K0910677

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906056/ K0910677	SA52-15BSPLP3	Total phosphorus	0.050U mg/L	A	bl
R0906056/ K0910677	SA52-28BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0906056/ K0910677	RSAQ8-10BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0906056/ K0910677	RSAQ8-31BSPLP3	Ammonia as N Total phosphorus	0.050U mg/L 0.050U mg/L	A	bl
R0906056/ K0910677	SA52-15BSPLP2	Ammonia as N Total organic carbon Total phosphorus Nitrate as N	0.050U mg/L 1.0U mg/L 0.050U mg/L 0.565J+ mg/L	A	bl
R0906056/ K0910677	SA52-28BSPLP2	Ammonia as N Total organic carbon Nitrate as N	0.050U mg/L 1.0U mg/L 0.409J+ mg/L	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906056/ K0910677	RSAQ8-10BSPLP2	Ammonia as N Total organic carbon Nitrate as N	0.050U mg/L 1.0U mg/L 0.229J+ mg/L	A	bl
R0906056/ K0910677	RSAQ8-31BSPLP2	Ammonia as N Total organic carbon Total phosphorus Nitrate as N	0.050U mg/L 1.0U mg/L 0.050U mg/L 0.831J+ mg/L	A	bl
R0906056/ K0910677	SA34-10BSPLP2	Ammonia as N Total phosphorus Sulfate Nitrate as N	0.050U mg/L 0.050U mg/L 6.11J+ mg/L 0.250J+ mg/L	A	bl
R0906056/ K0910677	SA34-31BSPLP2	Ammonia as N Total phosphorus Nitrate as N	0.050U mg/L 0.050U mg/L 0.346J+ mg/L	A	bl
R0906056/ K0910677	SA34-10BSPLP3	Chloride Sulfate	1.30J+ mg/L 5.10J+ mg/L	A	bl
R0906056/ K0910677	SA34-31BSPLP3	Total phosphorus	0.050U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0906056/K0910677

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A6
SDG #: R0906056 / K0910677
Laboratory: Columbia Analytical Services

Date: 1-5-10
Page: 1 of 1
Reviewer: CE
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), Conductivity (EPA Method 120.1), 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), TDS (SM2540C), TSS (SM2540D)

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: 10/21/09 - 10/26/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	Dup
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	A	
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: 30.1

1	SA52-15BSPLP2	11	SA34-10BSPLP3RE	21		31	PBS
2	SA52-15BSPLP3	12	SA34-31BSPLP2	22		32	
3	SA52-28BSPLP2	13	SA34-31BSPLP3	23		33	
4	SA52-28BSPLP3	14	RSAQ8-10BSPLP2MS	24		34	
5	RSAQ8-10BSPLP2	15	RSAQ8-10BSPLP2MSD	25		35	
6	RSAQ8-10BSPLP3	16	RSAQ8-10BSPLP2DUP	26		36	
7	RSAQ8-31BSPLP2	17		27		37	
8	RSAQ8-31BSPLP3	18		28		38	
9	SA34-10BSPLP2	19		29		39	
10	SA34-10BSPLP3	20		30		40	

Notes: _____

LDC #: 22285A6
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 duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 22285A6
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: ER
2nd Reviewer: W

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 #: 22285A6
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
1-10,12,13	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]
11		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:14		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]
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]
16		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 #: 22285A6
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:** 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	1.8												
Alk., Bicarb	1.8												
NH3-N	0.027				0.047 / 0.050	0.032 / 0.050	0.049 / 0.050						
Cl	0.06												
Cond (umhos/cm)	1.45		14.5										
pH (pH units)	5.60												
T-P	0.008			0.022 / 0.050	0.01 / 0.050	0.007 / 0.050	0.009 / 0.050						
SO4	0.16												

LDC #: 22285A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: ar
2nd Reviewer: lr

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	1.2												
Alk., Bicarb	1.2												
NH3-N	0.012			0.049 / 0.050	0.018 / 0.050	0.014 / 0.050	0.041 / 0.050						
TOC	0.1			0.3 / 1.0	0.2 / 1.0	0.1 / 1.0	0.2 / 1.0						
Cl	0.08												
Cond (umhos/cm)	7.25		72.5										
pH (pH units)	4.98												
T-P	0.006			0.035 / 0.050			0.009 / 0.050						
NO3-N	0.121		1.21	0.565 J+	0.409 J+	0.229 J+	0.831 J+						

LDC #: 22285A6
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/L **Associated Samples:** 9, 12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			9	12								
Alk., Total	0.9												
Alk., Bicarb	0.9												
NH3-N	0.009			0.025 / 0.050	0.024 / 0.050								
Cl	0.08												
Cond (umhos/cm)	7.35		73.5										
pH (pH units)	5.02												
T-P	0.006			0.016 / 0.050	0.007 / 0.050								
SO4	1.22		12.2	6.11 J+									
NO3-N	0.143		1.43	0.250 J+	0.346 J+								

LDC #: 22285A6
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:** 10, 13

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			10	13								
Cl	0.32		3.2	1.30 J+									
Cond (umhos/cm)	1.53		15.3										
pH (pH units)	5.62												
T-P	0.007				0.006 / 0.050								
SO4	0.78		7.8	5.10 J+									

Conc. units: mg/L **Associated Samples:** 11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl	0.07												

Conc. units: mg/L **Associated Samples:** 6, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.063											

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:** 2, 4

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.098											

Conc. units: mg/L **Associated Samples:** 5, 7

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.085											

Conc. units: mg/L **Associated Samples:** 10, 13

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.081											

Conc. units: mg/L **Associated Samples:** 9, 12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.077											

LDC #: 22285A6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
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:** 12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
SO4		0.132											

Conc. units: mg/L **Associated Samples:** 11

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Cl		0.074											

LDC #: 22188A6
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	Finding	Associated Samples	Qualifications
		10	C1		X / A(o)

Comments: _____

LDC #: 22285A6
SDG #: See cover

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

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

Method: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of Cr^{6+} was recalculated. Calibration date: 10/22/09

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	Cr^{6+}	s1	0	0	*0.999657*	0.999657	Y
		s2	0.01	224648			
		s3	0.1	3238235			
		s4	0.5	16376437			
		s5	0.7	22244818			
		s6	1	31530713			
Calibration verification	NO_2-N	CCV	0.45	Found (mg/L) 0.4506	100	-	
Calibration verification	Phosphorus	CCV	0.8	0.7906	99	-	
Calibration verification	Cl	CCV	3	3.029	101	-	

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 #: 22858
SDG #: seecover

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: CR
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)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Br	1.00	1.00	100	100	Y
14	Matrix spike sample	ClO_4	(SSR-SR) 1989	2000	99	99	↓
16	Duplicate sample	↓	821	795	3	3	↓

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 #: 22285A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method see cover

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

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

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

Concentration = $\frac{V_{Titrant} \times N_{Titrant} \times 50{,}000}{V_{sample}}$

Alk = $\frac{V_{Titrant} \times N_{Titrant} \times 50{,}000}{V_{sample}}$

Carb = 2(Phenolphthalein Alk)

Bicarb = Total Alk − 2(Phenolphthalein Alk)

Recalculation:

Total = 2mL(0.02N)(50,000)/80mL = 25mg/L

Phenolphthalein = 0.4mL(0.02N)(50,000)/80mL = 5mL/L

Carb. = 5(2) = 10mg/L

Bicarb. = 25 − 5(2) = 15mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	5	Alk, Total	25.0	25.0	Y
		Alk, Bicarb.	15.0	15.0	
		Alk, Carb.	10.0	10.0	
		NH_3-N	0.014	0.014	
		TOC	0.1	0.1	
		Cl	3.24	3.24	
		Cond. (umhos/cm)	175	175	
		NO_3-N	0.229	0.229	
		pH (units)	9.22	9.22	
		TDS	94	94	
		SO_4	32.9	32.9	
		Surfactants	0.011	0.011	

