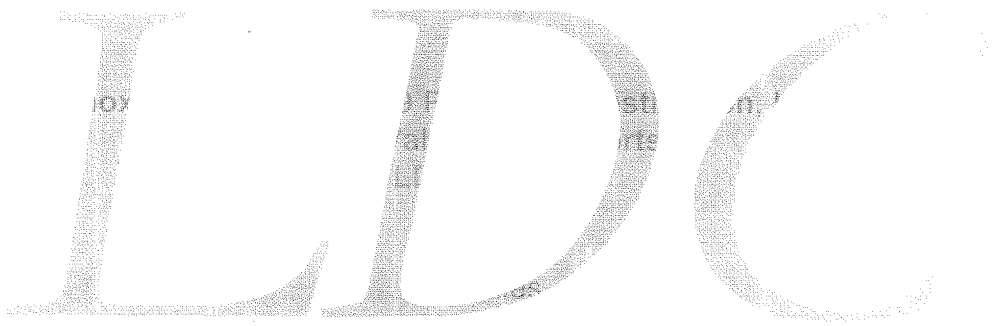
Tronox LLC Facility, 2009 Phase B Investigation, Henderson
Data Validation Reports
LDC #21495

Volatiles



Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: May 27 through June 4, 2009

LDC Report Date: September 30, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903006

Sample Identification

MC-3B
EB052709
TB052709-GW1
M-127B
M-127BDL
TB052809-GW1
FB060409
TB060409

Introduction

This data review covers 8 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.

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
5/6/09	2-Methyl-2-propanol	0.021 (≥0.05)	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 156849MB	J (all detects) UJ (all non-detects)	A
6/12/09	2-Methyl-2-propanol	0.018 (≥0.05)	FB060409 TB060409 157676MB	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
7/9/09	Bromomethane	33.5	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 156849MB	J- (all detects) UJ (all non-detects)	A
7/9/09	Di-isopropyl ether	27.9	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 156849MB	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
7/9/09	2-Methyl-2-propanol	0.023 (≥0.05)	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 156849MB	J (all detects) UJ (all non-detects)	A
6/15/09	2-Methyl-2-propanol	0.015 (≥0.05)	FB060409 TB060409 157676MB	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.

Samples TB060407 (from SDG R0903051), TB052709-GW1, and TB052809-GW1 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
TB060409	6/4/09	Acetone Dichloromethane Toluene	2.8 ug/L 0.29 ug/L 0.29 ug/L	FB060409

Sample EB052709 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
EB052709	5/27/09	Acetone Dichloromethane Toluene	7.3 ug/L 7.3 ug/L 0.25 ug/L	MC-3B

Sample FB060409 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
FB060409	6/4/09	Acetone Dichloromethane Toluene	2.1 ug/L 3.2 ug/L 1.7 ug/L	MC-3B M-127B M-127BDL

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
FB060409	Acetone	2.1 ug/L	2.1U ug/L

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 with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
156849LCS	Bromomethane Dichlorodifluoromethane Hexachlorobutadiene	71 (75-125) 72 (75-125) 73 (75-125)	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 156849MB	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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-127B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903006	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

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
M-127B	Chloroform	X	A
M-127BDL	All TCL compounds except Chloroform	X	A

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 R0903006

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 FB060409 TB060409	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1	Bromomethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1	Di-isopropyl ether	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 FB060409 TB060409	2-Methyl-2-propanol	J- (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1	Bromomethane Dichlorodifluoromethane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903006	M-127B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0903006	MC-3B EB052709 TB052709-GW1 M-127B M-127BDL TB052809-GW1 FB060409	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903006	M-127B	Chloroform	X	A	Overall assessment of data (o)
R0903006	M-127BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903006

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903006

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903006	FB060409	Acetone	2.1U ug/L	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21495B1
SDG #: R0903006
Laboratory: Columbia Analytical Services

Date: 9/16/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/27-28/09, 6/04/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD, r^2
IV.	Continuing calibration ~~/ICV~~	SW	CCV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	EB = 2 FB = 7 TB = 3, 6, ~~FB060407 from R0903051~~

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	MC-3B	11	156849 MB	21		31	
+ 2	EB052709	12	157676	22		32	
3	TB052709-GW1	13		23		33	
+ 4	M-127B	14		24		34	
+ 5	M-127BDL	15		25		35	
6	TB052809-GW1	16		26		36	
+ 7	2 FB060409	17		27		37	
+ 8	TB060409	18		28		38	
9		19		29		39	
10		20		30		40	

(no CCV)

LDC #: 21495 B7
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: SW
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 #: 31495 B1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: VV
2nd Reviewer:

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 #: 21495 B1
SDG #: Sq Cmpd

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	5/06/09	ICAL	NNNN		0.021	1-6, 150849 MB	J/UJ/A (C)
	6/12/09	ICAL	NNNN		0.018	7,8, 157676 MB	(C)

INICAL.1SB

LDC #: 21495 B1
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
	7/09/09	B8663	B (-)	33.5		1-6, 156849 MB	J-/UJ/A (c)
			XXX (+)	27.9			J+ Acts/A
			NNNN		0.023		J/UJ/A
	6/15/09	F0303	NNNN		0.015	7, 8, 157676 MB	J/UJ/A

CONCAL.1SB

LDC #: 21495 B1
SDG #: See Cover

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:_____ **Associated sample units:**_____

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

Compound	Blank ID (TB060409)	Blank ID 8	Sample Identification							
Sampling Date	6/04/09		7							
~~Methylene chloride~~ F	2.8		2.1 U							
~~Acetone~~ E	0.29		(3.2)							
~~Chloroform~~ CC	0.29		(1.7)							
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										
Methylene chloride										
Acetone										
Chloroform										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 21495 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

Compound	Blank ID 2	Blank ID	Sample Identification							
Sampling Date	5/27/09									
F	7.3									
E	7.3									
CC	0.25									

Blank units: ug/L **Associated sample units:** NA
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: blanks 1, 4, 5

Compound	Blank ID 7	Blank ID	Sample Identification							
Sampling Date	6/04/09		4	5						
F	2.1									
E	3.2		(3000)	(2700)						
CC	1.7									

LDC #: 21495B1
SDG #: Su Coray

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVE
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		156849 LCS	B	71 (75-125)	( )	( )	1-6, 156849 MB	J-/UJ/P (L)
			JJ	72 (↓)	( )	( )	↓	↓
			LLL	73 (↓)	( )	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: JG
2nd Reviewer: Q

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		4	K > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: [illegible]
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
		4	K > cal range		X / A (Co)
		5	All except K dil		↓ / ↓

Comments: _____

OVR.1SB

LDC #: 21495B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	5/06/09	C (1st internal standard)	0.409	0.409	0.420	0.420	7.4	7.4
			S (2nd internal standard)	0.258	0.257	0.269	0.269	7.7	7.7
	MS10		AA (3rd internal standard)	0.250	0.250	0.264	0.264	7.9	7.9
			BB (4th internal standard)	0.471	0.471	0.480	0.480	5.0	5.0
2	ICAL	6/12/09 5/28/09	C (1st internal standard)	0.532	0.532	0.541	0.541	9.1	9.1
			S (2nd internal standard)	0.274	0.274	0.284	0.284	5.8	5.8
			AA (3rd internal standard)	0.308	0.308	0.307	0.307	4.9	4.97
			BB (4th internal standard)	0.477	0.477	0.522	0.522	7.7	7.7
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th 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 #: 21495B1
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: d

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	B8663	7/09/09	C (1st internal standard)	0.420	0.483	0.483	15.0	15.0
			S (2nd internal standard)	0.269	0.275	0.275	2.2	2.2
			AA (3rd internal standard)	0.264	0.255	0.255	3.4	3.3
			BB (4th internal standard)	0.480	0.481	0.481	0.2	0.2
2	F0303	6/15/09	C (1st internal standard)	0.571	0.490	0.490	9.4	9.5
			S (2nd internal standard)	0.284	0.275	0.275	3.2	3.2
			AA (3rd internal standard)	0.307	0.323	0.323	5.2	5.2
			BB (4th internal standard)	0.522	0.430	0.430	17.6	17.7
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th 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 #: 21495 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: [illegible]

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: See #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	53.74	107	107	0
Bromofluorobenzene		50.29	101	101	
1,2-Dichloroethane-d4					
Dibromofluoromethane		48.15	96	96	

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 #: 21495B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVR
2nd Reviewer: CP

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: 156849 LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	20.0	NA	19.0	NA	95	95				
Trichloroethene	↓	↓	16.8	↓	84	84				
Benzene			18.3		91	91				
Toluene			17.8		89	89				
Chlorobenzene			18.2		91	91				

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 #: 21495 B)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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. 5 , K:

Conc. = $\frac{(1055622)(50)(100)}{(817558)(0.71\checkmark)(\quad)(\quad)}$

= 9067.3

≈ 9100 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: June 1 through June 4, 2009

LDC Report Date: September 30, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903051

Sample Identification

RSA12-0.5B
TB060109-001
RSAI3-0.5B
TB060209-SO1
RSAJ5-0.5B
RSAK5-0.5B
SA76-0.5B
SA76009-0.5B
TB060309-SO1
TB060309-SO2
RSAL3-0.5B
SA100-0.5B
RSAM3-0.5B
RSAM2-0.5B
SA189-0.5B
SA88-0.5B
TB060409-SO1
SA152-0.5B
SA152009-0.5B
RSAJ2-0.5B
RSAJ3-0.5B
SA202-0.5B

Introduction

This data review covers 17 soil samples and 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

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
6/12/09	2-Methyl-2-propanol	0.018 (≥0.05)	TB060109-001 157676MB	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
6/10/09	1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane n-Propylbenzene Bromobenzene 1,3,5-Trimethylbenzene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene p-Isopropyltoluene 1,3-Dichlorobenzene n-Butylbenzene 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	28.8 35.8 30.8 28.0 31.5 32.5 29.1 32.5 32.3 27.6 31.2 30.5 29.3 42.9 30.0 31.5	RSA12-0.5B RSAI3-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B 157075MB	J- (all detects) UJ (all non-detects)	A
6/11/09	Dichlorodifluoromethane	25.7	RSAJ5-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B 157212MB	J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/15/09	2-Methyl-2-propanol	0.015 (≥0.05)	TB060109-001 157676MB	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.

Samples TB060109-001, TB060209-SO1, TB060309-SO1, TB060309-SO2, and TB060409-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
TB060109-001	6/1/09	Acetone	3.2 ug/L	RSA12-0.5B
TB060309-SO1	6/3/09	Dichloromethane	0.27 ug/L	SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B
TB060309-SO2	6/3/09	Dichloromethane	0.35 ug/L	SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B
TB060409-SO1	6/4/09	Dichloromethane	0.46 ug/L	SA189-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	All soil samples in SDG R0903051

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
RSAJ3-0.5B	Dichloromethane	0.85 ug/Kg	0.85U ug/Kg
SA202-0.5B	Dichloromethane Acetone	0.60 ug/Kg 2.8 ug/Kg	0.60U ug/Kg 2.8U ug/Kg
RSAK5-0.5B	Acetone	5.9 ug/Kg	5.9U ug/Kg
RSAL3-0.5B	Acetone	7.2 ug/Kg	7.2U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA189-0.5B	Acetone	7.1 ug/Kg	7.1U ug/Kg
SA88-0.5B	Acetone	4.1 ug/Kg	4.1U ug/Kg
SA152009-0.5B	Acetone	5.1 ug/Kg	5.1U ug/Kg
RSAJ2-0.5B	Acetone	6.3 ug/Kg	6.3U 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

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 R0903051	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 SA76-0.5B and SA76009-0.5B and samples SA152-0.5B and SA152009-0.5B 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
	SA76-0.5B	SA76009-0.5B				
Acetone	15	7.8	-	7.2 (≤24)	-	-
Dichloromethane	2.9	1.7	-	1.2 (≤5.9)	-	-
Toluene	1.1	0.94	-	0.16 (≤5.9)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA152-0.5B	SA152009-0.5B				
Acetone	9.8	5.1	-	4.7 (≤19)	-	-
Dichloromethane	3.9	2.2	-	1.7 (≤4.9)	-	-
Toluene	1.2	1.0	-	0.2 (≤4.9)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903051

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903051	TB060109-001	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903051	RSA12-0.5B RSAI3-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B	1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane n-Propylbenzene Bromobenzene 1,3,5-Trimethylbenzene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene p-Isopropyltoluene 1,3-Dichlorobenzene n-Butylbenzene 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903051	RSAJ5-0.5B SA88-0.5B SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903051	TB060109-001	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903051	RSA12-0.5B TB060109-001 RSAI3-0.5B TB060209-SO1 RSAJ5-0.5B RSAK5-0.5B SA76-0.5B SA76009-0.5B TB060309-SO1 TB060309-SO2 RSAL3-0.5B SA100-0.5B RSAM3-0.5B RSAM2-0.5B SA189-0.5B SA88-0.5B TB060409-SO1 SA152-0.5B SA152009-0.5B RSAJ2-0.5B RSAJ3-0.5B SA202-0.5B	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 R0903051

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903051

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903051	RSAJ3-0.5B	Dichloromethane	0.85U ug/Kg	A	bt
R0903051	SA202-0.5B	Dichloromethane	0.60U ug/Kg	A	bt
R0903051	SA202-0.5B	Acetone	2.8U ug/Kg	A	bf
R0903051	RSAK5-0.5B	Acetone	5.9U ug/Kg	A	bt
R0903051	RSAL3-0.5B	Acetone	7.2U ug/Kg	A	bt
R0903051	SA189-0.5B	Acetone	7.1U ug/Kg	A	bt
R0903051	SA88-0.5B	Acetone	4.1U ug/Kg	A	bt
R0903051	SA152009-0.5B	Acetone	5.1U ug/Kg	A	bt
R0903051	RSAJ2-0.5B	Acetone	6.3U ug/Kg	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495C1
SDG #: R0903051
Laboratory: Columbia Analytical Services

Date: 9/16/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: Q

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: 6/01-04/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r²
IV.	Continuing calibration ~~ICV~~	SW	CCV ≤ 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 7, 8 D_2 = 18, 19
XVII.	Field blanks	SW	TB = 2, 4, 9, 10, 17, 24 ~~FB = 23~~ ~~RB = 24~~ FB = FB072109-SO from R0907016

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

Validated Samples: soil + Water

1	1	RSA12-0.5B	S	11	1	RSAL3-0.5B	S	21	4	RSAJ3-0.5B	S	31	1	157075 MB
2	1	TB060109-001	W	12	1	SA100-0.5B		22	4	SA202-0.5B		32	1	157676
3	1	RSAI3-0.5B	S	13	1	RSAM3-0.5B		~~23~~	~~1~~	~~FB060409~~	W	33	3	157447
4	3	TB060209-SO1	W	14	1	RSAM2-0.5B		~~24~~	~~1~~	~~RB060409~~		34	4	157212
5	4	RSAJ5-0.5B	S	15	1	SA189-0.5B		25				35		
6	1	RSAK5-0.5B		16	1	SA88-0.5B		26				36		
7	1	SA76-0.5B	D_1	17	3	TB060409-SO1	W	27				37		
8	1	SA76009-0.5B	D_1	18	4	SA152-0.5B	D_2 S	28				38		
9	3	TB060309-SO1	W	19	4	SA152009-0.5B	D_2	29				39		
10	3	TB060309-SO2		20	4	RSAJ2-0.5B		30				40		

(no ICV) (FB060409 → reported on R0903006 TB060409)

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 #: 21495C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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
	6/12/09	ICAL	NNNN		0.018	2, ~~23, 24~~, 157676MB	J/UJ/A (c)

LDC #: 21495C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of ___
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 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
	6/10/09	M8729	BB (-)	28.8		1, 3, 6-8, 11-15, 157075 MB	J-/UJ/A (c)
			XX (-)	35.8			
			YY (-)	30.8			
			WW (-)	28.0			
			AAA (-)	31.5			
			CCC (-)	32.5			
			DDD (-)	29.1			
			EEE (-)	32.5			
			GGG (-)	32.3			
			FFF (-)	27.6			
			III (-)	31.2			
			MMM (-)	30.5			
			KKK (-)	29.3			
			LLL (-)	42.9			
			MMM (-)	30.0			
			NNN (-)	31.5			
	6/11/09	M8750	JJ (+)	25.7		6, 16, 18, 19-22, 157218 MB	J+ detB/A
	6/15/09	F0303	NNNN		0.015	2, 157676 MB	J/UJ/A

CONCAL.1SB

LDC #: 21495C1
SDG #: See Cover

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: 1 (ND)

Compound	Blank ID 2	Blank ID	Sample Identification							
Sampling Date	6/01/09									
~~Methylene chloride~~ F	3.2									
Acetone										
Chloroform										
CRQL										

Blank units: ug/L **Associated sample units:** ug/Kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 7, 8, 11-14

Compound	Blank ID 9	Blank ID 10	Sample Identification							
Sampling Date	6/03/09 →		7	8	11	12	13	14		
(2x) 0.7 Dichloromethane (E) ~~Methylene chloride~~	0.27	0.35	(2.9)	(1.7)	(0.85)	(1.4)	(3.2)	(1.0)		
Acetone										
Chloroform										
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 21495C1
SDG #: See Cover

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: 15, 16, and 18 - 22

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	6/04/09		15	16	18	19	20	21	22	
~~Methylene chloride~~ Dichloromethane (E) (2X (0.92))	0.46		2.1	1.3	3.9	2.2	1.4	0.85 U	0.60 U	
Acetone										
Chloroform										
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: ~~23~~ None

Compound	Blank ID 24	Blank ID	Sample Identification							
Sampling Date	6/04/09		~~23~~							
~~Methylene chloride~~ F	2.8		2.1 U							
~~Acetone~~ E	0.29		3.2							
~~Chloroform~~ EE	0.29		1.7							
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 21495C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: [illegible]

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

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

Blank units: ug/L **Associated sample units:** NA
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: None

Compound	Blank ID 23	Blank ID	Sample Identification							
Sampling Date	6/04/09									
E	3.2									
F	2.1									
CC	1.7									

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

Compound	Blank ID FB072109-SO	Blank ID	Sample Identification							
Sampling Date	7/21/09		6	11	15	16	19	20	22	
7.4 F	3.7		5.9 J	7.2 J	7.1 J	4.4 J	5.1 J	6.3 J	2.8 J	
0.56 X	0.28									
			(All others either ND or > MB)							

LDC #: 21495 C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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
	7	8	
F	15	7.8	7.2 (≤ 24 Diff)
E	2.9	1.7	1.2 (≤ 5.9 Diff)
CC	1.1	0.94	0.16

Compound	Concentration (ug/kg)		RPD
	18	19	
F	9.8	5.1	4.7 (≤ 19 Diff)
E	3.9	2.2	1.7 (≤ 4.9 Diff)
CC	1.2	1.0	0.2

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: June 9 through June 16, 2009

LDC Report Date: October 5, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903243

Sample Identification

H-28AB
TB060909-GW1
AW-BW-02B
TB061009-GW1
M-142B
TB061209-GW1
M-130B
M-130BDL
TB061509-GW
M-29B
TB061609-GW1

Introduction

This data review covers 11 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	All samples in SDG R0903243	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
6/22/09	2-Methyl-2-propanol	0.029 (≥0.05)	TB060909-GW1 TB061009-GW1 M-142B TB061209-GW1 M-130B TB061509-GW 158621MB	J (all detects) UJ (all non-detects)	A
6/23/09	2-Methyl-2-propanol	0.024 (≥0.05)	H-28AB AW-BW-02B M-130BDL TB061609-GW1 158836MB	J (all detects) UJ (all non-detects)	A
6/24/09	2-Methyl-2-propanol	0.022 (≥0.05)	M-29B 159019MB	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.

Samples TB060909-GW1, TB061009-GW1, TB061209-GW1, TB061509-GW, and TB061609-GW1 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
TB060909-GW1	6/9/09	Methylene chloride	0.30 ug/L	H-28AB
TB061009-GW1	6/10/09	Acetone	1.9 ug/L	AW-BW-02B
TB061209-GW1	6/12/09	Acetone	1.7 ug/L	M-142B
TB061509-GW	6/15/09	2-Methyl-2-propanol Acetone Methylene chloride	1.7 ug/L 3.3 ug/L 0.29 ug/L	M-130B M-130BDL

Sample FB060409-SO (from SDG R0903006) 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
FB060409-SO	6/4/09	Acetone Methylene chloride Toluene	2.1 ug/L 3.2 ug/L 1.7 ug/L	H-28AB AW-BW-02B M-142B M-130B M-130BDL

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
M-142B	Acetone	2.3 ug/L	2.3U ug/L
M-130B	Methylene chloride	0.20 ug/L	0.20U ug/L
M-130BDL	Acetone	4.7 ug/L	4.7U ug/L

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 project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-130B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903243	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
M-130B	Chloroform	X	A
M-130BDL	All TCL compounds except Chloroform	X	A

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 R0903243

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903243	H-28AB TB060909-GW1 AW-BW-02B TB061009-GW1 M-142B TB061209-GW1 M-130B M-130BDL TB061509-GW M-29B TB061609-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903243	TB060909-GW1 TB061009-GW1 M-142B TB061209-GW1 M-130B TB061509-GW H-28AB AW-BW-02B M-130BDL TB061609-GW1 M-29B	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903243	M-130B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0903243	H-28AB TB060909-GW1 AW-BW-02B TB061009-GW1 M-142B TB061209-GW1 M-130B M-130BDL TB061509-GW M-29B TB061609-GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903243	M-130B	Chloroform	X	A	Overall assessment of data (o)
R0903243	M-130BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903243

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903243

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903243	M-142B	Acetone	2.3U ug/L	A	bt, bf
R0903243	M-130B	Methylene chloride	0.20U ug/L	A	bt, bf
R0903243	M-130BDL	Acetone	4.7U ug/L	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495D1
SDG #: R0903243
Laboratory: Columbia Analytical Services

Date: 10/05/09
Page: 1 of 1
Reviewer: JW
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: 6/09 - 16/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r
IV.	Continuing calibration/ICV	SW	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 2, 4, 6, 9 FB = FB060409-50 (R0903006)

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

Validated Samples: All water

1	H-28AB	11	TB061609-GW1	21	158621 MB	31	
2	TB060909-GW1	12		22	158836	32	
3	AW-BW-02B	13		23	159019	33	
4	TB061009-GW1	14		24		34	
5	M-142B	15		25		35	
6	TB061209-GW1	16		26		36	
7	M-130B	17		27		37	
8	M-130BDL	18		28		38	
9	TB061509-GW	19		29		39	
10	M-29B	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 #: 21495D1
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? r² ≥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
	6/18/09	NNNN			0.026	All + Blks	J/UJ/A (c)

LDC #: 21495 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 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
	6/22/09	B8922	NNNN		0.029	2, 4-7, 9, 158621 MB	J/UJ/A (C)
	6/23/09	B8951	NNNN		0.024	1, 3, 8, 11, 158836 MB	
	6/24/09	B8974	NNNN		0.022	10, 159019 MB	

CONCAL.1SB

LDC #: 21495D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVB
2nd Reviewer:

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

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

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

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

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

Compound	Blank ID 1	Blank ID	Sample Identification								
Sampling Date	6/09/09										
E	0.30										

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

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 3

Compound	Blank ID 4	Blank ID	Sample Identification								
Sampling Date	6/10/09										
F	1.9		(Result > TB)								

LDC #: 21495D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
(Y) N /N/A Were field blanks identified in this SDG?
(Y) N N/A Were target compounds detected in the field blanks?
Blank units: ug/L **Associated sample units:** ~~ug/kg~~ ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 5

Compound	Blank ID 6	Blank ID	Sample Identification							
Sampling Date	6/12/09		5							
F	1.7		2.3/U							

Blank units: ug/L **Associated sample units:** ~~ug/kg~~ ug/L
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 7, 8

Compound	Blank ID 9	Blank ID	Sample Identification							
Sampling Date	6/15/09		7	8						
NNNN	1.7									
F	3.3			4.7/U						
E	0.29		0.20/U							

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: ______ Associated Samples: 1, 3, 5, 7, 8

Compound	Blank ID FB060409-SD	Blank ID	Sample Identification							
Sampling Date	6/04/09		5	7						
F	2.1		2.3/U							
E	3.2			0.20/U						
CC	1.7									
			(All others either ND or > FB)							

Blank units: ______ **Associated sample units:** ______

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 21495 D7
SDG #: Cal Curve

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: SVB
2nd Reviewer: _____

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		7	K > cal range		J dets / A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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	K > cal range		X /A (o)
					↓ ↓
		8	All except K	dil	

Comments: ____

OVR.1SB

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 17 through June 24, 2009

LDC Report Date: September 28, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-78B
M-78BDL
TB061709-GW1
M-128B
TB061809-GW1
H-38B
M-19B
M-19BDL
TB061909-GW1
M-34B
M-34BDL
M-125B
TB062309-GW1
M-22AB
M-22ABDL
TB062409-GW1
M-17AB
M-17ABDL
M-125BMS
M-125BMSD

Introduction

This data review covers 20 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
TB061709-GW1	All aromatic compounds	9	7	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. 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	All samples in SDG R0903404	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
6/25/09	2-Methyl-2-propanol	0.025 (≥0.05)	M-78B TB061709-GW1 M-128B TB061809-GW1 H-38B M-19B TB061909-GW1 M-34B TB062309-GW1 159353MB	J (all detects) UJ (all non-detects)	A
6/30/09	2-Methyl-2-propanol	0.027 (≥0.05)	M-78BDL M-19BDL M-34BDL M-125B M-22AB M-22ABDL TB062409-GW1 M-17AB M-17ABDL M-125BMS M-125BMSD 159620MB	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.

Samples TB061709-GW1, TB061809-GW1, TB061909-GW1, TB062309-GW1, and TB062409-GW1 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
TB061709-GW1	6/17/09	2-Methyl-2-propanol	1.6 ug/L	M-78B M-78BDL
TB061809-GW1	6/18/09	Dichloromethane Toluene	0.38 ug/L 0.23 ug/L	M-128B H-38B
TB061909-GW1	6/19/09	Dichloromethane	0.24 ug/L	M-19B M-19BDL M-34B
TB062309-GW1	6/23/09	Dichloromethane	0.28 ug/L	M-125B
TB062409-GW1	6/24/09	2-Methyl-2-propanol Dichloromethane	2.0 ug/L 0.24 ug/L	M-22AB M-22ABDL M-17AB M-17ABDL

Sample FB060409 (from SDG R0903006) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB060409	6/4/09	Acetone Dichloromethane Toluene	2.1 ug/L 3.2 ug/L 1.7 ug/L	M-78B M-78BDL M-128B H-38B M-125B

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
M-19B	Dichloromethane	0.29 ug/L	0.29U ug/L
M-34B	Dichloromethane	0.26 ug/L	0.26U ug/L
M-78B	Acetone	2.1 ug/L	2.1U ug/L
M-128B	Acetone	3.1 ug/L	3.1U ug/L

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recoveries (%R) were not within QC limits for some compounds, the MS or MSD percent recoveries (%R) were 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 project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-78B M-19B M-34B M-22AB M-17AB	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903404	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
M-78B M-19B M-34B M-22AB M-17AB	Chloroform	X	A
M-78BDL M-19BDL M-34BDL M-22ABDL M-17ABDL	All TCL compounds except Chloroform	X	A

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 R0903404

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903404	TB061709-GW1	Benzene Toluene Chlorobenzene Ethylbenzene Styrene Isopropylbenzene Bromobenzene 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 Naphthalene 1,2,3-Trichlorobenzene m,p-Xylenes o-Xylene	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903404	M-78B M-78BDL TB061709-GW1 M-128B TB061809-GW1 H-38B M-19B M-19BDL TB061909-GW1 M-34B M-34BDL M-125B TB062309-GW1 M-22AB M-22ABDL TB062409-GW1 M-17AB M-17ABDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903404	M-78B M-78BDL TB061709-GW1 M-128B TB061809-GW1 H-38B M-19B M-19BDL TB061909-GW1 M-34B M-34BDL M-125B TB062309-GW1 M-22AB M-22ABDL TB062409-GW1 M-17AB M-17ABDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903404	M-78B M-19B M-34B M-22AB M-17AB	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0903404	M-78B M-78BDL TB061709-GW1 M-128B TB061809-GW1 H-38B M-19B M-19BDL TB061909-GW1 M-34B M-34BDL M-125B TB062309-GW1 M-22AB M-22ABDL TB062409-GW1 M-17AB M-17ABDL	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903404	M-78B M-19B M-34B M-22AB M-17AB	Chloroform	X	A	Overall assessment of data (o)
R0903404	M-78BDL M-19BDL M-34BDL M-22ABDL M-17ABDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903404

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903404

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903404	M-19B	Dichloromethane	0.29U ug/L	A	bt
R0903404	M-34B	Dichloromethane	0.26U ug/L	A	bt
R0903404	M-78B	Acetone	2.1U ug/L	A	bf
R0903404	M-128B	Acetone	3.1U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495E1
SDG #: R0903404
Laboratory: Columbia Analytical Services

Date: 9/17/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer: 9

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	SW	Sampling dates: 6/17 - 24/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD r²
IV.	Continuing calibration ~~ICV~~	SW	%D ≤ 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	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 3, 5, 9, 13, 16 FB = FB060409 from R0903006

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-78B	11	M-34BDL	21	159353 MB	31	
2	M-78BDL	12	M-125B	22	159620 MB	32	
3	TB061709-GW1	13	TB062309-GW1	23		33	
4	M-128B	14	M-22AB	24		34	
5	TB061809-GW1	15	M-22ABDL	25		35	
6	H-38B	16	TB062409-GW1	26		36	
7	M-19B	17	M-17AB	27		37	
8	M-19BDL	18	M-17ABDL	28		38	
9	TB061909-GW1	19	M-125BMS	29		39	
10	M-34B	20	M-125BMSD	30		40	

(no ICV)

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.

Aromatics

LDC #: 21945 E1
SDG #: Sy Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: VC
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/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
3	W	N (pH = 5)	6/17/09	—	6/26/09	9 (Aromatics only)	J-/UJ/R (h)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Both within 14 days of sample collection.
Soil:	Both within 14 days of sample collection.