Note:

LDC #: 22285A6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: Inorganics, Method see cover

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

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

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

Concentration = $\frac{\text{Absorbance} - \text{Yintercept}}{\text{Slope}}$

Recalculation: $\frac{0.003 + 0.003311}{1.025888} = 0.006\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	8	Alk, Total	22.1	22.1	
		Alk, Bicarb	22.1	22.1	
		NH_3-N	0.049	0.049	
		TOC	0.1	0.1	
		Cl	4.39	4.39	
		Cond (umhos/cm)	1680	1680	
		NO_3-N	0.7222	0.7222	
		pH (units)	8.10	8.10	
		T-P	0.009	0.009	
		TDS	1220	1220	
		TSS	1.8	1.8	
		SO_4	721	721	
		Surfactants	0.006	0.006	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 22 through October 23, 2009

LDC Report Date: January 13, 2010

Matrix: Soil/Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

EB102209-SO1A3
SA112-0.5B
SA112-10B
SA112-20B
SA112-34B
RSAQ8-0.5B
RSAQ8-10B
RSAQ8-22B
RSAQ8-31B
RSAQ8-34B
SA132-0.5B
SA132-10B
SA132009-10B
SA132-20B
SA132-34B
RSAR8-0.5B
RSAR8-10B
RSAR8-20B
RSAR8-34B
RSAP8-0.5B
RSAP8-10B
RSAP8-25B
RSAP8-40B
EB102209-SO1A3MS
EB102209-SO1A3MSD
EB102209-SO1A3DUP
RSAR8-34BMS
RSAR8-34BMSD
RSAR8-34BDUP

Introduction

This data review covers 25 soil samples and 4 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 Method 300.1 for Chlorate, EPA SW 846 Method 7199 for Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Methods 9040B/9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Khan 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
EB102209-SO1A3	Hexavalent chromium	27 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)	Chloride Sulfate	0.13 mg/L 0.18 mg/L	All water samples in SDG R0906081
ICB/CCB	Chloride Sulfate Alkalinity, total Alkalinity, bicarbonate	0.154 mg/L 0.176 mg/L 0.5 mg/L 0.5 mg/L	All water samples in SDG R0906081
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	11 mg/Kg 11 mg/Kg 1.1 mg/Kg	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-22B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate	19 mg/Kg 19 mg/Kg	RSAQ8-10B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B
ICB/CCB	Chloride	0.114 mg/L	RSAQ8-10B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B
PB (prep blank)	Alkalinity, total Alkalinity, bicarbonate Chloride	10 mg/Kg 10 mg/Kg 1.1 mg/Kg	SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B
ICB/CCB	Nitrite as N	0.0092 mg/L	SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B
PB (prep blank)	Total organic carbon	40 mg/Kg	RSAP8-25B RSAP8-40B

Method Blank ID	Analyte	Concentration	Associated Samples
PB (prep blank)	Total organic carbon	100 mg/Kg	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B
ICB/CCB	Total organic carbon	116.0 mg/Kg	All soil samples in SDG R0906081
ICB/CCB	Alkalinity, total Alkalinity, bicarbonate	0.5 mg/L 0.5 mg/L	SA112-10B RSAP8-10B RSAP8-25B RSAP8-40B
ICB/CCB	Chloride	0.113 mg/L	SA112-34B RSAQ8-22B
ICB/CCB	Sulfate	0.064 mg/L	SA132-10B
ICB/CCB	Chloride	0.104 mg/L	SA132009-10B SA132-20B RSAP8-0.5B RSAP8-10B
ICB/CCB	Chloride	0.076 mg/L	SA112-0.5B
ICB/CCB	Chloride	0.121 mg/L	SA112-10B SA112-20B RSAQ8-0.5B
ICB/CCB	Sulfate	0.098 mg/L	RSAP8-10B
ICB/CCB	Chloride	0.075 mg/L	SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Sulfate	0.095 mg/L	SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B
ICB/CCB	Sulfate	0.157 mg/L	RSAQ8-34B

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
EB102209-SO1A3	Chloride Sulfate Alkalinity, total Alkalinity, bicarbonate	1.6 mg/L 1.3 mg/L 0.5 mg/L 0.5 mg/L	2.0U mg/L 2.0U mg/L 2.0U mg/L 2.0U mg/L
SA112-34B	Total organic carbon	210 mg/Kg	300U mg/Kg
RSAQ8-34B	Total organic carbon	230 mg/Kg	290U mg/Kg
SA132-34B	Total organic carbon	200 mg/Kg	290U mg/Kg

Sample EB102209-SO1A3 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
EB102209-SO1A3	10/22/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate Surfactants	0.5 mg/L 0.5 mg/L 0.012 mg/L 0.2 mg/L 1.6 mg/L 0.76 mg/L 5.03 units 0.006 mg/L 1.3 mg/L 0.052 mg/L	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B

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
SA112-0.5B	Nitrate as N Surfactants	8.35 mg/Kg 0.9 mg/Kg	8.35J+ mg/Kg 2.0U mg/Kg
SA112-10B	Nitrate as N	5.31 mg/Kg	5.31J+ mg/Kg
SA112-20B	Nitrate as N Surfactants	16.7 mg/Kg 1.3 mg/Kg	16.7J+ mg/Kg 2.6U mg/Kg
SA112-34B	Total organic carbon Nitrate as N	210 mg/Kg 1.89 mg/Kg	300U mg/Kg 1.89J+ mg/Kg
RSAQ8-0.5B	Nitrate as N Surfactants	13.8 mg/Kg 1.4 mg/Kg	13.8J+ mg/Kg 2.1U mg/Kg
RSAQ8-10B	Nitrate as N	3.67 mg/Kg	3.67J+ mg/Kg
RSAQ8-22B	Nitrate as N	3.51 mg/Kg	3.51J+ mg/Kg
RSAQ8-31B	Nitrate as N	24.0 mg/Kg	24.0J+ mg/Kg
RSAQ8-34B	Total organic carbon Nitrate as N	230 mg/Kg 3.08 mg/Kg	290U mg/Kg 3.08J+ mg/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.033 mg/L 0.2 mg/L 1.2 mg/L 0.68 mg/L 5.88 units 0.008 mg/L 1.4 mg/L	All soil samples in SDG R0906081

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
SA112-0.5B	Nitrate as N	8.35 mg/Kg	8.35J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
SA112-10B	Nitrate as N	5.31 mg/Kg	5.31J+ mg/Kg
SA112-20B	Nitrate as N	16.7 mg/Kg	16.7J+ mg/Kg
SA112-34B	Total organic carbon Nitrate as N	210 mg/Kg 1.89 mg/Kg	300U mg/Kg 1.89J+ mg/Kg
RSAQ8-0.5B	Nitrate as N	13.8 mg/Kg	13.8J+ mg/Kg
RSAQ8-10B	Nitrate as N	3.67 mg/Kg	3.67J+ mg/Kg
RSAQ8-22B	Nitrate as N	3.51 mg/Kg	3.51J+ mg/Kg
RSAQ8-31B	Nitrate as N	24.0 mg/Kg	24.0J+ mg/Kg
RSAQ8-34B	Total organic carbon Nitrate as N	230 mg/Kg 3.08 mg/Kg	290U mg/Kg 3.08J+ mg/Kg
SA132-0.5B	Nitrate as N	1.35 mg/Kg	1.35J+ mg/Kg
SA132-10B	Nitrate as N	1.06 mg/Kg	1.06J+ mg/Kg
SA132009-10B	Nitrate as N	1.04 mg/Kg	1.04J+ mg/Kg
SA132-20B	Nitrate as N	0.78 mg/Kg	0.78J+ mg/Kg
SA132-34B	Total organic carbon Nitrate as N	200 mg/Kg 3.67 mg/Kg	290U mg/Kg 3.67J+ mg/Kg
RSAR8-0.5B	Nitrate as N	8.64 mg/Kg	8.64J+ mg/Kg
RSAR8-10B	Nitrate as N	2.27 mg/Kg	2.27J+ mg/Kg
RSAR8-20B	Nitrate as N	3.29 mg/Kg	3.29J+ mg/Kg
RSAR8-34B	Nitrate as N	3.66 mg/Kg	3.66J+ mg/Kg
RSAP8-0.5B	Nitrate as N	3.11 mg/Kg	3.11J+ mg/Kg
RSAP8-10B	Nitrate as N	1.66 mg/Kg	1.66J+ mg/Kg
RSAP8-25B	Nitrate as N	1.04 mg/Kg	1.04J+ mg/Kg