LDC #: 21495E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: SVG
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 20.99
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
	6/18/09	ICAL	NNNN		0.026	All + Blks	J/nJ/A (c)

INICAL.1SB

LDC #: 21495 E1
SDG #: Sy Cmpd

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: 9

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
	6/25/09	B9023	NNNN		0.025	1, 3-7, 9, 10, 13, 159353 MB	J/UJ/A (c)
	6/30/09	B9089	NNNN		0.027	2, 8, 11, 12, 14-20, 159620 MB	

LDC #: 21495 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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: _____ Associated Samples: 1, 2

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	6/17/09		1	2						
3.5 NNNN	1.6		(4.3)	(6.3)						
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 4, 6 ~~(MD)~~ 7

Compound	Blank ID 5	Blank ID	Sample Identification							
Sampling Date	6/18/09		6							
E	0.38		(300)							
CC	0.23									
CRQL										

LDC #: 21495F1
SDG #: Lu Creek

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/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 7, 8, 10 (bt)

Compound	Blank ID 9	Blank ID	Sample Identification							
Sampling Date	6/19/09		7	10						
E	0.24		0.29/U	0.26/U						
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 12 (ND)

Compound	Blank ID 13	Blank ID	Sample Identification							
Sampling Date	6/23/09									
E	0.28									
CRQL										

LDC #: 21495 E1
SDG #: [illegible]

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/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 14, 15, 17, 18 (ND)

Compound	Blank ID 16	Blank ID	Sample Identification							
Sampling Date	6/24/09									
NNNN	2.0									
E	0.24									
CRQL										

Blank units: ug/L **Associated ~~sample~~ units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1, 2, 4, 6, 12 (6 f)

Compound	FB060409 Blank ID	Blank ID	Sample Identification							
Sampling Date	6/04/09		1	4						
F	2.1		2.1/U	3.1/U						
E	3.2									
CC	1.7									
			(All others either ND or > ~~[illegible]~~ FB)							
CRQL										

2x
4.2
6.4
3.4

LDC #: 21495 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		19/20	DD	( )	65 (70-130)	( )	12	No qual (msin)
			D	133 (70-130)	( )	( )		(msdin)
			K	67 ( )	47 ( )	( )		(lcsin)
			A	143 ( )	86 ( )	( )		
			KK	135 ( )	( )	( )		(msdin)
			C	145 ( )	137 ( )	( )		(lcsin)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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%

LDC #: 21495 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		159620 LCS	NNN	74 (75-125)	( )	( )	2, 8, 11, 12, 14-18, 159620 MB	No qual (MS/MSD in)
			KKK	72 (↓)	( )	( )	↓	↓
			LLL	71 (↓)	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		

LDC #: 21495 E7g
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: JV6
2nd Reviewer: 9

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 7, 10, 14, 17	K > cal range		J dets / A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495 E7
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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
		1, 7, 10, 14, 17	K > cal range		X/A (O)
		2, 8, 11, 15, 18	All except K	dil	

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 5 through June 11, 2009

LDC Report Date: October 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903184

Sample Identification

SA127-0.5B
TB060409-SO1
RSAJ6-0.5B
RSAK6-0.5B
RSAK8-0.5B
RSAL7-0.5B
RSAL8-0.5B
SA35-0.5B
SA55-0.5B
SA56-0.5B
SA176-0.5B
TB061009-SO1
RSAO3-0.5B
SA182-0.5B
SA201-0.5B
TB061109-SO1
SA166-0.5B
RSAK4-0.5B
RSAK4009-0.5B
SA134-0.5B
SA127-0.5BMS
SA127-0.5BMSD

Introduction

This data review covers 19 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
6/12/09	2-Methyl-2-propanol	0.028 (≥0.05)	All water samples in SDG R0903184	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
6/11/09	Dichlorodifluoromethane	25.7	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B SA127-0.5BMS SA127-0.5BMSD 157212MB	J+ (all detects)	A
6/17/09	Trichlorofluoromethane Di-isopropyl ether Ethyl-tert-butyl ether	26.9 25.5 26.7	RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B 157810MB	J+ (all detects) J+ (all detects) J+ (all detects)	A
6/19/09	Bromomethane	42.7	TB060409-SO1 TB061009-SO1 TB061109-SO1 158382MB	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
6/19/09	2-Methyl-2-propanol	0.014 (≥0.05)	TB060409-SO1 TB061009-SO1 TB061109-SO1 158382MB	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
158171MB	6/18/09	Acetone	2.1 ug/Kg	SA134-0.5B

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
158382MB	6/19/09	1,2,3-Trichlorobenzene Hexachlorobutadiene	0.35 ug/L 0.41 ug/L	TB060409-SO1 TB061009-SO1 TB061109-SO1
158352MB	6/22/09	Acetone	1.7 ug/Kg	RSAK4009-0.5B

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

Samples TB060409-SO1, TB061009-SO1, and TB061109-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
TB060409-SO1	6/5/09	Acetone	2.1 ug/L	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B
TB061009-SO1	6/10/09	Dichloromethane	0.22 ug/L	SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	All soil samples in SDG R0903184

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
SA127-0.5B	Acetone	4.0 ug/Kg	4.0U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAK6-0.5B	Acetone	3.8 ug/Kg	3.8U ug/Kg
RSAL7-0.5B	Acetone	3.3 ug/Kg	3.3U ug/Kg
RSAJ6-0.5B	Acetone	5.3 ug/Kg	5.3U ug/Kg
RSAK8-0.5B	Acetone	4.4 ug/Kg	4.4U ug/Kg
RSAL8-0.5B	Acetone	5.4 ug/Kg	5.4U ug/Kg
SA35-0.5B	Acetone	4.0 ug/Kg	4.0U ug/Kg
SA55-0.5B	Acetone	3.6 ug/Kg	3.6U ug/Kg
SA56-0.5B	Acetone	3.1 ug/Kg	3.1U ug/Kg
RSAO3-0.5B	Acetone	3.3 ug/Kg	3.3U ug/Kg
RSAK4-0.5B	Acetone	3.9 ug/Kg	3.9U ug/Kg
RSAK4009-0.5B	Acetone	5.0 ug/Kg	5.0U ug/Kg
SA134-0.5B	Acetone	4.9 ug/Kg	4.9U ug/Kg

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. 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 R0903184	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 RSAK4-0.5B and RSAK4009-0.5B 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
	RSAK4-0.5B	RSAK4009-0.5B				
Acetone	3.9	5.0	-	1.1 (≤21)	-	-
Dichloromethane	1.1	2.3	-	1.2 (≤5.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK4-0.5B	RSAK4009-0.5B				
Toluene	0.69	1.2	-	0.59 (≤5.2)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903184

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903184	TB060409-SO1 TB061009-SO1 TB061109-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903184	SA127-0.5B RSAJ6-0.5B RSAK6-0.5B	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D)(c)
R0903184	RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B RSAO3-0.5B SA182-0.5B SA201-0.5B SA166-0.5B RSAK4-0.5B	Trichlorofluoromethane Di-isopropyl ether Ethyl-tert-butyl ether	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D)(c)
R0903184	TB060409-SO1 TB061009-SO1 TB061109-SO1	Bromomethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D)(c)
R0903184	TB060409-SO1 TB061009-SO1 TB061109-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903184	SA127-0.5B TB060409-SO1 RSAJ6-0.5B RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA55-0.5B SA56-0.5B SA176-0.5B TB061009-SO1 RSAO3-0.5B SA182-0.5B SA201-0.5B TB061109-SO1 SA166-0.5B RSAK4-0.5B RSAK4009-0.5B SA134-0.5B	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 R0903184

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903184

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903184	SA127-0.5B	Acetone	4.0U ug/Kg	A	bt, bf
R0903184	RSAK6-0.5B	Acetone	3.8U ug/Kg	A	bt, bf
R0903184	RSAL7-0.5B	Acetone	3.3U ug/Kg	A	bt, bf
R0903184	RSAJ6-0.5B	Acetone	5.3U ug/Kg	A	bf
R0903184	RSAK8-0.5B	Acetone	4.4U ug/Kg	A	bf
R0903184	RSAL8-0.5B	Acetone	5.4U ug/Kg	A	bf
R0903184	SA35-0.5B	Acetone	4.0U ug/Kg	A	bf
R0903184	SA55-0.5B	Acetone	3.6U ug/Kg	A	bf
R0903184	SA56-0.5B	Acetone	3.1U ug/Kg	A	bf
R0903184	RSAO3-0.5B	Acetone	3.3U ug/Kg	A	bf
R0903184	RSAK4-0.5B	Acetone	3.9U ug/Kg	A	bf
R0903184	RSAK4009-0.5B	Acetone	5.0U ug/Kg	A	bf
R0903184	SA134-0.5B	Acetone	4.9U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495F1
SDG #: R0903184
Laboratory: Columbia Analytical Services

Date: 9/17/09
Page: 1 of 1
Reviewer: JVC
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: 6/05 - 11/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r²
IV.	Continuing calibration ~~/ICV~~	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
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 = 18, 19
XVII.	Field blanks	SW	TB = 2, 12, 16* FB = FB072109-SO from R0904016

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	SA127-0.5B	S	11	SA176-0.5B	S	21	SA127-0.5BMS	S	31	157212	MB
2	TB060409-SO1	W	12	TB061009-SO1	W	22	SA127-0.5BMSD	S	32	158382	MB
3	RSAJ6-0.5B	S	13	RSAJ8-0.5B	S	23			33	157810	MB
4	RSAK6-0.5B		14	SA182-0.5B		24			34	158357	MB
5	RSAK8-0.5B		15	SA201-0.5B		25			35	158171	MB
6	RSAL7-0.5B		16	TB061109-SO1	W	26			36		
7	RSAL8-0.5B		17	SA166-0.5B	S	27			37		
8	SA35-0.5B		18	RSAK4-0.5B	D	28			38		
9	SA55-0.5B		19	RSAK4009-0.5B	D	29			39		
10	SA56-0.5B		20	SA134-0.5B		30			40		

(no ICV) (#13 "O" letter not #)

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 #: 21495F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/12/09	ICAL	NNNN		0.018	All water + 158382MB	J/UJ/A (c)

LDC #: 21495F1
SDG #: Sci Cmer

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVE
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".

X 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
	6/11/09	M8756	JJ (+)	25.7		1, 3, 4, 21, 22, 157212 MB	J+ Det+/A (C)
	6/17/09	M8864	kk (+)	26.9		5-11, 13-15, 17, 18, 157810 MB	
			XXX (+)	25.5		↓	↓
			AAAA (+)	26.7			
	6/19/09	F0424	B (-)	42.7		2, 12, 16, 158382 MB	J-/NJ/A
			NNNN		0.014	↓	J/NJ/A ↓

CONCAL.1SB

LDC #: 21495 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 6/18/09
Conc. units: ug/kg
Associated Samples: 20

Compound	Blank ID	Sample Identification								
	158171 MB	20								
(2x) 4.x Methylene chloride F	2.1	(4.9)								
Acetone										
CRQL										

Blank analysis date: 6/19/09
Conc. units: ug/L
Associated Samples: 2, 12, 16 (ND)

Compound	Blank ID	Sample Identification								
	158382 MB									
Methylene chloride NNN	0.35									
Acetone LLL	0.41									
CRQL										

LDC #: 21495 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVC
2nd Reviewer: Q

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: 6/22/09
Conc. units: ug/kg Associated Samples: 19

Compound	Blank ID	Sample Identification								
	158352MB	19								
~~Methylene chloride~~ F	1.7	5.0								
Acetone										
CRQL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21495F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
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 (bt)

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 1, 3-7

Compound	Blank ID 2	Blank ID	Sample Identification							
Sampling Date	6/05/09		1	3	4	5	6	7		
F (2X) 4.7	2.1		4.0/U	(5.3)	3.8/U	(4.4)	3.3/U	(5.4)		
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 8-11, 13

Compound	Blank ID 12	Blank ID	Sample Identification							
Sampling Date	6/10/09									
E (2X) 0.44	0.22		(All results > TB)							
CRQL										

LDC #: 21495 F1
SDG #: see Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer:

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

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

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

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

Compound	Blank ID: FB072109-SO	Blank ID:	Sample Identification							
Sampling Date	7/21/09	1	3	4	5	6	7	8	9	10
F	3.7	4.0 /U	5.3 /U	3.8 /U	4.4 /U	3.3 /U	5.4 /U	4.0 /U	3.6 /U	3.1 /U
X	0.28									

(2X)
7.4
0.56

Blank units: **Associated sample units:** same as above

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

Compound	Blank ID: FB072109-SO	Blank ID:	Sample Identification							
Sampling Date	7/21/09	11	13	15	17	18	19	20		
F	3.7	(23)	3.3 /U	(38)	(9.0)	3.9 /U	5.0 /U	4.9 /U		
X	0.28									

LDC #: 21495 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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
		21/22	Several	compounds have %R outside limits		( )	1	No qual (LCS in)
			(see	attached	report)	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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: R0903184
Date Collected: 6/5/09
Date Received: 6/6/09
Date Analyzed: 6/11/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA127-0.5B
Lab Code: R0903184-001

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0904576-03 Result	Expected	% Rec		Duplicate Matrix Spike RQ0904576-04 Result	Expected	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	35.0	46.6	75		36.1	50.9	71		70 - 130	3	30
1,1,1-Trichloroethane (TCA)	ND	47.5	46.6	102		46.1	50.9	91		70 - 130	3	30
1,1,2,2-Tetrachloroethane	ND	9.86	46.6	21	*	8.23	50.9	16	*	70 - 130	18	30
1,1,2-Trichloroethane	ND	36.2	46.6	78		37.5	50.9	74		70 - 130	4	30
1,1-Dichloroethane (1,1-DCA)	ND	41.7	46.6	89		42.8	50.9	84		70 - 130	3	30
1,1-Dichloroethene (1,1-DCE)	ND	44.2	46.6	95		46.6	50.9	92		70 - 130	5	30
1,1-Dichloropropene	ND	44.1	46.6	95		45.0	50.9	89		70 - 130	2	30
1,2,3-Trichlorobenzene	ND	19.7	46.6	42	*	19.7	50.9	39	*	70 - 130	0	30
1,2,3-Trichloropropane	ND	33.5	46.6	72		35.9	50.9	71		70 - 130	7	30
1,2,4-Trichlorobenzene	ND	18.7	46.6	40	*	18.4	50.9	36	*	70 - 130	2	30
1,2,4-Trimethylbenzene	ND	24.9	46.6	53	*	26.0	50.9	51	*	70 - 130	4	30
1,2-Dibromo-3-chloropropane (DBC	ND	30.2	46.6	65		36.5	50.9	72		50 - 150	19	30
1,2-Dibromoethane	ND	35.0	46.6	75		36.0	50.9	71		70 - 130	3	30
1,2-Dichlorobenzene	ND	25.9	46.6	56	*	26.6	50.9	52	*	70 - 130	3	30
1,2-Dichloroethane	ND	43.5	46.6	93		42.5	50.9	84		70 - 130	2	30
1,2-Dichloropropane	ND	41.5	46.6	89		40.0	50.9	79		70 - 130	4	30
1,3,5-Trimethylbenzene	ND	25.7	46.6	55	*	26.3	50.9	52	*	70 - 130	2	30
1,3-Dichlorobenzene	ND	24.6	46.6	53	*	25.2	50.9	50	*	70 - 130	2	30
1,3-Dichloropropane	ND	34.4	46.6	74		37.6	50.9	74		70 - 130	9	30
1,4-Dichlorobenzene	ND	23.9	46.6	51	*	24.3	50.9	48	*	70 - 130	1	30
2,2-Dichloropropane	ND	44.7	46.6	96		44.7	50.9	88		70 - 130	0	30
2-Butanone (MEK)	ND	38.1	46.6	82		40.6	50.9	80		50 - 150	6	30
2-Chlorotoluene	ND	29.4	46.6	63	*	27.4	50.9	54	*	70 - 130	7	30
2-Hexanone	ND	30.1	46.6	65	*	33.7	50.9	66	*	70 - 130	11	30
2-Methyl-2-propanol	ND	863	931	93		944	1020	93		50 - 150	9	30
4-Chlorotoluene	ND	26.6	46.6	57	*	26.8	50.9	53	*	70 - 130	1	30
4-Isopropyltoluene	ND	22.6	46.6	48	*	24.1	50.9	47	*	70 - 130	7	30
4-Methyl-2-pentanone	ND	39.4	46.6	85		44.6	50.9	88		70 - 130	12	30
Acetone	4.0	42.8	46.6	83		46.9	50.9	84		50 - 150	9	30
Benzene	ND	39.3	46.6	84		38.5	50.9	76		70 - 130	2	30
Bromobenzene	ND	27.9	46.6	60	*	28.2	50.9	55	*	70 - 130	1	30
Bromochloromethane	ND	40.0	46.6	86		38.6	50.9	76		70 - 130	4	30
Bromodichloromethane	ND	41.6	46.6	89		41.9	50.9	82		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: R0903184
Date Collected: 6/5/09
Date Received: 6/6/09
Date Analyzed: 6/11/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA127-0.5B
Lab Code: R0903184-001

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0904576-03 Result	Expected	% Rec		Duplicate Matrix Spike RQ0904576-04 Result	Expected	% Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	34.5	46.6	74		36.6	50.9	72		70 - 130	6	30
Bromomethane	ND	37.5	46.6	80		41.5	50.9	82		50 - 150	10	30
Carbon Tetrachloride	ND	45.2	46.6	97		46.3	50.9	91		70 - 130	2	30
Chlorobenzene	ND	32.0	46.6	69	*	32.8	50.9	65	*	70 - 130	3	30
Chloroethane	ND	40.6	46.6	87		45.8	50.9	90		70 - 130	12	30
Chloroform	ND	41.2	46.6	88		40.1	50.9	79		70 - 130	3	30
Chloromethane	ND	41.1	46.6	88		42.4	50.9	83		70 - 130	3	30
Dibromochloromethane	ND	35.9	46.6	77		37.3	50.9	73		70 - 130	4	30
Dibromomethane	ND	39.6	46.6	85		39.1	50.9	77		70 - 130	1	30
Dichlorodifluoromethane (CFC 12)	ND	42.4	46.6	91		47.2	50.9	93		70 - 130	11	30
Dichloromethane	1.3	40.9	46.6	85		40.2	50.9	77		70 - 130	2	30
Diisopropyl Ether	ND	43.3	46.6	93		43.6	50.9	86		70 - 130	1	30
Ethyl tert-Butyl Ether	ND	44.9	46.6	96		45.5	50.9	90		70 - 130	2	30
Ethylbenzene	ND	34.0	46.6	73		34.3	50.9	67	*	70 - 130	1	30
Hexachlorobutadiene	ND	15.2	46.6	33	*	15.9	50.9	31	*	70 - 130	4	30
Isopropylbenzene (Cumene)	ND	31.5	46.6	68	*	32.6	50.9	64	*	70 - 130	4	30
Methyl tert-Butyl Ether	ND	42.1	46.6	90		43.1	50.9	85		70 - 130	2	30
Naphthalene	ND	25.4	46.6	54		29.4	50.9	58		50 - 150	15	30
Styrene	ND	32.1	46.6	69	*	32.9	50.9	65	*	70 - 130	2	30
Tetrachloroethene (PCE)	ND	35.6	46.6	76		36.3	50.9	71		70 - 130	2	30
Toluene	0.79	37.4	46.6	79		39.4	50.9	76		70 - 130	5	30
Trichloroethene (TCE)	ND	62.6	46.6	134	*	63.9	50.9	126		70 - 130	2	30
Trichlorofluoromethane (CFC 11)	ND	52.6	46.6	113		53.6	50.9	105		70 - 130	2	30
Vinyl Chloride	ND	43.6	46.6	94		48.1	50.9	95		70 - 130	10	30
cis-1,2-Dichloroethene	ND	40.3	46.6	87		41.2	50.9	81		70 - 130	2	30
cis-1,3-Dichloropropene	ND	37.9	46.6	81		36.2	50.9	71		70 - 130	5	30
m,p-Xylenes	ND	65.9	93.1	71		67.0	102	66	*	70 - 130	2	30
n-Butylbenzene	ND	20.2	46.6	43	*	20.8	50.9	41	*	70 - 130	3	30
n-Propylbenzene	ND	25.6	46.6	55	*	27.7	50.9	54	*	70 - 130	8	30
o-Xylene	ND	31.7	46.6	68	*	32.2	50.9	63	*	70 - 130	2	30
sec-Butylbenzene	ND	27.6	46.6	59	*	27.7	50.9	54	*	70 - 130	0	30
tert-Amyl Methyl Ether	ND	42.7	46.6	92		43.2	50.9	85		70 - 130	1	30
tert-Butylbenzene	ND	26.9	46.6	58	*	28.1	50.9	55	*	70 - 130	4	30
trans-1,2-Dichloroethene	ND	41.5	46.6	89		43.7	50.9	86		70 - 130	5	30

Comments:

LDC #: 21495F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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
	18	19	
F	3.9	5.0	1.1 (≤21 Diff)
E	1.1	2.3	1.2 (≤5.2 Diff)
CC	0.69	1.2	0.59 ↓

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: June 19 through June 24, 2009

LDC Report Date: September 23, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903443

Sample Identification

SA197-0.5B
SA198-0.5B
SA64-0.5B
SA104-0.5B
SA129-0.5B
SA70-0.5B
TB061909-SO1
SA60-0.5B
SA150-0.5B
TB062209-SO1
RSAN5-0.5B
SA53-0.5B
TB062309-SO1
SA201-10B
SA201-28B
SA201009-28B
TB062409-SO2
SA43009-0.5B
SA40-0.5B
SA200-0.5B
RSAO6-0.5B
SA51-0.5B
SA43-0.5B
TB062409-SO1
SA150-0.5BMS
SA150-0.5BMSD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	All water samples in SDG R0903443	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
6/23/09	Acetone	34.1	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B 158730MB	J+ (all detects)	A
6/26/09	Dichlorodifluoromethane	26.6	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA150-0.5BMS SA150-0.5BMSD 159434MB	J+ (all detects)	A
6/29/09	Dichlorodifluoromethane Acetone 2,2-Dichloropropane	27.5 25.2 26.7	SA51-0.5B SA43-0.5B 159618MB	J+ (all detects) J+ (all detects) J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/30/09	2-Methyl-2-propanol	0.025 (≥0.05)	All water samples in SDG R0903443	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
158730MB	6/23/09	Acetone	2.0 ug/Kg	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B
159434MB	6/26/09	Acetone	3.5 ug/Kg	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B
159618MB	6/29/09	Acetone	2.8 ug/Kg	SA51-0.5B SA43-0.5B

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	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA150-0.5B	Acetone	5.9 ug/Kg	5.9U ug/Kg

Samples TB061909-SO1, TB062209-SO1, TB062309-SO1, TB062409-SO2, and sample TB062409-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
TB061909-SO1	6/19/09	Dichloromethane	0.24 ug/L	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B
TB062309-SO1	6/23/09	Dichloromethane	0.38 ug/L	RSAN5-0.5B SA53-0.5B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB062409-SO1	6/24/09	2-Methyl-2-propanol Acetone Chloroform Dichloromethane	1.3 ug/L 12 ug/L 0.30 ug/L 0.51 ug/L	SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	SA201-10B SA201-28B SA201009-28B

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
SA43009-0.5B	Acetone Dichloromethane	18 ug/Kg 0.54 ug/Kg	18U ug/Kg 0.54U ug/Kg
SA40-0.5B	Acetone	24 ug/Kg	24U ug/Kg
SA200-0.5B	Acetone Dichloromethane	11 ug/Kg 0.47 ug/Kg	11U ug/Kg 0.47U ug/Kg
RSAO6-0.5B	Acetone Dichloromethane	15 ug/Kg 0.40 ug/Kg	15U ug/Kg 0.40U ug/Kg
SA51-0.5B	Acetone Chloroform Dichloromethane	11 ug/Kg 0.55 ug/Kg 0.54 ug/Kg	11U ug/Kg 0.55U ug/Kg 0.54U ug/Kg
SA43-0.5B	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

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
158730LCS	Dichlorodifluoromethane	152 (75-125)	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B 158730MB	J+ (all detects)	P
159618LCS	Hexachlorobutadiene	71 (75-125)	SA51-0.5B SA43-0.5B 159618MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903443	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 SA201-28B and SA201009-28B and samples SA43009-0.5B and SA43-0.5B 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
	SA201-28B	SA201009-28B				
Acetone	18	12	-	6 (≤18)	-	-
Chloroform	0.67	1.1	-	0.43 (≤4.4)	-	-
Dichloromethane	2.2	3.5	-	1.3 (≤4.4)	-	-
Toluene	0.35	0.34	-	0.01 (≤4.4)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA43009-0.5B	SA43-0.5B				
Acetone	18	16	-	2 (≤27)	-	-
Dichloromethane	0.54	6.7U	-	6.16 (≤6.7)	-	-
Toluene	6.0U	0.61	-	5.39 (≤6.0)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903443

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903443	TB061909-SO1 TB062209-SO1 TB062309-SO1 TB062409-SO2 TB062409-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903443	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903443	SA60-0.5B SA150-0.5B RSAN5-0.5B SA53-0.5B SA201-10B SA201-28B SA201009-28B SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903443	SA51-0.5B SA43-0.5B	Dichlorodifluoromethane Acetone 2,2-Dichloropropane	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0903443	TB061909-SO1 TB062209-SO1 TB062309-SO1 TB062409-SO2 TB062409-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903443	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B	Dichlorodifluoromethane	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903443	SA51-0.5B SA43-0.5B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903443	SA197-0.5B SA198-0.5B SA64-0.5B SA104-0.5B SA129-0.5B SA70-0.5B TB061909-SO1 SA60-0.5B SA150-0.5B TB062209-SO1 RSAN5-0.5B SA53-0.5B TB062309-SO1 SA201-10B SA201-28B SA201009-28B TB062409-SO2 SA43009-0.5B SA40-0.5B SA200-0.5B RSAO6-0.5B SA51-0.5B SA43-0.5B TB062409-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 R0903443

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903443	SA150-0.5B	Acetone	5.9U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903443

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903443	SA43009-0.5B	Acetone Dichloromethane	18U ug/Kg 0.54U ug/Kg	A	bt
R0903443	SA40-0.5B	Acetone	24U ug/Kg	A	bt
R0903443	SA200-0.5B	Acetone Dichloromethane	11U ug/Kg 0.47U ug/Kg	A	bt
R0903443	RSAO6-0.5B	Acetone Dichloromethane	15U ug/Kg 0.40U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903443	SA51-0.5B	Acetone Chloroform Dichloromethane	11U ug/Kg 0.55U ug/Kg 0.54U ug/Kg	A	bt
R0903443	SA43-0.5B	Acetone	16U ug/Kg	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495G1
SDG #: R0903443
Laboratory: Columbia Analytical Services

Date: 9/16/09
Page: 1 of 1
Reviewer: JV6
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: 6/19 - 24/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD r
IV.	Continuing calibration/~~ICV~~	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	
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 = 15, 16 D_2 = 18, 23
XVII.	Field blanks	SW	TB = 7, 10*, 13, 17*, 24 FB = FB072109-SO from R0904016

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

Validated Samples: Soil + Water

1	1	SA197-0.5B	S	11	3	RSAN5-0.5B	S	21	3	RSAO6-0.5B	S	31	1	158730	MB
2	1	SA198-0.5B		12	3	SA53-0.5B		22	4	SA51-0.5B		32	✓	159793	
3	1	SA64-0.5B		13	✓	TB062309-SO1	W	23	4	SA43-0.5B	D_2	33	3	159434	
4	1	SA104-0.5B		14	3	SA201-10B	S	24	✓	TB062409-SO1	W	34	4	159618	
5	1	SA129-0.5B		15	3	SA201-28B	D_1	25	3	SA150-0.5BMS	S	35			
6	1	SA70-0.5B		16	3	SA201009-28B	D_1	26	3	SA150-0.5BMSD		36			
7	✓	TB061909-SO1	W	17	✓	TB062409-SO2	W	27				37			
8	3	SA60-0.5B	S	18	3	SA43009-0.5B	D_2 S	28				38			
9	3	SA150-0.5B		19	3	SA40-0.5B		29				39			
10	✓	TB062209-SO1	W	20	3	SA200-0.5B		30				40			

(no IW)

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 #: 21495G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

Y N N/A 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?_____
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
	6/18/09	ICAL	NNNN		0.026	All water + 159793MB	J/UJ/A (C)

NNNN = [illegible]

LDC #: 21495G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of ___
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".

X 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
	6/23/09	M8955	F (+)	34.1		1-6, 158730MB	J+ dets/A (c)
	6/26/09	M9035	JJ (+)	26.6		8, 9, 11, 12, 14-16, 18-21, 25, 26, 159434 MB	
	6/29/09	M9060	JJ (+)	27.5		22, 23, 159618MB	
			F (+)	25.2			
			OO (+)	26.7			
	6/30/09	B9114	NNNN		0.025	All water + 159793MB	J/UJ/A

CONCAL.1SB

LDC #: 21495G1
SDG #: Sq Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
2nd Reviewer: Q

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: 6/23/09
Conc. units: ug/Kg
Associated Samples: 1-6

Compound	Blank ID	Sample Identification										
	158730 MB	1	2	3	4	5	6					
4.0 ~~Methylene chloride~~ F	2.0	(7.1)	(11)	(8.0)	(19)	(44)	(8.8)					
Acetone												
CRQL												

Blank analysis date: 6/26/09
Conc. units: ug/Kg
Associated Samples: 8, 9, 11, 12, 14-16, 18-21 (bl)

Compound	Blank ID	Sample Identification										
	159434 MB	8	9	11	12	14	15	16	18	19	20	21
7.0 ~~Methylene chloride~~ F	3.5	(21)	5.9/U	(8.6)	(19)	(18)	(18)	(12)	(18)	(24)	(11)	(15)
Acetone												
CRQL												

LDC #: 21495 G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 6/29/09
Conc. units: ug/Kg
Associated Samples: 22, 23

Compound	Blank ID	Sample Identification								
	159618 MB	22	23							
5.6 ~~Methylene chloride~~ F	2.8	11	16							
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21495 G/
SDG #: Sw Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: DE
2nd Reviewer: Q

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: 1-6

Compound	Blank ID 7	Blank ID	Sample Identification							
Sampling Date	6/19/09		2	5						
(0.48) E	0.24		(1.8)	(0.84)						
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 11, 12

Compound	Blank ID 13	Blank ID	Sample Identification							
Sampling Date	6/23/09		11							
0.76 E	0.38		(0.79)							
CRQL										

LDC #: 21495 G1
SDG #: Dry Creek

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer: CV

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: Associated Samples: 18-23 (6t)

Compound	Blank ID 24	Blank ID	Sample Identification							
Sampling Date	6/24/09		18	19	20	21	22	23		
2.6 NNN	1.3									
24 F	12		18/U	24/U	11/U	15/U	11/U	16/U		
0.6 K	0.30		0				0.55/U			
1.0 E	0.51		0.54/U		0.47/U	0.40/U	0.54/U			

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 14, 15, 16

Compound	Blank ID FB072109-50	Blank ID	Sample Identification							
Sampling Date	7/21/09		14	15	16					
F	3.7		(18)	(18)	(12)					
X	0.28									

LDC #: 21495G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		25/26	please see attached list	( )	( )	( )	9	No qual (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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: R0903443
Date Collected: 6/22/09
Date Received: 6/23/09
Date Analyzed: 6/27/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA150-0.5B
Lab Code: R0903443-009