Sample	Analyte	Reported Concentration	Modified Final Concentration
RSAP8-40B	Nitrate as N	3.80 mg/Kg	3.80J+ 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
RSAR8-34BMS (All soil samples in SDG R0906081)	Alkalinity, total Ammonia as N	70 (75-125) 74 (75-125)	- -	- -	Alkalinity, total Alkalinity, bicarbonate Ammonia as N	J- (all detects) UJ (all non-detects)	A
RSAR8-34BMS (All soil samples in SDG R0906081)	Chloride Nitrate as N Sulfate	329 (75-125) 135 (75-125) 154 (75-125)	- - -	- - -	Chloride Nitrate as N Sulfate	J+ (all detects) J+ (all detects) J+ (all 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
SA112-0.5B	Dichloroacetate	88 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
SA112-20B	Dichloroacetate	87 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A

Sample	Surrogate	%R (Limits)	Analyte	Flag	A or P
SA112-34B	Dichloroacetate	89 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAQ8-0.5B	Dichloroacetate	87 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAQ8-22B	Dichloroacetate	78 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAQ8-31B	Dichloroacetate	86 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAQ8-34B	Dichloroacetate	89 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAR8-0.5B	Dichloroacetate	88 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAR8-10B	Dichloroacetate	75 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAR8-20B	Dichloroacetate	80 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAR8-34B	Dichloroacetate	88 (90-115)	Chlorate	J- (all detects) UJ (all non-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 R0906081	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 SA132-10B and SA132009-10B 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
	SA132-10B	SA132009-10B				
Alkalinity, total	724 mg/Kg	764 mg/Kg	5 (≤50)	-	-	-
Alkalinity, bicarbonate	687 mg/Kg	707 mg/Kg	3 (≤50)	-	-	-
Alkalinity, carbonate	37 mg/Kg	57 mg/Kg	-	20 (≤22)	-	-
Chloride	4.8 mg/Kg	4.8 mg/Kg	0 (≤50)	-	-	-
Nitrate as N	1.06 mg/Kg	1.04 mg/Kg	-	0.02 (≤0.55)	-	-
pH	9.47 units	9.48 units	0 (≤50)	-	-	-
Sulfate	108 mg/Kg	103 mg/Kg	5 (≤50)	-	-	-
Total organic carbon	400 mg/Kg	1530 mg/Kg	-	1130 (≤300)	J (all detects)	A
Total phosphorus	863 mg/Kg	842 mg/Kg	2 (≤50)	-	-	-
Chlorate	318 ug/Kg	378 ug/Kg	-	60 (≤230)	-	-
Perchlorate	2080 ug/Kg	2030 ug/Kg	2 (≤50)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0906081

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906081	EB102209-SO1A3	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0906081	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	Alkalinity, total Alkalinity, bicarbonate Ammonia as N	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0906081	SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	Chloride Nitrate as N Sulfate	J+ (all detects) J+ (all detects) J+ (all detects)	A	Matrix spike analysis (%R) (m)

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906081	SA112-0.5B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-22B RSAQ8-31B RSAQ8-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0906081	EB102209-SO1A3 SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	All analytes reported below the PQL.	J (all detects)	A	Sample result verification (sp)
R0906081	SA132-10B SA132009-10B	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 R0906081

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906081	EB102209-SO1A3	Chloride Sulfate Alkalinity, total Alkalinity, bicarbonate	2.0U mg/L 2.0U mg/L 2.0U mg/L 2.0U mg/L	A	bl
R0906081	SA112-34B	Total organic carbon	300U mg/Kg	A	bl
R0906081	RSAQ8-34B	Total organic carbon	290U mg/Kg	A	bl

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906081	SA132-34B	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 R0906081

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906081	SA112-0.5B	Nitrate as N Surfactants	8.35J+ mg/Kg 2.0U mg/Kg	A	be
R0906081	SA112-10B	Nitrate as N	5.31J+ mg/Kg	A	be
R0906081	SA112-20B	Nitrate as N Surfactants	16.7J+ mg/Kg 2.6U mg/Kg	A	be
R0906081	SA112-34B	Total organic carbon Nitrate as N	300U mg/Kg 1.89J+ mg/Kg	A	be
R0906081	RSAQ8-0.5B	Nitrate as N Surfactants	13.8J+ mg/Kg 2.1U mg/Kg	A	be
R0906081	RSAQ8-10B	Nitrate as N	3.67J+ mg/Kg	A	be
R0906081	RSAQ8-22B	Nitrate as N	3.51J+ mg/Kg	A	be
R0906081	RSAQ8-31B	Nitrate as N	24.0J+ mg/Kg	A	be
R0906081	RSAQ8-34B	Total organic carbon Nitrate as N	290U mg/Kg 3.08J+ mg/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0906081

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906081	SA112-0.5B	Nitrate as N	8.35J+ mg/Kg	A	bf
R0906081	SA112-10B	Nitrate as N	5.31J+ mg/Kg	A	bf
R0906081	SA112-20B	Nitrate as N	16.7J+ mg/Kg	A	bf

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906081	SA112-34B	Total organic carbon Nitrate as N	300U mg/Kg 1.89J+ mg/Kg	A	bf
R0906081	RSAQ8-0.5B	Nitrate as N	13.8J+ mg/Kg	A	bf
R0906081	RSAQ8-10B	Nitrate as N	3.67J+ mg/Kg	A	bf
R0906081	RSAQ8-22B	Nitrate as N	3.51J+ mg/Kg	A	bf
R0906081	RSAQ8-31B	Nitrate as N	24.0J+ mg/Kg	A	bf
R0906081	RSAQ8-34B	Total organic carbon Nitrate as N	290U mg/Kg 3.08J+ mg/Kg	A	bf
R0906081	SA132-0.5B	Nitrate as N	1.35J+ mg/Kg	A	bf
R0906081	SA132-10B	Nitrate as N	1.06J+ mg/Kg	A	bf
R0906081	SA132009-10B	Nitrate as N	1.04J+ mg/Kg	A	bf
R0906081	SA132-20B	Nitrate as N	0.78J+ mg/Kg	A	bf
R0906081	SA132-34B	Total organic carbon Nitrate as N	290U mg/Kg 3.67J+ mg/Kg	A	bf
R0906081	RSAR8-0.5B	Nitrate as N	8.64J+ mg/Kg	A	bf
R0906081	RSAR8-10B	Nitrate as N	2.27J+ mg/Kg	A	bf
R0906081	RSAR8-20B	Nitrate as N	3.29J+ mg/Kg	A	bf
R0906081	RSAR8-34B	Nitrate as N	3.66J+ mg/Kg	A	bf
R0906081	RSAP8-0.5B	Nitrate as N	3.11J+ mg/Kg	A	bf
R0906081	RSAP8-10B	Nitrate as N	1.66J+ mg/Kg	A	bf
R0906081	RSAP8-25B	Nitrate as N	1.04J+ mg/Kg	A	bf
R0906081	RSAP8-40B	Nitrate as N	3.80J+ mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B6
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 1-5-10
Page: 1 of 1
Reviewer: KR
2nd Reviewer:

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), 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: 10/22-10/23/09
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	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(12,13)
XI	Field blanks	SW	EB=1. FB= FBO82809-SO (R0904894)

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	EB102209-SO1A3	W	11	SA132-0.5B	S	~~21~~	~~RSAP8-0.5B~~	S	31	PBS
2	SA112-0.5B	S	12	SA132-10B		22	RSAP8-10B		32	PBW
3	SA112-10B		13	SA132009-10B		23	RSAP8-25B		33	
4	SA112-20B		14	SA132-20B		24	RSAP8-40B		34	
5	SA112-34B		15	SA132-34B		25	EB102209-SO1A3MS	W	35	
6	RSAQ8-0.5B		16	RSAR8-0.5B		26	EB102209-SO1A3MSD		36	
7	RSAQ8-10B		17	RSAR8-10B		27	EB102209-SO1A3DUP		37	
8	RSAQ8-22B		18	RSAR8-20B		28	RSAR8-34BMS	S	38	
9	RSAQ8-31B		19	RSAR8-34B		29	RSAR8-34BMSD		39	
10	RSAQ8-34B		20	RSAP8-0.5B		30	RSAR8-34BDUP		40	

Notes:

LDC #: 22285B6
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 22-24	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]
		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: 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]
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]
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]
29		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]
30		[✓ 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 #: 22285B6
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.
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**
1	10/22/09 08:15	10/23/09 11:19	(27hrs)				J-/UJ/P (h)
↓	↓	↓ 11:09	↓				↓

LDC #: 22285B6
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/L **Associated Samples: All Water**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			1									
Cl	0.13	0.154		1.6 / 2.0									
SO4	0.18	0.176		1.3 / 2.0									
Alk., Total		0.5		0.5 / 2.0									
Alk., Bicarb.		0.5		0.5 / 2.0									

Conc. units: mg/Kg **Associated Samples: 2-6, 8**

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	1.1												

LDC #: 22285B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: SR
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/Kg **Associated Samples:** 7, 9-12

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total	19												
Alk., Bicarb.	19												
Cl		0.114											

Conc. units: mg/Kg **Associated Samples:** 13-20, 22-24

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	1.1												
NO2-N		0.0092											

Conc. units: mg/Kg **Associated Samples:** 23, 24

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
TOC	40												

LDC #: 22285B6
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:** 2-20, 22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			5	10	15							
TOC	100			210 / 300	230 / 290	200 / 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)			5	10	15							
TOC		116.0		See PB	See PB	See PB							

Conc. units: mg/Kg **Associated Samples:** 3, 22-24

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Alk., Total		0.5											
Alk., Bicarb.		0.5											

Conc. units: mg/Kg **Associated Samples:** 5, 8

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.113											

LDC #: 22285B6
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: 12**

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: 13, 14, 20, 22**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.104											

Conc. units: mg/Kg **Associated Samples: 2**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.076											

Conc. units: mg/Kg **Associated Samples: 3, 4, 6**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.121											

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:** 22

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.098											

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									
Cl		0.075											

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									
SO4		0.095											

Conc. units: mg/Kg **Associated Samples:** 10

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.157											

LDC #: 22285B6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: be
Sampling date: 10/22/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other (EB) Associated Samples: 2-10

Analyte	Blank ID	Sample Identification									
	1	Action Level	2	3	4	5	6	7	8	9	10
Total alkalinity	0.5										
Bicarbonate alkalinity	0.5										
Ammonia as N	0.012										
TOC (average)	0.2					210 / 300					230 / 290
Cl	1.6										
Nitrate as N	0.76	76	8.35 J+	5.31 J+	16.7 J+	1.89 J+	13.8 J+	3.67 J+	3.51 J+	24.0 J+	3.08 J+
pH (pH Units)	5.03										
Total Phosphorus	0.006										
Sulfate	1.3										
Surfactants	0.052	5.2	0.9 / 2.0		1.3 / 2.6		1.4 / 2.1				

LDC #: 22285B6
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: 8/28/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All Soil

Analyte	Blank ID	Sample Identification																						
	FB082809-SO (SDG# R0904894)	Action Level	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	22	23	24
Total alkalinity	1.9																							
Bicarbonate alkalinity	1.9																							
Ammonia as N	0.033																							
TOC (average)	0.2					210 / 300					230 / 290					200 / 290								
Cl	1.2																							
Nitrate as N	0.68	68	8.35 J+	5.31 J+	16.7 J+	1.89 J+	13.8 J+	3.67 J+	3.51 J+	24.0 J+	3.08 J+	1.35 J+	1.06 J+	1.04 J+	0.78 J+	3.67 J+	8.64 J+	2.27 J+	3.29 J+	3.66 J+	3.11 J+	1.66 J+	1.04 J+	3.80 J+
pH (pH Units)	5.88																							
Total P	0.008																							
Sulfate	1.4																							

LDC #: 22285B6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: SR
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
	28	Soil	Alk, Total ~~Bicarb.~~	70	All Soil	J- /UJ/A (m)
			NH_3-N	74		↓
			Cl	329		J+ det/A
			NO_3-N	135		↓
			SO_4	154	↓	↓

Comments:

LDC #: 22858b
SDG #: See cover

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

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

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
		C103		DCA	88 (90-115)	2	J-/UJ/A (S)
					87 ( )	4	
					89 ( )	5	
					87 ( )	6	
					78 ( )	8	
					86 ( )	9	
					89 ( )	10	
					84 ( )	16	
					75 ( )	17	
					80 ( )	18	
					88 ( )	19	
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

LDC#: 22285B6
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)
	12	13				
Total Alkalinity	724	764	5			
Bicarbonate Alkalinity	687	707	3			
Carbonate Alkalinity	37	57		20	(≤22)	
Chloride	4.8	4.8	0			
Nitrate as N	1.06	1.04		0.02	(≤0.55)	
pH (pH Units)	9.47	9.48	0			
Sulfate	108	103	5			
TOC	400	1530		1130	(≤300)	Jdet/A (fd)
Total Phosphorus	863	842	2			
Chlorate (ug/Kg)	318	378		60	(≤230)	
Perchlorate (ug/Kg)	2080	2030	2			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: October 28, 2009

LDC Report Date: January 11, 2010

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-10B
RSAS8-25B
RSAS8-35B
RSAS8-35BMS
RSAS8-35BMSD
RSAS8-35BDUP

Introduction

This data review covers 7 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 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 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Khan Method 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	10 mg/Kg 10 mg/Kg 1.1 mg/Kg	All samples in SDG R0906191
ICB/CCB	Chloride Total organic carbon	0.103 mg/L 116.0 mg/Kg	All samples in SDG R0906191

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
RSAS8-35B	Total organic carbon	170 mg/Kg	290U mg/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.033 mg/L 0.2 mg/L 1.2 mg/L 0.68 mg/L 5.88 units 0.008 mg/L 1.4 mg/L	All samples in SDG R0906191

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
RSAS8-0.5B	Nitrate as N	3.38 mg/Kg	3.38J+ mg/Kg
RSAS8-10B	Nitrate as N	1.85 mg/Kg	1.85J+ mg/Kg
RSAS8-25B	Nitrate as N	3.51 mg/Kg	3.51J+ mg/Kg
RSAS8-35B	Total organic carbon Nitrate as N	170 mg/Kg 5.18 mg/Kg	290U mg/Kg 5.18J+ 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
RSAS8-35BMS (All samples in SDG R0906191)	Chloride	58 (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)	Analyte	Flag	A or P
RSAS8-0.5B	Dichloroacetate	86 (90-115)	Chlorate	J- (all detects) UJ (all non-detects)	A
RSAS8-25B	Dichloroacetate	84 (90-115)	Chlorate	J- (all detects) UJ (all non-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 R0906191	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 R0906191