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905208-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0905208-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	33.2	48.4	69	*	31.4	48.9	64	*	70 - 130	5	30
1,1,1-Trichloroethane (TCA)	ND	42.7	48.4	88		42.7	48.9	87		70 - 130	0	30
1,1,2,2-Tetrachloroethane	ND	16.6	48.4	34	*	14.4	48.9	30	*	70 - 130	14	30
1,1,2-Trichloroethane	ND	34.1	48.4	71		33.3	48.9	68	*	70 - 130	2	30
1,1-Dichloroethane (1,1-DCA)	ND	42.1	48.4	87		41.1	48.9	84		70 - 130	2	30
1,1-Dichloroethene (1,1-DCE)	ND	41.6	48.4	86		41.2	48.9	84		70 - 130	1	30
1,1-Dichloropropene	ND	39.7	48.4	82		39.4	48.9	81		70 - 130	1	30
1,2,3-Trichlorobenzene	ND	13.1	48.4	27	*	13.8	48.9	28	*	70 - 130	5	30
1,2,3-Trichloropropane	ND	31.8	48.4	66	*	31.3	48.9	64	*	70 - 130	2	30
1,2,4-Trichlorobenzene	ND	12.3	48.4	25	*	12.8	48.9	26	*	70 - 130	4	30
1,2,4-Trimethylbenzene	ND	20.8	48.4	43	*	20.5	48.9	42	*	70 - 130	1	30
1,2-Dibromo-3-chloropropane (DBC	ND	26.6	48.4	55		28.3	48.9	58		50 - 150	6	30
1,2-Dibromoethane	ND	33.0	48.4	68	*	32.3	48.9	66	*	70 - 130	2	30
1,2-Dichlorobenzene	ND	20.5	48.4	42	*	20.0	48.9	41	*	70 - 130	2	30
1,2-Dichloroethane	ND	42.3	48.4	87		42.2	48.9	86		70 - 130	0	30
1,2-Dichloropropane	ND	37.6	48.4	78		35.0	48.9	72		70 - 130	7	30
1,3,5-Trimethylbenzene	ND	21.9	48.4	45	*	21.1	48.9	43	*	70 - 130	4	30
1,3-Dichlorobenzene	ND	19.3	48.4	40	*	19.2	48.9	39	*	70 - 130	1	30
1,3-Dichloropropane	ND	33.5	48.4	69	*	34.5	48.9	71		70 - 130	3	30
1,4-Dichlorobenzene	ND	18.4	48.4	38	*	18.7	48.9	38	*	70 - 130	2	30
2,2-Dichloropropane	ND	42.7	48.4	88		42.2	48.9	86		70 - 130	1	30
2-Butanone (MEK)	ND	35.8	48.4	74		38.6	48.9	79		50 - 150	8	30
2-Chlorotoluene	ND	22.9	48.4	47	*	22.4	48.9	46	*	70 - 130	2	30
2-Hexanone	ND	40.3	48.4	83		42.0	48.9	86		70 - 130	4	30
2-Methyl-2-propanol	ND	867	967	90		903	977	92		50 - 150	4	30
4-Chlorotoluene	ND	21.8	48.4	45	*	21.3	48.9	44	*	70 - 130	2	30
4-Isopropyltoluene	ND	18.8	48.4	39	*	18.9	48.9	39	*	70 - 130	0	30
4-Methyl-2-pentanone	ND	43.0	48.4	89		44.0	48.9	90		70 - 130	2	30
Acetone	5.9	92.0	48.4	178	*	99.9	48.9	192	*	50 - 150	8	30
Benzene	ND	36.2	48.4	75		34.9	48.9	71		70 - 130	4	30
Bromobenzene	ND	24.4	48.4	50	*	22.5	48.9	46	*	70 - 130	8	30
Bromochloromethane	ND	36.3	48.4	75		38.0	48.9	78		70 - 130	5	30
Bromodichloromethane	ND	38.5	48.4	80		38.6	48.9	79		70 - 130	0	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0903443
Date Collected: 6/22/09
Date Received: 6/23/09
Date Analyzed: 6/27/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA150-0.5B
Lab Code: R0903443-009

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905208-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0905208-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	30.3	48.4	63	*	30.6	48.9	63	*	70 - 130	1	30
Bromomethane	ND	35.4	48.4	73		36.9	48.9	75		50 - 150	4	30
Carbon Tetrachloride	ND	41.2	48.4	85		39.6	48.9	81		70 - 130	4	30
Chlorobenzene	ND	28.8	48.4	60	*	28.0	48.9	57	*	70 - 130	3	30
Chloroethane	ND	37.6	48.4	78		39.7	48.9	81		70 - 130	5	30
Chloroform	ND	39.4	48.4	81		39.7	48.9	81		70 - 130	1	30
Chloromethane	ND	38.4	48.4	79		35.3	48.9	72		70 - 130	8	30
Dibromochloromethane	ND	34.2	48.4	71		33.3	48.9	68	*	70 - 130	3	30
Dibromomethane	ND	37.6	48.4	78		36.4	48.9	74		70 - 130	3	30
Dichlorodifluoromethane (CFC 12)	ND	38.1	48.4	79		35.7	48.9	73		70 - 130	6	30
Dichloromethane	0.81	36.6	48.4	74		36.7	48.9	73		70 - 130	0	30
Diisopropyl Ether	ND	46.7	48.4	97		47.8	48.9	98		70 - 130	2	30
Ethyl tert-Butyl Ether	ND	48.4	48.4	100		51.6	48.9	106		70 - 130	6	30
Ethylbenzene	ND	30.7	48.4	63	*	28.0	48.9	57	*	70 - 130	9	30
Hexachlorobutadiene	ND	10.5	48.4	22	*	11.4	48.9	23	*	70 - 130	9	30
Isopropylbenzene (Cumene)	ND	27.5	48.4	57	*	27.3	48.9	56	*	70 - 130	1	30
Methyl tert-Butyl Ether	ND	40.9	48.4	85		42.5	48.9	87		70 - 130	4	30
Naphthalene	ND	17.4	48.4	36	*	19.5	48.9	40	*	50 - 150	11	30
Styrene	ND	28.1	48.4	58	*	27.4	48.9	56	*	70 - 130	3	30
Tetrachloroethene (PCE)	ND	32.2	48.4	67	*	30.7	48.9	63	*	70 - 130	5	30
Toluene	0.79	33.7	48.4	68	*	31.0	48.9	62	*	70 - 130	8	30
Trichloroethene (TCE)	ND	48.3	48.4	100		50.3	48.9	103		70 - 130	4	30
Trichlorofluoromethane (CFC 11)	ND	48.3	48.4	100		46.1	48.9	94		70 - 130	5	30
Vinyl Chloride	ND	39.5	48.4	82		41.5	48.9	85		70 - 130	5	30
cis-1,2-Dichloroethene	ND	37.1	48.4	77		37.7	48.9	77		70 - 130	2	30
cis-1,3-Dichloropropene	ND	34.1	48.4	71		33.3	48.9	68	*	70 - 130	2	30
m,p-Xylenes	ND	58.3	96.7	60	*	55.5	97.7	57	*	70 - 130	5	30
n-Butylbenzene	ND	15.3	48.4	32	*	15.4	48.9	32	*	70 - 130	1	30
n-Propylbenzene	ND	22.3	48.4	46	*	21.2	48.9	43	*	70 - 130	5	30
o-Xylene	ND	27.5	48.4	57	*	26.6	48.9	54	*	70 - 130	4	30
sec-Butylbenzene	ND	22.4	48.4	46	*	21.6	48.9	44	*	70 - 130	3	30
tert-Amyl Methyl Ether	ND	47.0	48.4	97		47.2	48.9	97		70 - 130	0	30
tert-Butylbenzene	ND	23.1	48.4	48	*	23.2	48.9	47	*	70 - 130	0	30
trans-1,2-Dichloroethene	ND	37.4	48.4	77		39.2	48.9	80		70 - 130	5	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0903443
Date Collected: 6/22/09
Date Received: 6/23/09
Date Analyzed: 6/27/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA150-0.5B
Lab Code: R0903443-009

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905208-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0905208-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
trans-1,3-Dichloropropene	ND	32.8	48.4	68	*	31.8	48.9	65	*	70 - 130	3	30

Comments:

LDC #: 21495G1
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVC
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		158730 LCS	JJ	152 (75-125)	( )	( )	1-6, 158730 MB	J+ dets/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		159434 LCS	F	137 (75-125)	( )	( )	8, 9, 11, 12, 14-16,	No qual (MS/MSD in)
			JJ	137 ( )	( )	( )	18-21, 159434 MB	
			KK	140 ( )	( )	( )		
			C	129 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		159618 LCS	LLL	71 (75-125)	( )	( )	22, 23, 159618 MB	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JV6
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	
F	18	12	6 (≤ 18 Diff)
K	0.67	1.1	0.43 (≤ 1.4 Diff)
E	2.2	3.5	1.3
CC	0.35	0.34	0.01

Compound	Concentration (ug/kg)		RPD
	18	23	
F	18	16	2 (≤ 27 Diff)
E	0.54	6.7 U	6.16 (≤ 6.7 Diff)
CC	6.0 U	0.61	5.39 (≤ 6.0 Diff)

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: June 29 through June 30, 2009

LDC Report Date: September 24, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903615

Sample Identification

SA45-0.5B
SA452009-0.5B
TB062909-SO1
SA187-0.5
SA153-0.5B
SA186-0.5B
SA185-0.5B
RSAO5-0.5B
SA152-10B
SA152-20B
SA152-34B
TB062909-SO2
SA50-0.5B
SA54-0.5B
TB063009-SO1
SA106-0.5B
SA102-0.5B
SA109-0.5B
SA106-0.5BMS
SA106-0.5BMSD

Introduction

This data review covers 17 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	All water samples in SDG R0903615	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
7/7/09	2-Methyl-2-propanol	0.025 (≥0.05)	All water samples in SDG R0903615	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
160052	7/2/09	Acetone	2.7 ug/Kg	SA45-0.5B SA452009-0.5B SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B

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	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA187-0.5	Acetone	4.6 ug/Kg	4.6U ug/Kg
SA186-0.5B	Acetone	5.4 ug/Kg	5.4U ug/Kg
SA152-20B	Acetone	4.5 ug/Kg	4.5U ug/Kg

Samples TB062909-SO1, TB062909-SO2, and TB063009-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
TB062909-SO1	6/29/09	Dichloromethane	0.23 ug/L	SA45-0.5B SA452009-0.5B SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B
TB062909-SO2	6/29/09	Dichloromethane 2-Methyl-2-propanol Toluene	0.26 ug/L 2.3 ug/L 0.24 ug/L	SA45-0.5B SA452009-0.5B SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B
TB063009-SO1	6/30/09	Dichloromethane	0.45 ug/L	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	SA152-10B SA152-20B SA152-34B

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
SA452009-0.5B	Dichloromethane	0.42 ug/Kg	0.42U ug/Kg
SA187-0.5	Toluene	0.43 ug/Kg	0.43U ug/Kg
SA186-0.5B	Dichloromethane	0.48 ug/Kg	0.48U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA50-0.5B	Dichloromethane	0.53 ug/Kg	0.53U ug/Kg
SA54-0.5B	Dichloromethane	0.46 ug/Kg	0.46U ug/Kg
SA106-0.5B	Dichloromethane	0.61 ug/Kg	0.61U ug/Kg
SA102-0.5B	Dichloromethane	0.70 ug/Kg	0.70U ug/Kg
SA109-0.5B	Dichloromethane	0.75 ug/Kg	0.75U ug/Kg
SA152-20B	Acetone	4.5 ug/Kg	4.5U 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
SA106-0.5BMS/MSD (SA106-0.5B)	1,2,3-Trichlorobenzene	24 (70-130)	24 (70-130)	-	J- (all detects)	A
	p-Isopropyltoluene	47 (70-130)	46 (70-130)	-	UJ (all non-detects)	
	Hexachlorobutadiene	33 (70-130)	34 (70-130)	-		
	n-Butylbenzene	41 (70-130)	41 (70-130)	-		
	sec-Butylbenzene	48 (70-130)	48 (70-130)	-		

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
160052LCS	Vinyl chloride	130 (75-125)	SA45-0.5B SA452009-0.5B SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B 160052MB	J+ (all detects)	P
160281LCS	1,2,3-Trichlorobenzene p-Isopropyltoluene Hexachlorobutadiene n-Butylbenzene sec-Butylbenzene	74 (75-125) 73 (75-125) 59 (75-125) 71 (75-125) 73 (75-125)	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B 160281MB	J- (all detects) UJ (all non-detects)	P
160447LCS	Hexachlorobutadiene Tetrachloroethene	73 (75-125) 72 (75-125)	TB062909-SO1 TB062909-SO2 TB063009-SO1 160447MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903615	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 SA45-0.5B and SA452009-0.5B 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
	SA45-0.5B	SA452009-0.5B				
Acetone	6.0	7.0	-	1.0 (≤20)	-	-
Dichloromethane	5.0U	0.42	-	4.58 (≤5.0)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903615

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903615	TB062909-SO1 TB062909-SO2 TB063009-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903615	TB062909-SO1 TB062909-SO2 TB063009-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903615	SA106-0.5B	1,2,3-Trichlorobenzene p-Isopropyltoluene Hexachlorobutadiene n-Butylbenzene sec-Butylbenzene	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(m)
R0903615	SA45-0.5B SA452009-0.5B SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B	Vinyl chloride	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903615	SA50-0.5B SA54-0.5B SA106-0.5B SA102-0.5B SA109-0.5B	1,2,3-Trichlorobenzene p-Isopropyltoluene Hexachlorobutadiene n-Butylbenzene sec-Butylbenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903615	TB062909-SO1 TB062909-SO2 TB063009-SO1	Hexachlorobutadiene Tetrachloroethene	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903615	SA45-0.5B SA452009-0.5B TB062909-SO1 SA187-0.5 SA153-0.5B SA186-0.5B SA185-0.5B RSAO5-0.5B SA152-10B SA152-20B SA152-34B TB062909-SO2 SA50-0.5B SA54-0.5B TB063009-SO1 SA106-0.5B SA102-0.5B SA109-0.5B	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 R0903615

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903615	SA187-0.5	Acetone	4.6U ug/Kg	A	bl
R0903615	SA186-0.5B	Acetone	5.4U ug/Kg	A	bl
R0903615	SA152-20B	Acetone	4.5U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903615

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903615	SA452009-0.5B	Dichloromethane	0.42U ug/Kg	A	bt
R0903615	SA187-0.5	Toluene	0.43U ug/Kg	A	bt
R0903615	SA186-0.5B	Dichloromethane	0.48U ug/Kg	A	bt
R0903615	SA50-0.5B	Dichloromethane	0.53U ug/Kg	A	bt
R0903615	SA54-0.5B	Dichloromethane	0.46U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903615	SA106-0.5B	Dichloromethane	0.61U ug/Kg	A	bt
R0903615	SA102-0.5B	Dichloromethane	0.70U ug/Kg	A	bt
R0903615	SA109-0.5B	Dichloromethane	0.75U ug/Kg	A	bt
R0903615	SA152-20B	Acetone	4.5U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495H1
SDG #: R0903615
Laboratory: Columbia Analytical Services

Date: 9/18/09
Page: 1 of 1
Reviewer: VG
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: 6/29-30/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD r
IV.	Continuing calibration ~~ver~~	SW	CCV ≤ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 1, 2
XVII.	Field blanks	SW	TB = 3, 12, 15 FB = FB072109-SO from R0904016

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

Validated Samples: Soil + Water

1	1	SA45-0.5B	D S	11	1	SA152-34B	S	21	1	160052 MB	31
2	1	SA452009-0.5B	b	12	3	TB062909-SO2	W	22	✓	160281 MB	32
3	3	TB062909-SO1	W	13	✓	SA50-0.5B	S	23	3	160447 MB	33
4	1	SA187-0.5	S	14	✓	SA54-0.5B		24			34
5	1	SA153-0.5B		15	3	TB063009-SO1	W	25			35
6	1	SA186-0.5B		16	✓	SA106-0.5B	S	26			36
7	1	SA185-0.5B		17	✓	SA102-0.5B		27			37
8	1	RSAO5-0.5B		18	✓	SA109-0.5B		28			38
9	1	SA152-10B		19	✓	SA106-0.5BMS		29			39
10	1	SA152-20B	↓	20	✓	SA106-0.5BMSD	↓	30			40

(no IW)

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 #: 21495-H1
SDG #: Cu Curv

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: [signature]

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

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

(Y) N N/A 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
	6/18/09	ICAL	NNNN		0.026	All water + 166447MB	J/UJ/A (c)

LDC #: 21495H1
SDG #: Su Cor

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVL
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
	7/07/09	B9270	NNNN		0.025	All Waters + 160947MB	J/NJ/A (C)

CONCAL.1SB

LDC #: 21495H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVC
2nd Reviewer: Q

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: 7/02/09 (6L)
Conc. units: ug/kg Associated Samples: 1, 2 4-11

Compound	Blank ID	Sample Identification								
	160052 MB	1	2	4	5	6	7	8	9	10
~~Methylene chloride~~ F (2x) 5.4	2.7	(6.0)	(7.0)	4.6 /U	(19)	5.4 /U	(11)	(5.9)	(9.0)	4.5/U
Acetone										
CRQL										

Blank analysis date: _____ Same as above
Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
	160052 MB	11								
~~Methylene chloride~~ F	2.7	(10)								
Acetone										
CRQL										

LDC #: 21495 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 1, 2, 4-11 (bt)

Compound	Blank ID 3	Blank ID 12	Sample Identification							
Sampling Date	6/29/09 →		2	4	6	9	10	11		
(Dichloromethane) Methylene chloride E	0.23	0.26	0.42/U	(0.74)	0.48/U	~~9.6~~ (0.96)	(0.57)	(0.90)		
~~Acetone~~ NNNN		2.3								
~~Chloroform~~ CC		0.24		0.43/U		(0.71)				
CRQL										

(2x) 0.57 4.6 0.68

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 13, 14, 16-18 (bt)

Compound	Blank ID 15	Blank ID	Sample Identification							
Sampling Date	6/30/09		13	14	16	17	18			
(Dichloromethane) Methylene chloride E	0.45		0.53/U	0.46/U	0.61/U	0.70/U	0.75/U			
Acetone										
Chloroform										
CRQL										

0.90

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 21495H1
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: Q

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: 9 – 11 (6 f)

Compound	FB072109-SO Blank ID	Blank ID	Sample Identification							
Sampling Date	7/21/09		9	10	11					
F	3.7		(9.0)	4.5/U	(10)					
X	0.28									

(2x) 7.4 0.56

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 21465H1
SDG #: Sulphur

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JV6
2nd Reviewer: Q

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
		19/20	Several	compounds have %R outside limits			16	No qual (LCS in
			except	for the	ffg. ( )	( )		
			NNN	24 (70-130)	24 (70-130)	( )		
			GGG	47 ( )	46 ( )	( )		J-/NJ/A (m)
			LLL	33 ( )	34 ( )	( )		
			III	41 ( )	41 ( )	( )		
			EEE	48 ( )	48 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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%

LDC #: 21495H1
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
		160052 LCS	C	130 (75-125)	( )	( )	1, 2, 4-11, 160052MB	J+ detects/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		160281 LCS	NNN	74 (75-125)	( )	( )	13, 14, 16-18, 160281MB	J-/UJ/P (l)
			GGG	73 ( )	( )	( )		
			LLL	59 ( )	( )	( )		
			III	71 ( )	( )	( )		
			EEE	73 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		160447 LCS	LLL	73 (75-125)	( )	( )	3, 12, 15, 160447MB	J-/UJ/P (l)
			AA	72 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 H1
SDG #: Sy Creek

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
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
	1	2	
F	6.0	7.0	1.0 (≤ 20 Diff)
E	5.0 U	0.42	4.58 (≤ 5.0 Diff)

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: July 1 through July 2, 2009

LDC Report Date: September 23, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903678

Sample Identification

EB070109-SO1
TB0070109-W1
SA114-0.5B
SA114009-0.5B
RSAN6-0.5B
TB070109-SO1
SA82-0.5B
SA82-10B
SA82-29B
SA82-29BDL
RSAL3-10B
RSAL3-30B
RSAL3-30BDL
TB070109-SO2
SA134-10B
SA134-20B
SA134-31B
SA134009-31B
TB070209-S1
TB070209-S2
SA88-10B
SA88-20B
SA88-20BDL
SA88-32B
RSAK3-0.5B
RSAK3-10B
RSAK3-20B
RSAK3-20BRE
RSAK3-31B
RSAK3-31BDL
SA82-0.5BMS
SA82-0.5BMSD
RSAK3-31BMS
RSAK3-31BMSD

Introduction

This data review covers 28 soil samples and 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	EB070109-SO1 TB0070109-W1 TB070109-SO1 SA82-29BDL RSAL3-30BDL TB070109-SO2 TB070209-S1 TB070209-S2 SA88-20BDL SA134-20B RSAK3-31BMS RSAK3-31BMSD 160447MB 161113MB 161553MB	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
7/10/09	Dichlorodifluoromethane	25.3	SA82-29BDL RSAL3-30BDL 161113MB	J+ (all detects)	A
7/15/09	Acetone	26.7	SA88-20BDL RSAK3-31BDL RSAK3-31BMS RSAK3-31BMSD 161553MB	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
7/7/09	2-Methyl-2-propanol	0.025 (≥0.05)	All water samples in SDG R0903678	J (all detects) UJ (all non-detects)	A
7/10/09	2-Methyl-2-propanol	0.023 (≥0.05)	SA82-29BDL RSAL3-30BDL 161113MB	J (all detects) UJ (all non-detects)	A
7/15/09	2-Methyl-2-propanol	0.024 (≥0.05)	SA88-20BDL RSAK3-31BDL RSAK3-31BMS RSAK3-31BMSD 161553MB	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
161113MB	7/10/09	2-Butanone Acetone	110 ug/Kg 49 ug/Kg	SA82-29BDL RSAL3-30BDL
161394MB	7/14/09	Acetone	3.2 ug/Kg	RSAL3-10B SA134-10B SA134009-31B SA88-10B SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-31B
161553	7/15/09	2-Butanone	120 ug/Kg	SA88-20BDL
161557	7/15/09	1,3,5-Trimethylbenzene 4-Methyl-2-pentanone Acetone	0.34 ug/Kg 0.87 ug/Kg 4.3 ug/Kg	RSAK3-20BRE

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
SA82-29BDL (67.5x)	Acetone	150 ug/Kg	150U ug/Kg
RSAL3-30BDL (53.5x)	2-Butanone Acetone	120 ug/Kg 180 ug/Kg	120U ug/Kg 180U ug/Kg
RSAL3-10B	Acetone	3.1 ug/Kg	3.1U ug/Kg
RSAK3-0.5B	Acetone	3.7 ug/Kg	3.7U ug/Kg
RSAK3-10B	Acetone	6.4 ug/Kg	6.4U ug/Kg
SA88-20BDL (70x)	2-Butanone	150 ug/Kg	150U ug/Kg

Samples TB0070109-W1, TB070109-SO1, TB070109-SO2, TB070209-S1, and TB070209-S2 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
TB0070109-W1	7/1/09	Dichloromethane	0.52 ug/L	EB070109-SO1
TB070109-SO1	7/1/09	Dichloromethane 2-Methyl-2-propanol	0.35 ug/L 1.7 ug/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B SA82-29BDL RSAL3-10B RSAL3-30B RSAL3-30BDL
TB070109-SO2	7/1/09	Dichloromethane	0.33 ug/L	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-0.5B SA82-10B SA82-29B SA82-29BDL RSAL3-10B RSAL3-30B RSAL3-30BDL
TB070209-S1	7/2/09	2-Methyl-2-propanol Dichloromethane	1.5 ug/L 0.25 ug/L	SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-20BDL SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-20BRE RSAK3-31B RSAK3-31BDL
TB070209-S2	7/2/09	Dichloromethane Chloroform Toluene	0.35 ug/L 0.21 ug/L 0.26 ug/L	SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-20BDL SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-20BRE RSAK3-31B RSAK3-31BDL

Sample EB070109-SO1 was identified as an equipment blank. No volatile contaminants were found in this blank.

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	SA82-0.5B SA82-10B SA82-29B SA82-29BDL RSAL3-10B RSAL3-30B RSAL3-30BDL SA134-10B SA134-20B SA134-31B SA134009-31B SA88-10B SA88-20B SA88-20BDL SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-20BRE RSAK3-31B RSAK3-31BDL

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
SA114-0.5B (1.09x)	Dichloromethane	0.71 ug/Kg	0.71U ug/Kg
SA114009-0.5B (1.23x)	Dichloromethane	0.86 ug/Kg	0.86U ug/Kg
RSAN6-0.5B	Dichloromethane	0.66 ug/Kg	0.66U ug/Kg
RSAL3-10B	Dichloromethane Acetone	0.30 ug/Kg 3.1 ug/Kg	0.30U ug/Kg 3.1U ug/Kg
RSAL3-30B	Dichloromethane Acetone	0.46 ug/Kg 2.9 ug/Kg	0.46U ug/Kg 2.9U ug/Kg
SA134-10B	Dichloromethane Toluene	0.69 ug/Kg 0.32 ug/Kg	0.69U ug/Kg 0.32U ug/Kg
SA134009-31B (1.67x)	Dichloromethane	1.0 ug/Kg	1.0U ug/Kg
SA88-32B	Dichloromethane	0.57 ug/Kg	0.57U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAK3-0.5B	Dichloromethane Chloroform Acetone	0.28 ug/Kg 1.2 ug/Kg 3.7 ug/Kg	0.28U ug/Kg 1.2U ug/Kg 3.7U ug/Kg
RSAK3-10B	Dichloromethane Acetone	0.25 ug/Kg 6.4 ug/Kg	0.25U ug/Kg 6.4U ug/Kg
RSAK3-20B	Dichloromethane Toluene	0.64 ug/Kg 0.32 ug/Kg	0.64U ug/Kg 0.32U ug/Kg
RSAK3-20BRE	Toluene	0.52 ug/Kg	0.52U ug/Kg
SA134-31B	Acetone	6.6 ug/Kg	6.6U 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 with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAK3-20B	Bromofluorobenzene	42 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
160281LCS (SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B 160281MB)	Hexachlorobutadiene n-Butylbenzene sec-Butylbenzene	59 (75-125) 71 (75-125) 73 (75-125)	- - -	- - -	J- (all detects) UJ (all non-detects)	P
160447LCS (EB070109-SO1 TB0070109-W1 TB070109-SO1 TB070109-SO2 TB070209-S1 TB070209-S2 160447MB)	Hexachlorobutadiene Tetrachloroethene	73 (75-125) 72 (75-125)	- -	- -	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
161113LCS (SA82-29BDL RSAL3-30BDL 161113MB)	1,2-Dibromo-3-chloropropane	73 (75-125)	-	-	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
SA88-20B	Pentafluorobenzene	226550 (229238-916952)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAK3-20B	Pentafluorobenzene 1,4-Dichlorobenzene-d4	164612 (229238-916952) 143664 (161120-644478)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A
RSAK3-20BRE	Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	35657 (215453-861810) 71906 (349214-1396854) 46888 (284607-1138426) 10845 (156782-627128)	All TCL compounds	J (all detects) R (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SA82-29B RSAL3-30B SA88-20B RSAK3-31B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903678	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
SA82-29B RSAL3-30B SA88-20B RSAK3-31B	Chloroform	X	A
SA82-29BDL RSAL3-30BDL SA88-20BDL RSAK3-31BDL	All TCL compounds except Chloroform	X	A
RSAK3-20BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA114-0.5B and SA114009-0.5B and samples SA134-31B and SA134009-31B 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
	SA114-0.5B	SA114009-0.5B				
Acetone	6.2	7.5	-	1.3 (≤27)	-	-
Chloroform	2.36	2.1	-	0.2 (≤6.7)	-	-
Dichloromethane	0.71	0.86	-	0.15 (≤6.7)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA134-31B	SA134009-31B				
1,1-Dichloroethane	1.0	1.3	-	0.3 (≤13)	-	-
1,2-Dichlorobenzene	9.7U	1.3	-	8.4 (≤9.7)	-	-
1,2-Dichloroethane	1.0	1.3	-	0.3 (≤13)	-	-
Acetone	6.6	39	-	32.4 (≤51)	-	-
Chloroform	170	270	45 (≤50)	-	-	-
Dichloromethane	9.7U	1.0	-	8.7 (≤9.7)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903678

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903678	EB070109-SO1 TB0070109-W1 TB070109-SO1 SA82-29BDL RSAL3-30BDL TB070109-SO2 TB070209-S1 TB070209-S2 SA88-20BDL SA134-20B	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903678	SA82-29BDL RSAL3-30BDL	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903678	SA88-20BDL RSAK3-31BDL	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903678	EB070109-SO1 TB0070109-W1 TB070109-SO1 TB070109-SO2 TB070209-S1 TB070209-S2 SA82-29BDL RSAL3-30BDL SA88-20BDL RSAK3-31BDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903678	RSAK3-20B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0903678	SA114-0.5B SA114009-0.5B RSAN6-0.5B SA82-10B	Hexachlorobutadiene n-Butylbenzene sec-Butylbenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903678	EB070109-SO1 TB0070109-W1 TB070109-SO1 TB070109-SO2 TB070209-S1 TB070209-S2	Hexachlorobutadiene Tetrachloroethene	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903678	SA82-29BDL RSAL3-30BDL	1,2-Dibromo-3-chloropropane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903678	SA88-20B	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903678	RSAK3-20B	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R0903678	RSAK3-20BRE	All TCL compounds	J (all detects) R (all non-detects)	A	Internal standards (area) (i)
R0903678	SA82-29B RSAL3-30B SA88-20B RSAK3-31B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903678	EB070109-SO1 TB0070109-W1 SA114-0.5B SA114009-0.5B RSAN6-0.5B TB070109-SO1 SA82-0.5B SA82-10B SA82-29B SA82-29BDL RSAL3-10B RSAL3-30B RSAL3-30BDL TB070109-SO2 SA134-10B SA134-20B SA134-31B SA134009-31B TB070209-S1 TB070209-S2 SA88-10B SA88-20B SA88-20BDL SA88-32B RSAK3-0.5B RSAK3-10B RSAK3-20B RSAK3-20BRE RSAK3-31B RSAK3-31BDL	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903678	SA82-29B RSAL3-30B SA88-20B RSAK3-31B	Chloroform	X	A	Overall assessment of data (o)
R0903678	SA82-29BDL RSAL3-30BDL SA88-20BDL RSAK3-31BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R0903678	RSAK3-20BRE	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 R0903678

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903678	SA82-29BDL (67.5x)	Acetone	150U ug/Kg	A	bl
R0903678	RSAL3-30BDL (53.5x)	2-Butanone Acetone	120U ug/Kg 180U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903678	RSAL3-10B	Acetone	3.1U ug/Kg	A	bl
R0903678	RSAK3-0.5B	Acetone	3.7U ug/Kg	A	bl
R0903678	RSAK3-10B	Acetone	6.4U ug/Kg	A	bl
R0903678	SA88-20BDL (70x)	2-Butanone	150U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903678

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903678	SA114-0.5B (1.09x)	Dichloromethane	0.71U ug/Kg	A	bt
R0903678	SA114009-0.5B (1.23x)	Dichloromethane	0.86U ug/Kg	A	bt
R0903678	RSAN6-0.5B	Dichloromethane	0.66U ug/Kg	A	bt
R0903678	RSAL3-10B	Dichloromethane	0.30U ug/Kg	A	bt
R0903678	RSAL3-10B	Acetone	3.1U ug/Kg	A	bf
R0903678	RSAL3-30B	Dichloromethane	0.46U ug/Kg	A	bt
R0903678	RSAL3-30B	Acetone	2.9U ug/Kg	A	bf
R0903678	SA134-10B	Dichloromethane Toluene	0.69U ug/Kg 0.32U ug/Kg	A	bt
R0903678	SA134009-31B (1.67x)	Dichloromethane	1.0U ug/Kg	A	bt
R0903678	SA88-32B	Dichloromethane	0.57U ug/Kg	A	bt
R0903678	RSAK3-0.5B	Dichloromethane Chloroform	0.28U ug/Kg 1.2U ug/Kg	A	bt
R0903678	RSAK3-0.5B	Acetone	3.7U ug/Kg	A	bf
R0903678	RSAK3-10B	Dichloromethane	0.25U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903678	RSAK3-10B	Acetone	6.4U ug/Kg	A	bf
R0903678	RSAK3-20B	Dichloromethane Toluene	0.64U ug/Kg 0.32U ug/Kg	A	bt
R0903678	RSAK3-20BRE	Toluene	0.52U ug/Kg	A	bt
R0903678	SA134-31B	Acetone	6.6U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495I1
SDG #: R0903678
Laboratory: Columbia Analytical Services

Date: 9/18/09
Page: 1 of 1
Reviewer: JVL
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: 7/01 - 07/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD rr
IV.	Continuing calibration/~~ICV~~	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 3, 4 D_2 = 17, 18
XVII.	Field blanks	SW	EB = 1 TB = 2, 6, 14, 19, 20 FB = FB072109-SO from R0904016

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

Validated Samples: Soil + Water

1	1	EB070109-SO1	W	11	5	RSAL3-10B	S	21	5	SA88-10B	S	31	3	SA82-0.5BMS	S
2	1	TB0070109-W1		12	3	RSAL3-30B		22	5	SA88-20B		32	3	SA82-0.5BMSD	
3	2	SA114-0.5B	D_1 S	13	4	RSAL3-30BDL		23	7	SA88-20BDL		33	7	RSAK3-31BMS	
4	2	SA114009-0.5B	D_1	14	1	TB070109-SO2	W	24	5	SA88-32B		34	7	RSAK3-31BMSD	
5	2	RSAN6-0.5B		15	5	SA134-10B	S	25	5	RSAK3-0.5B		35	1	160447 MB	
6	1	TB070109-SO1	W	16	3	SA134-20B		26	5	RSAK3-10B		36	2	160281 MB	
7	3	SA82-0.5B	S	17	3	SA134-31B	D_2	27	5	RSAK3-20B		37	3	160561 MB	
8	2	SA82-10B		18	5	SA134009-31B	D_2	28	6	RSAK3-20BRE		38	4	161113 MB	
9	3	SA82-29B		19	1	TB070209-S1	W	29	5	RSAK3-31B		39	5	161394 MB	
10	4	SA82-29BDL		20	1	TB070209-S2		30	7	RSAK3-31BDL		40	6	161557 MB	
													7	161553 MB	

(no ICV)

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.