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	Chloride	J- (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R) (m)
R0906191	RSAS8-0.5B RSAS8-25B	Chlorate	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	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 R0906191

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906191	RSAS8-35B	Total organic carbon	290U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0906191

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906191	RSAS8-0.5B	Nitrate as N	3.38J+ mg/Kg	A	bf
R0906191	RSAS8-10B	Nitrate as N	1.85J+ mg/Kg	A	bf
R0906191	RSAS8-25B	Nitrate as N	3.51J+ mg/Kg	A	bf
R0906191	RSAS8-35B	Total organic carbon Nitrate as N	290U mg/Kg 5.18J+ mg/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C6
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 1-6-10
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), Chlorate (EPA Method 300.1), Cyanide (EPA SW846 Method 9012A), 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: 10/28/09
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	A	DUP
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	SW	FB = FB082809-SO (R0904894)

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	RSAS8-0.5B	11	RBS	21		31	
2	RSAS8-10B	12		22		32	
3	RSAS8-25B	13		23		33	
4	RSAS8-35B	14		24		34	
5	RSAS8-35BMS	15		25		35	
6	RSAS8-35BMSD	16		26		36	
7	RSAS8-35BDUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 22285C6
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
1-4	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
QC: 5		[✓ 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
6		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
7		[✓ 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 #: 22285C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: CR
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Reason: (b1)

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:** All

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			4									
Alk., Total	10												
Alk., Bicarb.	10												
Cl	1.1	0.103											
TOC		116.0 mg/Kg		170 / 290									

LDC #: 22285C6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CR
2nd Reviewer: LN

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: 8/28/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification									
	FB082809-SO (SDG# R0904894)	Action Level	1	2	3	4					
Total alkalinity	1.9										
Bicarbonate alkalinity	1.9										
Ammonia as N	0.033										
TOC (average)	0.2					170 / 290					
Cl	1.2										
Nitrate as N	0.68	68	3.38 J+	1.85 J+	3.51 J+	5.18 J+					
pH (pH Units)	5.88										
Total Phosphorus	0.008										
Sulfate	1.4										

LDC #: 22285C6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike 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 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
	5	Soil	Cl	58	All	J-/UJ/A (m)

Comments:

LDC #: 22285G
SDG #: seecaseL

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of
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
		C103		DCA	86 (90-115)	1	J-L05/A(s)
					84 (↓)	3	↓
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Dichloroacetate			
B				

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 2, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906270

Sample Identification

M-147B
M-147009B
EB110209-GWA3
EB110209-GWA3MS
EB110209-GWA3MSD
EB110209-GWA3DUP

Introduction

This data review covers 6 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 Method 300.1 for Chlorate, EPA Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2540C for Total Dissolved Solids, 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
EB110209-GWA3	Hexavalent chromium	30 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
11/25/09	CCV (19:49)	Perchlorate	129 (85-115)	All samples in SDG R0906270	J+ (all 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 Chloride Total dissolved solids	0.8 mg/L 0.8 mg/L 0.09 mg/L 7 mg/L	All samples in SDG R0906270
ICB/CCB	Alkalinity, total Alkalinity, bicarbonate	0.8 mg/L 0.8 mg/L	All samples in SDG R0906270

Method Blank ID	Analyte	Concentration	Associated Samples
ICB/CCB	Chloride Sulfate	0.085 mg/L 0.193 mg/L	EB110209-GWA3

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
EB110209-GWA3	Alkalinity, total Alkalinity, bicarbonate Chloride Total dissolved solids Sulfate	1.2 mg/L 1.2 mg/L 0.08 mg/L 9 mg/L 0.11 mg/L	2.0U mg/L 2.0U mg/L 0.20U mg/L 10U mg/L 0.20U mg/L

Sample EB110209-GWA3 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
EB110209-GWA3	11/2/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Chloride Conductivity pH Total dissolved solids Sulfate Surfactants	1.2 mg/L 1.2 mg/L 0.206 mg/L 0.08 mg/L 1.28 umhos/cm 7.20 units 9 mg/L 0.11 mg/L 0.008 mg/L	M-147B M-147009B

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
M-147B	Ammonia as N Surfactants	0.022 mg/L 0.010 mg/L	0.050U mg/L 0.020U mg/L
M-147009B	Ammonia as N Surfactants	0.031 mg/L 0.009 mg/L	0.050U mg/L 0.020U mg/L

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB102309-A3	10/23/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Conductivity Nitrate as N pH Total dissolved solids Sulfate Chlorate	1.1 mg/L 1.1 mg/L 2.60 mg/L 0.2 mg/L 0.9 mg/L 3.83 umhos/cm 0.69 mg/L 5.79 units 9 mg/L 1.5 mg/L 23 ug/L	M-147B M-147009B

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-147B	Ammonia as N	0.022 mg/L	0.050U mg/L
M-147009B	Ammonia as N	0.031 mg/L	0.050U mg/L

Sample FiltB092509-A2 (from SDG R0905462) was identified as a filter blank. No contaminant concentrations were found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Perchlorate	75 (85-115)	All samples in SDG R0906270	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.

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 R0906270	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 M-147B and M-147009B 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
	M-147B	M-147009B				
Ammonia as N	0.022 mg/Kg	0.031 mg/L	-	0.009 (≤0.050)	-	-
Alkalinity, total	106 mg/L	108 mg/L	2 (≤30)	-	-	-
Alkalinity, bicarbonate	106 mg/L	108 mg/L	2 (≤30)	-	-	-
Bromide	1.4 mg/L	1.4 mg/L	-	0 (≤1.0)	-	-
Chloride	583 mg/L	572 mg/L	2 (≤30)	-	-	-
Conductivity	5170 umhos/cm	5150 umhos/cm	0 (≤30)	-	-	-
Hexavalent chromium	0.142 mg/L	0.139 mg/L	2 (≤30)	-	-	-
Nitrate as N	12.4 mg/L	12.3 mg/L	1 (≤30)	-	-	-
Nitrite as N	0.007U mg/L	0.008 mg/L	-	0.001 (≤0.010)	-	-

Analyte	Concentration		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-147B	M-147009B				
pH	7.41 units	7.48 units	1 (≤30)	-	-	-
Sulfate	2280 mg/L	2260 mg/L	1 (≤30)	-	-	-
Surfactants	0.010 mg/L	0.009 mg/L	-	0.001 (≤0.020)	-	-
Total dissolved solids	4480 mg/L	4560 mg/L	2 (≤30)	-	-	-
Total organic carbon	1.3 mg/L	1.3 mg/L	-	0 (≤1.0)	-	-
Total phosphorus	0.020 mg/L	0.019 mg/L	-	0.001 (≤0.050)	-	-
Chlorate	4530 ug/L	4590 ug/L	1 (≤30)	-	-	-
Perchlorate	35300 ug/L	35900 ug/L	2 (≤30)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906270	EB110209-GWA3	Hexavalent chromium	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0906270	M-147B M-147009B EB110209-GWA3	Perchlorate	J+ (all detects)	P	Calibration (CCV %R) (c)
R0906270	M-147B M-147009B EB110209-GWA3	Perchlorate	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906270	M-147B M-147009B EB110209-GWA3	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 R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	EB110209-GWA3	Alkalinity, total Alkalinity, bicarbonate Chloride Total dissolved solids Sulfate	2.0U mg/L 2.0U mg/L 0.20U mg/L 10U mg/L 0.20U mg/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Equipment Blank Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	M-147B	Ammonia as N Surfactants	0.050U mg/L 0.020U mg/L	A	be
R0906270	M-147009B	Ammonia as N Surfactants	0.050U mg/L 0.020U mg/L	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Pump Blank Data Qualification Summary - SDG R0906270

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906270	M-147B	Ammonia as N	0.050U mg/L	A	bp
R0906270	M-147009B	Ammonia as N	0.050U mg/L	A	bp