PFB – O
4DCB – X

LDC #: 21495 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: NG
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 ≥ 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
	6/18/09	ICAL	NNNN		0.026	All waters + 160497MB, 10, 13, 23, 33, 33, 161113MB, 161553MB	J/UJ/A (c)
	~~7/6/09~~						

INICAL.1SB

LDC #: 21495 I1
SDG #: Eq Corr

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: JVC
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
	7/07/09	B9270	NNNN		0.025	All water + 160947 MB	J/NJ/A (c)
	7/10/09	B9347	JJ (+)	25.3		10, 13, 16 1113 MB	J+ acts/A
			NNNN		0.023	↓	J/NJ/A
	7/15/09	B9448	F (-)	26.7		23, 30, 33, 34, 16155 MB	J-/NJ/A
			NNNN		0.024	↓	J/NJ/A

CONCAL.1SB

LDC #: 21495 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 7/10/09
Conc. units: ug/kg
Associated Samples: 10 13 (bl)

Compound	Blank ID	Sample Identification								
(2X)	161113 MB	10 (67.5x)	13 (53.5x)							
220 Methylene chloride M	110		120/U							
98 Acetone F	49	150/U	180/U							
CRQL										

Blank analysis date: 7/14/09
Conc. units: ug/kg
Associated Samples: 11, 15, 18, 21, 24-27, 29 (bl)

Compound	Blank ID	Sample Identification									
	161394 MB	11	15	18 (1.67)	21	22	24	25	26	27	29
6.4 Methylene chloride F	3.2	3.1/U	(9.1)	(39)	(69)	(31)	(17)	3.7/U	6.4/U	(22)	(11)
Acetone											
CRQL											

LDC #: 21495 I1
SDG #: 3rd Group

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 7/15/09
Conc. units: ug/kg
Associated Samples: 23 (b1)

Compound	Blank ID	Sample Identification									
	161553 MB	23 (70x)									
~~Methylene chloride~~ M	120	150/4									
Acetone											
CRQL											

Blank analysis date: 7/15/09
Conc. units: ug/kg
Associated Samples: 28

Compound	Blank ID	Sample Identification									
	161557 MB	28									
~~Methylene chloride~~ AAA	0.34										
~~Acetone~~ Y	0.87										
F	4.3	(9.2)									
CRQL											

LDC #: 21495I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: CL

(bf)

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: ~~1-24~~ 7-13, 15-18, 21-30

Compound	Blank ID FB072109-SD	Blank ID	Sample Identification							
Sampling Date	7/21/09		11	12	17	25	26			
F	3.7		3.1/U	2.9/U	6.6/U	3.7/U	6.4/U			
X	0.28									
			CAll	others	either	ND	or	> FB)		

(2X)
7.4
0.56

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

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 21495 I1
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: Q

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: Associated Samples: 1 (ND)

Compound	Blank ID 2	Blank ID	Sample Identification							
Sampling Date	7/01/09									
E	0.52									

Blank units: ug/L **Associated sample units:** ug/Kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 3-5, 7-13 (bt)

Compound	Blank ID 6	Blank ID 14	Sample Identification							
Sampling Date	7/01/09 →		3 (1.09x)	4 (1.23x)	5	7 (1.52x)	8 (1.05x)	9	11	12
0.7 E	0.35	0.33	0.71/U	0.86/U	0.66/U	1.2	0.75	0.89	0.30/U	0.46/U
3.4 NNN	1.7									

LDC #: 21495 I 1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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 (6t)

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 15-18, 21-30

Compound	Blank ID 19	Blank ID 20	Sample Identification							
(2K) Sampling Date	7/02/09		15	16	17	18 (1.67X)	21	22 (1.08X)	23 (70X)	24
3.0 NNN	1.5									
0.7 E	0.25	0.35	0.69/U			1.0/U		(1.3)		0.57/U
0.4Y K		0.21	(3.3)	(4.7)	(170)	(270)	(2.7)	(820)	(480)	(190)
0.5Y CC		0.26	0.32/U							

Blank units: _____ **Associated sample units:** Same as above

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 15-18, 21-30 (6t)

Compound	Blank ID 19	Blank ID 20	Sample Identification							
Sampling Date			25	26	27	28	29	30		
NNN	1.5									
E	0.25	0.35	0.28/U	0.25/U	0.64/U		(1.1)			
K		0.21	1.2	(1.3)	(78)	(59)	(720)	(670)		
CC		0.26			0.32/U	0.52/U				

LDC #: 21495 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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 surrogate %R within QC limits?

(Y) N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		27	BFB	42 (70-130)	J-/UJ/A (S)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

LDC #: 21495I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: DVK
2nd Reviewer: Q

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
		31/32	All compounds (have)	RPDs (outside limits)			7	No qual (either MS/MSD or LCS in)
			Several	compounds) have (%R outside limits)			↓	↓
				(See attached report)				
				( )	( )	( )		
				( )	( )	( )		
		33/34	B	10 (50-150)	11 (50-150)	( )	29, 30	No qual (LCS in)
			D	31 (70-130)	31 (70-130)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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: R0903678
Date Collected: 7/1/09
Date Received: 7/2/09
Date Analyzed: 7/ 8/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA82-0.5B
Lab Code: R0903678-007

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905542-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0905542-04 Result	Amount	% Rec		% Rec Limits	RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	90.7	107	85		51.8	67.8	76		70 - 130	55	*	30
1,1,1-Trichloroethane (TCA)	ND	99.5	107	93		58.9	67.8	87		70 - 130	51	*	30
1,1,2,2-Tetrachloroethane	ND	2.71	107	3	*	35.7	67.8	53	*	70 - 130	172	*	30
1,1,2-Trichloroethane	ND	83.2	107	78		53.8	67.8	79		70 - 130	43	*	30
1,1-Dichloroethane (1,1-DCA)	ND	101	107	95		55.3	67.8	81		70 - 130	59	*	30
1,1-Dichloroethene (1,1-DCE)	ND	112	107	105		53.1	67.8	78		70 - 130	71	*	30
1,1-Dichloropropene	ND	94.0	107	88		57.8	67.8	85		70 - 130	48	*	30
1,2,3-Trichlorobenzene	ND	63.0	107	59	*	35.5	67.8	52	*	70 - 130	56	*	30
1,2,3-Trichloropropane	ND	92.6	107	87		58.0	67.8	86		70 - 130	46	*	30
1,2,4-Trichlorobenzene	ND	63.9	107	60	*	35.2	67.8	52	*	70 - 130	58	*	30
1,2,4-Trimethylbenzene	ND	83.9	107	79		47.8	67.8	70		70 - 130	55	*	30
1,2-Dibromo-3-chloropropane (DBC	ND	71.8	107	67		50.8	67.8	75		50 - 150	34	*	30
1,2-Dibromoethane	ND	95.2	107	89		54.3	67.8	80		70 - 130	55	*	30
1,2-Dichlorobenzene	ND	82.8	107	77		48.1	67.8	71		70 - 130	53	*	30
1,2-Dichloroethane	ND	103	107	96		59.7	67.8	88		70 - 130	53	*	30
1,2-Dichloropropane	ND	94.3	107	88		56.0	67.8	83		70 - 130	51	*	30
1,3,5-Trimethylbenzene	ND	84.0	107	79		48.7	67.8	72		70 - 130	53	*	30
1,3-Dichlorobenzene	ND	81.5	107	76		45.9	67.8	68	*	70 - 130	56	*	30
1,3-Dichloropropane	ND	92.6	107	87		53.4	67.8	79		70 - 130	54	*	30
1,4-Dichlorobenzene	ND	79.1	107	74		44.7	67.8	66	*	70 - 130	56	*	30
2,2-Dichloropropane	ND	96.0	107	90		55.2	67.8	81		70 - 130	54	*	30
2-Butanone (MEK)	1.8	105	107	97		59.7	67.8	85		50 - 150	55	*	30
2-Chlorotoluene	ND	84.3	107	79		53.9	67.8	80		70 - 130	44	*	30
2-Hexanone	ND	92.3	107	86		52.9	67.8	78		70 - 130	54	*	30
2-Methyl-2-propanol	ND	2070	2140	97		1280	1360	95		50 - 150	47	*	30
4-Chlorotoluene	ND	86.9	107	81		49.6	67.8	73		70 - 130	55	*	30
4-Isopropyltoluene	ND	85.3	107	80		49.4	67.8	73		70 - 130	53	*	30
4-Methyl-2-pentanone	ND	96.9	107	91		58.8	67.8	87		70 - 130	49	*	30
Acetone	30	141	107	104		90.2	67.8	89		50 - 150	44	*	30
Benzene	ND	88.6	107	83		54.1	67.8	80		70 - 130	48	*	30
Bromobenzene	ND	85.5	107	80		49.1	67.8	72		70 - 130	54	*	30
Bromochloromethane	ND	93.9	107	88		54.3	67.8	80		70 - 130	54	*	30
Bromodichloromethane	ND	88.2	107	83		55.0	67.8	81		70 - 130	46	*	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0903678
Date Collected: 7/1/09
Date Received: 7/2/09
Date Analyzed: 7/ 8/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA82-0.5B
Lab Code: R0903678-007

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905542-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0905542-04 Result	Amount	% Rec		% Rec Limits	RPD		RPD Limit
Bromoform	ND	85.9	107	80		49.8	67.8	73		70 - 130	53	*	30
Bromomethane	ND	82.5	107	77		48.7	67.8	72		50 - 150	52	*	30
Carbon Tetrachloride	ND	98.0	107	92		58.3	67.8	86		70 - 130	51	*	30
Chlorobenzene	ND	87.7	107	82		52.9	67.8	78		70 - 130	50	*	30
Chloroethane	ND	91.9	107	86		51.1	67.8	75		70 - 130	57	*	30
Chloroform	0.56	96.4	107	90		55.4	67.8	81		70 - 130	54	*	30
Chloromethane	ND	88.1	107	82		53.2	67.8	78		70 - 130	49	*	30
Dibromochloromethane	ND	92.4	107	86		55.2	67.8	81		70 - 130	50	*	30
Dibromomethane	ND	94.6	107	88		54.6	67.8	81		70 - 130	54	*	30
Dichlorodifluoromethane (CFC 12)	ND	68.6	107	64	*	39.4	67.8	58	*	70 - 130	54	*	30
Dichloromethane	1.2	91.8	107	85		52.0	67.8	75		70 - 130	55	*	30
Diisopropyl Ether	ND	97.9	107	92		54.1	67.8	80		70 - 130	58	*	30
Ethyl tert-Butyl Ether	ND	96.0	107	90		52.1	67.8	77		70 - 130	59	*	30
Ethylbenzene	ND	91.8	107	86		52.9	67.8	78		70 - 130	54	*	30
Hexachlorobutadiene	ND	65.4	107	61	*	40.8	67.8	60	*	70 - 130	46	*	30
Isopropylbenzene (Cumene)	ND	94.9	107	89		54.7	67.8	81		70 - 130	54	*	30
Methyl tert-Butyl Ether	ND	98.8	107	92		51.7	67.8	76		70 - 130	63	*	30
Naphthalene	ND	69.0	107	65		42.2	67.8	62		50 - 150	48	*	30
Styrene	ND	91.4	107	86		53.4	67.8	79		70 - 130	53	*	30
Tetrachloroethene (PCE)	ND	91.3	107	85		55.8	67.8	82		70 - 130	48	*	30
Toluene	0.62	92.6	107	86		51.3	67.8	75		70 - 130	57	*	30
Trichloroethene (TCE)	ND	159	107	149	*	70.2	67.8	104		70 - 130	78	*	30
Trichlorofluoromethane (CFC 11)	ND	98.1	107	92		57.8	67.8	85		70 - 130	52	*	30
Vinyl Chloride	ND	91.2	107	85		54.7	67.8	81		70 - 130	50	*	30
cis-1,2-Dichloroethene	ND	97.5	107	91		55.8	67.8	82		70 - 130	54	*	30
cis-1,3-Dichloropropene	ND	87.3	107	82		51.2	67.8	75		70 - 130	52	*	30
m,p-Xylenes	ND	169	214	79		103	136	76		70 - 130	48	*	30
n-Butylbenzene	ND	76.9	107	72		46.9	67.8	69	*	70 - 130	49	*	30
n-Propylbenzene	ND	82.8	107	77		49.5	67.8	73		70 - 130	50	*	30
o-Xylene	ND	91.0	107	85		53.5	67.8	79		70 - 130	52	*	30
sec-Butylbenzene	ND	84.7	107	79		51.2	67.8	75		70 - 130	49	*	30
tert-Amyl Methyl Ether	ND	95.5	107	89		52.6	67.8	78		70 - 130	58	*	30
tert-Butylbenzene	ND	86.0	107	80		50.0	67.8	74		70 - 130	53	*	30
trans-1,2-Dichloroethene	ND	91.3	107	85		51.5	67.8	76		70 - 130	56	*	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0903678
Date Collected: 7/1/09
Date Received: 7/2/09
Date Analyzed: 7/ 8/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA82-0.5B
Lab Code: R0903678-007

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0905542-03 Result	Amount	% Rec	Duplicate Matrix Spike RQ0905542-04 Result	Amount	% Rec	% Rec Limits	RPD		RPD Limit
trans-1,3-Dichloropropene	ND	92.5	107	86	51.6	67.8	76	70 - 130	57	*	30

Comments:

LDC #: 21495I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

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
		160281 LCS	LLL	59 (75-125)	( )	( )	3-5, 8, 160281 MB	J-/UJ/P (l)
			JJJ	71 ( )	( )	( )		
			EEE	73 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		160447 LCS	LLL	73 (75-125)	( )	( )	1, 2, 6, 14, 19, 20, 160447 MB	
			AA	72 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		161113 LCS	MM	73 (75-125)	( )	( )	10, 13, 161113 MB	
				( )	( )	( )		
				( )	( )	( )		
		161394 LCS	KKK	127 (75-125)	( )	( )	11, 15, 18, 21, 22, 24-27,	No qual LCSD (m)
			B	131 ( )	( )	( )	29, 161394 MB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: JVC
2nd Reviewer: 9