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Filter Blank Data Qualification Summary - SDG R0906270

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285D6
SDG #: R0906270
Laboratory: Columbia Analytical Services

Date: 1-6-10
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), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), 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), TDS (SM2540C), TSS (SM2540D)

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: 11/2/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	MS/D
VI.	Duplicates	A	DUP
VII.	Laboratory control samples	SW	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(1,2)
XI	Field blanks	SW	EB=3, FilterBlank = FilEB092509-A2 (R0905462) Pump Blank = PB102309-A3 (R0906095)

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	M-147B	11	PBW	21		31	
2	M-147009B	12		22		32	
3	EB110209-GWA3	13		23		33	
4	EB110209-GWA3MS	14		24		34	
5	EB110209-GWA3MSD	15		25		35	
6	EB110209-GWA3DUP	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22285D6
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
1-3	Water	[✓ 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:4-6		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 #: 22285D6
SDG #: xeaac

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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:	2.186					
Parameters:	6+					
Technical holding time:	24hrs					

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
3	11/2/09 1240	11/3/09 18:30	(30hrs)				J-/UJ/R (h)

LDC #: 22285D
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

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
	11/25/09	CCV (7:49PM) (19:44)	ClO4	129 (85-115)	All	J+ det+ (P(c)

Comments:

LDC #: 22285D6
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:** All

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			3									
Alk., Total	0.8	0.8		1.2 / 2.0									
Alk., Bicarb.	0.8	0.8		1.2 / 2.0									
Cl	0.09			0.08 / 0.20									
TDS	7			9 / 10									

Conc. units: mg/L **Associated Samples:** 3

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			3									
Cl		0.085		See PB									
SO4		0.193		0.11 / 0.20									

LDC #: 22285D6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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/L

Reason Code: be

Sampling date: 11/2/09 Soil factor applied NA

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

Associated Samples: 1, 2

Analyte	Blank ID	Sample Identification								
	3	Action Level	1	2						
Total Alkalinity	1.2									
Bicarbonate Alkalinity	1.2									
Ammonia as N	0.206	2.06	0.022 / 0.050	0.031 / 0.050						
Chloride	0.08									
Conductivity (umhos/cm)	1.28	12.8								
pH (pH Units)	7.20									
TDS	9									
SO4	0.11									
Surfactants	0.008		0.010 / 0.020	0.009 / 0.020						

LDC #: 22285D6
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/L
Sampling date: 10/23/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: 1, 2

Reason Code: bp

Analyte	Blank ID	Sample Identification								
	PB102309-A3 (SDG#R0906095)	Action Level	1	2						
Total Alkalinity	1.1									
Bicarbonate Alkalinity	1.1									
Ammonia as N	2.60	26.0	0.022 / 0.050	0.031 / 0.050						
TOC (average)	0.2									
Chloride	0.9									
Conductivity (umhos/cm)	3.83	38.3								
Nitrate as Nitrogen	0.69	6.9								
pH (pH Units)	5.79									
TDS	9									
SO4	1.5									
Chlorate (ug/L)	23	230								

LDC #: 22285D6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: CR
2nd Reviewer: A

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	water	ClO4	75 (85-115)	All	J-/UJ/P (L)

Comments:

LDC#: 22285D6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [signature]

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/L)		RPD (≤30)	Difference	Limits	Qualification (Parent only)
	1	2				
Ammonia as N	0.022	0.031		0.009	(≤0.050)	
Total Alkalinity	106	108	2			
Bicarbonate Alkalinity	106	108	2			
Bromide	1.4	1.4		0	(≤1.0)	
Chloride	583	572	2			
Conductivity (umhos/cm)	5170	5150	0			
Dissolved Hexavalent Chromium	0.142	0.139	2			
Nitrate as N	12.4	12.3	1			
Nitrite as N	0.007U	0.008		0.001	(≤0.010)	
pH (pH Units)	7.41	7.48	1			
Sulfate	2280	2260	1			
Surfactants	0.010	0.009		0.001	(≤0.020)	
TDS	4480	4560	2			
TOC, Average	1.3	1.3		0	(≤1.0)	
Total Phosphorus	0.020	0.019		0.001	(≤0.050)	
Chlorate (ug/L)	4530	4590	1			
Perchlorate (ug/L)	35300	35900	2			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 5, 2009

LDC Report Date: January 13, 2010

Matrix: Soil

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-10B
SA77009-10B

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 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 Method 9045D for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, and Lloyd/Khan Method 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 Total phosphorus	10 mg/Kg 10 mg/Kg 1.1 mg/Kg 1.0 mg/Kg	All samples in SDG R0906403
ICB/CCB	Total organic carbon	116.0 mg/Kg	All samples in SDG R0906403
ICB/CCB	Chloride	0.103 mg/L	SA77-0.5B
ICB/CCB	Sulfate	0.098 mg/L	SA77-10B SA77009-10B

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
SA77-10B	Total organic carbon	290 mg/Kg	290U mg/Kg

Sample FB082809-SO (from SDG R0904894) 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
FB082809-SO	8/28/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Nitrate as N pH Total phosphorus Sulfate	1.9 mg/L 1.9 mg/L 0.033 mg/L 0.2 mg/L 1.2 mg/L 0.68 mg/L 5.88 units 0.008 mg/L 1.4 mg/L	All samples in SDG R0906403

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
SA77-0.5B	Nitrate as N	1.11 mg/Kg	1.11J+ mg/Kg
SA77-10B	Total organic carbon Nitrate as N	290 mg/Kg 1.53 mg/Kg	290U mg/Kg 1.53J+ mg/Kg
SA77009-10B	Nitrate as N	1.51 mg/Kg	1.51J+ mg/Kg

IV. 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.

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.

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 R0906403	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 SA77-10B and SA77009-10B 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
	SA77-10B	SA77009-10B				
Alkalinity, total	268 mg/Kg	376 mg/Kg	34 (≤50)	-	-	-
Alkalinity, bicarbonate	255 mg/Kg	358 mg/Kg	34 (≤50)	-	-	-
Alkalinity, carbonate	13 mg/Kg	18 mg/Kg	-	5 (≤21)	-	-
Chloride	23.3 mg/Kg	21.2 mg/Kg	9 (≤50)	-	-	-
Nitrate as N	1.53 mg/Kg	1.51 mg/Kg	-	0.02 (≤0.54)	-	-
pH	8.75 units	8.77 units	0 (≤50)	-	-	-
Sulfate	187 mg/Kg	185 mg/Kg	1 (≤50)	-	-	-
Total organic carbon	290 mg/Kg	310 mg/Kg	-	20 (≤290)	-	-
Total phosphorus	907 mg/Kg	837 mg/Kg	8 (≤50)	-	-	-
Chlorate	842 ug/Kg	982 ug/Kg	-	140 (≤220)	-	-
Perchlorate	650 ug/Kg	604 ug/Kg	-	46 (≤540)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Data Qualification Summary - SDG R0906403

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906403	SA77-0.5B SA77-10B SA77009-10B	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 R0906403

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906403	SA77-10B	Total organic carbon	290U mg/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Field Blank Data Qualification Summary - SDG R0906403

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906403	SA77-0.5B	Nitrate as N	1.11J+ mg/Kg	A	be
R0906403	SA77-10B	Total organic carbon Nitrate as N	290U mg/Kg 1.53J+ mg/Kg	A	be
R0906403	SA77009-10B	Nitrate as N	1.51J+ mg/Kg	A	be

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E6
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 1-6-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

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), 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: 11/5/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	N	Client specified
VI.	Duplicates	N	↓
VII.	Laboratory control samples	A	LCS/D
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	SW	(2,3)
XI	Field blanks	SW	FB= FB082809-SO (R0904894)

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	SA77-0.5B	11	PBS	21		31	
2	SA77-10B	12		22		32	
3	SA77009-10B	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 #: 22285E 6
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	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 #: 22285E6
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: All**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			2									
Alk., Total	10												
Alk., Bicarb.	10												
Cl	1.1												
T-P	1.0												
TOC		116.0 mg/Kg		290 / 290									

Conc. units: mg/Kg **Associated Samples: 1**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
Cl		0.103											

Conc. units: mg/Kg **Associated Samples: 2, 3**

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/Kg)			No Qualifiers									
SO4		0.098											

LDC #: 22285E6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: 8/28/09 Soil factor applied 10X except TOC 1X
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: All

Analyte	Blank ID	Sample Identification									
	FB082809-SO (SDG# R0904894)	Action Level	1	2	3						
Total alkalinity	1.9										
Bicarbonate alkalinity	1.9										
Ammonia as N	0.033										
TOC (average)	0.2			290 / 290							
Cl	1.2										
Nitrate as N	0.68	68	1.11 J+	1.53 J+	1.51 J+						
pH (pH Units)	5.88										
Total Phosphorus	0.008										
Sulfate	1.4										

LDC#: 22285E6
SDG#: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: CR
2nd Reviewer: [signature]

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	268	376	34			
Bicarbonate Alkalinity	255	358	34			
Carbonate Alkalinity	13	18		5	(≤21)	
Chloride	23.3	21.2	9			
Nitrate as N	1.53	1.51		0.02	(≤0.54)	
pH (pH Units)	8.75	8.77	0			
Sulfate	187	185	1			
TOC	290	310		20	(≤290)	
Total Phosphorus	907	837	8			
Chlorate (ug/Kg)	842	982		140	(≤220)	
Perchlorate (ug/Kg)	650	604		46	(≤540)	

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 11, 2009

LDC Report Date: January 11, 2010

Matrix: Water

Parameters: Wet Chemistry

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906477

Sample Identification

M-122B

Introduction

This data review covers 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 Method 120.1 for Conductivity, EPA SW 846 Method 9012A for Cyanide, EPA Method 218.6 for Dissolved Hexavalent Chromium, EPA Method 353.2 for Nitrite as Nitrogen, EPA SW 846 Method 9040B for pH, Standard Method 5540C for Surfactants, EPA Method 314.0 for Perchlorate, EPA Method 365.1 for Total Phosphorus, EPA SW 846 Method 9060 for Total Organic Carbon, Standard Method 2540C for Total Dissolved Solids, 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.

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
11/25/09	CCV (19:49)	Perchlorate	129 (85-115)	All samples in SDG R0906477	J+ (all 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	0.5 mg/L 0.5 mg/L	All samples in SDG R0906477
ICB/CCB	Alkalinity, total Alkalinity, bicarbonate	0.5 mg/L 0.5 mg/L	All samples in SDG R0906477

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

Sample PB102309-A3 (from SDG R0906095) was identified as a pump blank. No contaminant concentrations were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB102309-A3	10/23/09	Alkalinity, total Alkalinity, bicarbonate Ammonia as N Total organic carbon Chloride Conductivity Nitrate as N pH Total dissolved solids Sulfate Chlorate	1.1 mg/L 1.1 mg/L 2.60 mg/L 0.2 mg/L 0.9 mg/L 3.83 umhos/cm 0.69 mg/L 5.79 units 9 mg/L 1.5 mg/L 23 ug/L	All samples in SDG R0906477

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-122B	Ammonia as N	0.061 mg/L	0.061J+ mg/L

Sample FiltB092509-A2 (from SDG R0905462) was identified as a filter blank. No contaminant concentrations were found in this blank.

IV. Matrix Spike/Matrix Spike Duplicates

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

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VI. Laboratory Control Samples

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

LCS ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
LCS	Perchlorate	75 (85-115)	All samples in SDG R0906477	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.

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 R0906477	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 R0906477

SDG	Sample	Analyte	Flag	A or P	Reason (Code)
R0906477	M-122B	Perchlorate	J+ (all detects)	P	Calibration (CCV %R) (c)
R0906477	M-122B	Perchlorate	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0906477	M-122B	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 R0906477

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Pump Blank Data Qualification Summary - SDG R0906477

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
R0906477	M-122B	Ammonia as N	0.061J+ mg/L	A	bp

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Wet Chemistry - Filter Blank Data Qualification Summary - SDG R0906477

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285F6
SDG #: R0906477
Laboratory: Columbia Analytical Services

Date: 1-6-10
Page: 1 of 1
Reviewer: CR
2nd Reviewer: W

METHOD: (Analyte) Alkalinity (SM2320B), Ammonia-N (EPA Method 350.1), Bromide, Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056), Chlorate (EPA Method 300.1), Conductivity (EPA Method 120.1), Cyanide (EPA SW846 Method 9012A), Dissolved Hexavalent Chromium (EPA Method 218.6), 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), TDS (SM2540C), TSS (SM2540D)

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: 11/11/09
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	SW	
IV	Surrogate Spikes	A	
V	Matrix Spike/Matrix Spike Duplicates	A	(R0906270) MS/D
VI.	Duplicates	A	↓ DUP
VII.	Laboratory control samples	SW	LCS
VIII.	Sample result verification	N	
IX.	Overall assessment of data	A	
X.	Field duplicates	N	
XI	Field blanks	SW	FilterBlank = FiltB092509-A2 (R0905462) PumpBlank = PB102309-A3 (R0906095)

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	M-122B	11	PBW	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22285F6
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	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]
		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 #: 22285F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: [illegible]
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
	11/25/09	CCV (7:49pm)	ClO4	129 (85-115)	All	J+ det/P(c)

Comments:

LDC #: 22285F6
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/L **Associated Samples:** All

Analyte	Blank ID	Maximum ICB/CCB (mg/L)	Blank Action Limit	Sample Identification									
	PB (mg/L)			No Qualifiers									
Alk., Total	0.5	0.5											
Alk., Bicarb.	0.5	0.5											

LDC #: 22285F6
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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/L

Reason Code: bp

Sampling date: 10/23/09 Soil factor applied NA
Field blank type: (circle one) Field Blank / Rinsate / Other: Pump Blank Associated Samples: All

Analyte	Blank ID	Sample Identification								
	PB102309-A3 (SDG#R0906095)	Action Level	1							
Total Alkalinity	1.1									
Bicarbonate Alkalinity	1.1									
Ammonia as N	2.60	26.0	0.061 J+							
TOC (average)	0.2									
Chloride	0.9									
Conductivity (umhos/cm)	3.83	38.3								
Nitrate as Nitrogen	0.69	6.9								
pH (pH Units)	5.79									
TDS	9									
SO4	1.5									
Chlorate (ug/L)	23	230								

LDC #: 22285F6
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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	water	Cl04	75 (85-115)	All	J-/UJ/P (L)

Comments:

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #22285

TPH as Extractables

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: November 22 through November 26, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906056

Sample Identification

RSAQ8-10BSPLP2
RSAQ8-10BSPLP3
RSAQ8-31BSPLP2
RSAQ8-31BSPLP3
SA34-10BSPLP2
SA34-10BSPLP3
SA34-31BSPLP2
SA34-31BSPLP3

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 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.

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

All target compound identifications were within validation criteria.

VI. 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 R0906056	All compounds reported below the PQL.	J (all detects)	A

VII. System Performance

The system performance was acceptable.

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 R0906056

SDG	Sample	Compound	Flag	A or P	Reason
R0906056	RSAQ8-10BSPLP2 RSAQ8-10BSPLP3 RSAQ8-31BSPLP2 RSAQ8-31BSPLP3 SA34-10BSPLP2 SA34-10BSPLP3 SA34-31BSPLP2 SA34-31BSPLP3	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 R0906056

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 R0906056

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 22285A8
SDG #: R0906056
Laboratory: Columbia Analytical Services

Date: 12/31/09
Page: 1 of 1
Reviewer: JV6
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: 11/22 - 26/09
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	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
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	RSAQ8-10BSPLP2	11	99759-MB	21		31	
2	RSAQ8-10BSPLP3	12	100467-MB	22		32	
3	RSAQ8-31BSPLP2	13	SPLP2-Blk1	23 11/07		33	
4	RSAQ8-31BSPLP3	14	SPLP3-Blk1	24 10/28		34	
5	SA34-10BSPLP2	15	SPLP2-Blk	25 11/04		35	
6	SA34-10BSPLP3	16	SPLP3-Blk	26 11/03		36	
7	SA34-31BSPLP2	17		27		37	
8	SA34-31BSPLP3	18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22285A8
SDG #: Subway

VALIDATION FINDINGS CHECKLIST

Reviewer: JVL
2nd Reviewer: W

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20%.0 or percent recoveries 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?	✓			
Was there contamination in the method 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) 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?	✓			
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?			✓	

LDC #: 22295A8
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SM
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
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 and dry weight factors 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 #: 22285A2
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

METHOD: GC / HPLC_____

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

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/19/09	DRO	1.167 e6	1167172.6	1.158 e6	1.158 e6	3.03	3.05
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 #: 22285 AV
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

METHOD: GC (HPLC

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

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	CCV 37	11/06/09	PRO	1.158 e6	1.135 e6	1135073.5	2.0	2.0
			↓	↓				
2	CCV 39	11/16/09	↓	↓	1.092 e6	1092218.9	5.7	5.7
3								
4								

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 #: 22285 A8
SDG #: See Cover
METHOD: ✓ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
o-TPH	ZB-5	100	86.16	86	86	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 22265A8
SDG #: See Cover

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

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

METHOD: __ GC __HPLC

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

Where: SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory control sample percent recovery
SC = Concentration
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 99759 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.
Gasoline (8015)										
Diesel (8015)	503	503	319.33	350.17	64	63.5	70	70	9	9
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										

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 #: 22285A8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: DVK
2nd Reviewer: [signature]

METHOD: ✓ GC ___ HPLC

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 within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID._____ Compound Name ND

Concentration =_____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	October 22 through October 23, 2009
LDC Report Date:	January 8, 2010
Matrix:	Soil/Water
Parameters:	Total Petroleum Hydrocarbons as Extractables
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906081

Sample Identification

EB102209-SO1A3
SA112-0.5B
SA112-10B
SA112-20B
SA112-34B
RSAQ8-0.5B
RSAQ8-10B
RSAQ8-22B
RSAQ8-31B
RSAQ8-34B
SA132-0.5B
SA132-10B
SA132009-10B
SA132-20B
SA132-34B
RSAR8-0.5B
RSAR8-10B
RSAR8-20B
RSAR8-34B
RSAP8-0.5B
RSAP8-10B
RSAP8-25B
RSAP8-40B
SA112-0.5BMS
SA112-0.5BMSD
RSAR8-34BMS
RSAR8-34BMSD

Introduction

This data review covers 26 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 EB102209-SO1A3 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

Sample FB082809-SO (from SDG R0904894) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO	8/28/09	Diesel range organics	110 ug/L	All soil samples in SDG R0906081

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

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 R0906081	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 SA132-10B and SA132009-10B 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 R0906081

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906081	EB102209-SO1A3 SA112-0.5B SA112-10B SA112-20B SA112-34B RSAQ8-0.5B RSAQ8-10B RSAQ8-22B RSAQ8-31B RSAQ8-34B SA132-0.5B SA132-10B SA132009-10B SA132-20B SA132-34B RSAR8-0.5B RSAR8-10B RSAR8-20B RSAR8-34B RSAP8-0.5B RSAP8-10B RSAP8-25B RSAP8-40B	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 R0906081

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 R0906081

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 R0906081

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285B8
SDG #: R0906081
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: VV
2nd Reviewer: W

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: 10/22-23/09
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 = 12, 13
X.	Field blanks	SW	*EB = 1 FB = FB182809-SO (R0904894)

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	EB102209-SO1A3 W	11	SA132-0.5B S	21	RSAP8-10B S	31	1	99053-MB	
2	SA112-0.5B S	12	SA132-10B D	22	RSAP8-25B	32	2	99295-	
3	SA112-10B	13	SA132009-10B D	23	RSAP8-40B	33	3	99299-	
4	SA112-20B	14	SA132-20B	24	SA112-0.5BMS	34			
5	SA112-34B	15	SA132-34B	25	SA112-0.5BMSD	35			
6	RSAQ8-0.5B	16	RSAR8-0.5B	26	RSAR8-34BMS	36			
7	RSAQ8-10B	17	RSAR8-10B	27	RSAR8-34BMSD	37			
8	RSAQ8-22B	18	RSAR8-20B	28		38			
9	RSAQ8-31B	19	RSAR8-34B	29		39			
10	RSAQ8-34B	20	RSAP8-0.5B	30		40			

Notes: _____

LDC #: 22285B8
SDG #: Ivy Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JVG
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: 8/28/09
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							
	FB082809-SO									
DRO	110		(All results either ND or > FB)							
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: October 28, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906191

Sample Identification

RSAS8-0.5B
RSAS8-10B
RSAS8-25B
RSAS8-35B
RSAS8-35BMS
RSAS8-35BMSD

Introduction

This data review covers 6 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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 FB082809-SO (from SDG R0904894) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO	8/28/09	Diesel range organics	110 ug/L	All samples in SDG R0906191

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

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 R0906191	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 R0906191

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906191	RSAS8-0.5B RSAS8-10B RSAS8-25B RSAS8-35B	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 R0906191

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 R0906191

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285C8
SDG #: R0906191
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: JM
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: 10/28/09
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	N	
X.	Field blanks	SW	FB = FB082809-50 (R0904894)

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	RSAS8-0.5B	11	99786-MB	21		31	
2	RSAS8-10B	12		22		32	
3	RSAS8-25B	13		23		33	
4	RSAS8-35B	14		24		34	
5	RSAS8-35BMS	15		25		35	
6	RSAS8-35BMSD	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22285 C8
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: [illegible]

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: 8/28/09

Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:

Associated Samples: All (ND)

Compound	Blank ID	Blank ID	Sample Identification							
	FB082809-SO									
DRO	110									
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: November 5, 2009

LDC Report Date: January 8, 2010

Matrix: Soil

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0906403

Sample Identification

SA77-0.5B
SA77-10B
SA77009-10B
SA77-0.5BMS
SA77-0.5BMSD

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 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 FB082809-SO (from SDG R0904894) was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB082809-SO	8/28/09	Diesel range organics	110 ug/L	All samples in SDG R0906403

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

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 R0906403	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 SA77-10B and SA77009-10B 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 R0906403

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0906403	SA77-0.5B SA77-10B SA77009-10B	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 R0906403

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 R0906403

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 22285E8
SDG #: R0906403
Laboratory: Columbia Analytical Services

Date: 12/29/09
Page: 1 of 1
Reviewer: SVL
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: 11/05/09
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	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 = 2,3
X.	Field blanks	SW	FB = FB082809-SO (R0904894)

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	SA77-0.5B	11		21		31	
2	SA77-10B D	12		22		32	
3	SA77009-10B D	13		23		33	
4	SA77-0.5BMS	14		24		34	
5	SA77-0.5BMSD	15		25		35	
6	100483-MB	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 22285 E8
SDG #: Sulphur

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JM
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: 8/28/09
Field blank type: (circle one) Field Blank / Trip Blank / Atmospheric Blank / Ambient Blank
Rinsate / Equipment Rinsate / Equipment Blank / Source Blank / Other:

Associated Samples: All (ND)

Compound	Blank ID	Blank ID	Sample Identification							
	FB082809-SO									
DRO	110									
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".