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
		22	PFB	226550 (229238 - 916952)		J/UJ/A (i)
		27	PFB	164617		
			4DCB	143664 (161120 - 644478)		(i)
		28	PFB	35657 (215453 - 861810)		J/R/A (all TCL) (i)
			DFB	71906 (349214 - 1396854)		
			CBZ	46888 (284607 - 1138426)		
			4DCB	90845 (156782 - 627128)		

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene (# 23 analyzed at 70x DL)

LDC #: 21495 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: JVB
2nd Reviewer: A

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		9, 17, 22, 29	K > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		9, 12, 22, 29	K > cal range		X /A (o)
		10, 13, 23, 30	All except K dil		
		28	All TCL (IS outside limits)		

Comments: _____

OVR.1SB

LDC #: 21495I1
SDG #: Sq Grav

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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
	3	4	
F	6.2	7.5	1.3 (≤ 27 Diff)
K	2.3	2.1	0.2 (≤ 6.7 Diff)
E	0.71	0.86	0.15 ↓

Compound	Concentration (ug/kg)		RPD
	17	18	
I	1.0	~~1.0~~ 1.3	0.3 (≤ 13 Diff)
JJJ	9.7 U	1.3	8.4 (≤ 9.7 Diff)
L	1.0	1.3	0.3 (≤ 13 Diff)
F	6.6	39	32.4 (≤ 51 Diff)
K	170	270	45 (≤ 50% RPD)
E	9.7 U	1.0	8.7 (≤ 9.7 Diff)

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Results U at MDL: #17 JJJ = 0.66U
E = 0.74U

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 25 through July 1, 2009

LDC Report Date: October 2, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903561

Sample Identification

M-75B
M-75BDL
TB062509-GW1
M-13AB
M-13009AB
M-64B
M-64BDL
TB062609-GW1
TB062609-W1
M-111AB
TB062909-GW1
EB062909-GW
M-25B
M-25BDL
TB063009-GW1
M-12AB
M-12ABDL
M-110B
TB070109-GW1
I-ARB
M-12ABMS
M-12ABMSD

Introduction

This data review covers 22 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	M-75BDL M-64BDL M-111AB TB062909-GW1 EB062909-GW M-25B M-25BDL TB063009-GW1 M-12AB M-12ABDL M-110B TB070109-GW1 I-ARB M-12ABMS M-12ABMSD 160676MB 161065MB 16113MB	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
7/7/09	2,2-Dichloropropane Carbon tetrachloride trans-1,3-Dichloropropene	45.3 28.1 25.3	M-75B TB062509-GW1 M-13AB M-13009AB M-64B TB062609-GW1 TB062609-W1 160416MB	J+ (all detects) J+ (all detects) J+ (all detects)	A
7/10/09	Dichlorodifluoromethane	25.3	M-25BDL M-12ABDL M-12ABMS M-12ABMSD 161113MB	J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/8/09	2-Methyl-2-propanol	0.025 (≥0.05)	M-64BDL M-111AB TB062909-GW1 EB062909-GW 160676MB	J (all detects) UJ (all non-detects)	A
7/9/09	2-Methyl-2-propanol	0.023 (≥0.05)	M-75BDL M-25B TB063009-GW1 M-12AB M-110B TB070109-GW1 I-ARB 161065MB	J (all detects) UJ (all non-detects)	A
7/10/09	2-Methyl-2-propanol	0.023 (≥0.05)	M-25BDL M-12ABDL M-12ABMS M-12ABMSD 161113MB	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.

Samples TB062509-GW1, TB062609-GW1, TB062609-W1, TB062909-GW1, TB063009-GW1, and TB070109-GW1 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
TB062509-GW1	6/25/09	Chloromethane Dichloromethane Toluene	0.25 ug/L 0.40 ug/L 0.27 ug/L	M-75B M-13AB M-13009AB
TB062609-GW1	6/26/09	Dichloromethane Toluene	0.26 ug/L 0.39 ug/L	M-64B M-64BDL
TB062909-GW1	6/29/09	Chloroform Dichloromethane Toluene	0.25 ug/L 0.36 ug/L 0.33 ug/L	M-111AB EB062909-GW
TB063009-GW1	6/30/09	Chloroform Dichloromethane Toluene	0.21 ug/L 0.43 ug/L 0.39 ug/L	M-25B M-25BDL M-12AB M-12ABDL

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB070109-GW1	7/1/09	Acetone Dichloromethane	2.1 ug/L 0.50 ug/L	M-110B I-ARB

Sample EB062909-GW 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
EB062909-GW	6/29/09	1,2-Dichloroethane Acetone Chlorobenzene Chloromethane Dichloromethane Tetrachloroethene Toluene	0.22 ug/L 4.9 ug/L 0.33 ug/L 0.25 ug/L 17 ug/L 1.2 ug/L 0.65 ug/L	No associated samples in this SDG

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
M-75B	Toluene	0.21 ug/L	0.21U ug/L
M-64B	Dichloromethane Toluene	0.24 ug/L 0.30 ug/L	0.24U ug/L 0.30U ug/L
EB062909-GW	Toluene	0.65 ug/L	0.65U ug/L
M-25B	Dichloromethane	0.45 ug/L	0.45U ug/L
M-12AB	Dichloromethane	0.21 ug/L	0.21U ug/L
I-ARB	Dichloromethane	0.45 ug/L	0.45U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
160416LCS (M-75B TB062509-GW1 M-13AB M-13009AB M-64B TB062609-GW1 TB062609-W1 160416MB)	2,2-Dichloropropane	153 (75-125)	-	-	J+ (all detects)	P
	Bromoform	127 (75-125)	-	-	J+ (all detects)	
	Carbon tetrachloride	131 (75-125)	-	-	J+ (all detects)	
	Chloromethane	126 (75-125)	-	-	J+ (all 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 project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-75B M-64B M-25B M-12AB	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903561	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
M-75B M-64B M-25B M-12AB	Chloroform	X	A
M-75BDL M-64BDL M-25BDL M-12ABDL	All TCL compounds except Chloroform	X	A

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

XVI. Field Duplicates

Samples M-13AB and M-13009AB 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-13AB	M-13009AB				
1,1-Dichloroethane	2.9	2.9	-	0 (≤1.0)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-13AB	M-13009AB				
1,1-Dichloroethene	1.4	1.3	-	0.1 (≤1.0)	-	-
1,2-Dichloroethane	1.0U	0.20	-	0.8 (≤1.0)	-	-
Acetone	2.0	2.4	-	0.4 (≤1.0)	-	-
Chloroform	35	36	3 (≤30)	-	-	-
Trichloroethene	23	25	8 (≤30)	-	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903561

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903561	M-75BDL M-64BDL M-111AB TB062909-GW1 EB062909-GW M-25B M-25BDL TB063009-GW1 M-12AB M-12ABDL M-110B TB070109-GW1 I-ARB	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903561	M-75B TB062509-GW1 M-13AB M-13009AB M-64B TB062609-GW1 TB062609-W1	2,2-Dichloropropane Carbon tetrachloride trans-1,3-Dichloropropene	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0903561	M-25BDL M-12ABDL	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903561	M-64BDL M-111AB TB062909-GW1 EB062909-GW M-75BDL M-25B TB063009-GW1 M-12AB M-110B TB070109-GW1 I-ARB M-25BDL M-12ABDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903561	M-75B TB062509-GW1 M-13AB M-13009AB M-64B TB062609-GW1 TB062609-W1	2,2-Dichloropropane Bromoform Carbon tetrachloride Chloromethane	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903561	M-75B M-64B M-25B M-12AB	Chloroform	J (all detects)	A	Project Quantitation Limit (PQL) (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903561	M-75B M-75BDL TB062509-GW1 M-13AB M-13009AB M-64B M-64BDL TB062609-GW1 TB062609-W1 M-111AB TB062909-GW1 EB062909-GW M-25B M-25BDL TB063009-GW1 M-12AB M-12ABDL M-110B TB070109-GW1 I-ARB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903561	M-75B M-64B M-25B M-12AB	Chloroform	X	A	Overall assessment of data (o)
R0903561	M-75BDL M-64BDL M-25BDL M-12ABDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903561

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903561

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903561	M-75B	Toluene	0.21U ug/L	A	bt
R0903561	M-64B	Dichloromethane Toluene	0.24U ug/L 0.30U ug/L	A	bt
R0903561	EB062909-GW	Toluene	0.65U ug/L	A	bt
R0903561	M-25B	Dichloromethane	0.45U ug/L	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903561	M-12AB	Dichloromethane	0.21U ug/L	A	bt
R0903561	I-ARB	Dichloromethane	0.45U ug/L	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495J1
SDG #: R0903561
Laboratory: Columbia Analytical Services

Date: 9/23/09
Page: 1 of 1
Reviewer: JVL
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/25 - 7/01/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD
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	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	SW	TB = 3, 8, 9, 11, 15, 19 EB = 12 ~~FB =~~

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	1	M-75B	11	TB062909-GW1	21	M-12ABMS	31	1	160416 MB
2	3	M-75BDL	12	EB062909-GW	22	M-12ABMSD	32	2	160676
3	1	TB062509-GW1	13	M-25B	23		33	3	161065
4	1	M-13AB b	14	M-25BDL	24		34	4	161113
5	1	M-13009AB b	15	TB063009-GW1	25		35		
6	1	M-64B	16	M-12AB	26		36		
7	2	M-64BDL	17	M-12ABDL	27		37		
8	1	TB062609-GW1	18	M-110B	28		38		
9	1	TB062609-W1	19	TB070109-GW1	29		39		
10		M-111AB	20	I-ARB	30		40		

(no IW)

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 #: 21495J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: 9

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
	6/18/09	ICAL	NNNN		0.026	2, 7, 10-22, 160676MB, 161065MB, 161113MB	J/NJ/A (c)
	/						

INICAL.1SB

LDC #: 21495J1
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
	7/07/09	X2677	00 (+)	45.3		1, 3-6, 8 9, 160416 MB	J+ dets/A (c)
			O (+)	28.1			
			W (+)	25.3			
	7/08/09	B9295	NNNN		0.025	7, 10-12, 160676 MB	J/UJ/A
	7/09/09	B9321	NNNN		0.023	2, 13, 15, 16, 18-20, +161065 MB	J/UJ/A
	7/10/09	B9347	JJ (+)	25.3		14, 17, 21, 22,	J+ dets/A
			NNNN		0.023	+16 1113 MB	J/UJ/A

CONCAL.1SB

LDC #: 21495J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV6
2nd Reviewer: 9

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: _____ Associated Samples: 1, 4, 5

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	6/25/09		1							
6.5 A	0.25									
6.8 E	0.40									
0.54 CC	0.27		0.21/U							

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 6, 7

Compound	Blank ID 8	Blank ID	Sample Identification							
Sampling Date	6/26/09		6							
E	0.26		0.24/U							
CC	0.39		0.30/U							

LDC #: 21495J1
SDG #: Sq Cmw

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: Q

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: _____ Associated Samples: 10, 12

Compound	Blank ID 11	Blank ID	Sample Identification							
Sampling Date	6/29/09		10	12						
K	0.25		(34)							
E	0.36			(17)						
CC	0.33			0.65/U						

0.66

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: ~~10~~ None

Compound	Blank ID 12	Blank ID	Sample Identification							
Sampling Date	6/29/09		~~10~~							
L	0.22		/							
F	4.9		~~6.7/U~~							
DD	0.33									
~~A~~	0.25									
E	17									
AA	1.2									
CC	0.65									

LDC #: 21495J1
SDG #: Sa Cruz

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: 9

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: _____ Associated Samples: 13, 14, 16, 17

Compound	Blank ID 15	Blank ID	Sample Identification							
Sampling Date	6/30/09		13	14	16	17				
K	0.21		(600)	(590)	(870)	(980)				
E	0.43		0.45/U		0.21/U					
CC	0.39									

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 18, 20

Compound	Blank ID 19	Blank ID	Sample Identification							
Sampling Date	7/01/09		20							
F	2.1		(14)							
E	0.50		0.45/U							

LDC #: 21495J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		21/22	KK	( )	134 (70-130)	( )	16, 17	No qual (MSin)
			C	( )	135 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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%

LDC #: 21495 J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		160416 LCS	OO	153 (75-125)	( )	( )	1, 3-6, 8, 9, + 160416 MB	J+dets/P (l)
			X	127 ( )	( )	( )		
			O	131 ( )	( )	( )		
			A	126 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		161113 LCS	MM	73 ( )	( )	( )	14, 17, 161113 MB	No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 J1
SDG #: Lu Conv

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: JVL
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 the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 6, 13, 16	k > cal range		J (all detects) /A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JVC
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
		1, 6, 13, 16	K > cal range		X/A (o)
		2, 7, 14, 17	All except K dil		

Comments: _____

OVR.1SB

LDC #: 21415 J1
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/L)		RPD
	4	5	
I	2.9	2.9	0 (≤ 1.0 Diff)
H	1.4	1.3	0.1
L	1.0U	0.20	0.8
F	2.0	2.4	0.4
K	35	36	3 (≤ 30% RPD)
S	23	25	8

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: June 25 through June 30, 2009

LDC Report Date: September 28, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903584

Sample Identification

SA202-28B
TB062509-SO1
TB062509-SO1RE
RSAI3-10B
RSAI3-20B
RSAI3-32B
SA188-0.5B
SA172-0.5B
TB062609-SO1
TB062609-SO1RE
SA41-0.5B
SA44-0.5B
SA42-0.5B
RSAI2-10B
RSAI2009-10B
TB062609-SO2
TB062609-SO2RE
RSAI2-20B
RSAI2-31B
RSAJ2-10B
RSAJ2-20B
RSAJ2-33B
RSAJ2009-33B
EB062609-SO
EB062609-SORE
TB063009-SO2
TB063009-SO2RE
SA202-10B

Introduction

This data review covers 18 soil samples and 10 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 with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag	A or P
TB062509-SO1 TB062609-SO1RE	All aromatic compounds	12	7	J- (all detects) UJ (all non-detects)	P
TB062609-SO1 TB062609-SO2 EB062609-SO	All aromatic compounds	11	7	J- (all detects) UJ (all non-detects)	P
TB062509-SO1RE	All TCL compounds	26	14	J- (all detects) UJ (all non-detects)	P
TB062609-SO2RE EB062609-SORE	All TCL compounds	25	14	J- (all detects) UJ (all non-detects)	P
TB063009-SO2RE	All TCL compounds	21	14	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. 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	TB062509-SO1RE TB062609-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE 160676MB 162407MB	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
6/29/09	Dichlorodifluoromethane Trichlorofluoromethane Acetone 2,2-Dichloropropane	27.5 33.0 25.2 26.7	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B 159618MB	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A
7/7/09	2,2-Dichloropropane Carbon tetrachloride trans-1,3-Dichloropropene	45.3 28.1 25.3	TB062509-SO1 TB062609-SO1 TB062609-SO2 EB062609-SO TB063009-SO2 160416MB	J+ (all detects) J+ (all detects) J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/8/09	2-Methyl-2-propanol	0.025 (≥0.05)	TB062609-SO1RE 160676MB	J (all detects) UJ (all non-detects)	A
7/21/09	2-Methyl-2-propanol	0.023 (≥0.05)	TB062509-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE 162407MB	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
159618MB	6/29/09	Acetone	2.8 ug/Kg	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B
159999MB	7/1/09	Acetone	2.3 ug/Kg	RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
160052MB	7/2/09	Acetone	2.7 ug/kg	SA202-10B

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA188-0.5B	Acetone	3.6 ug/L	3.6U ug/L
SA41-0.5B	Acetone	3.2 ug/L	3.2U ug/L

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA44-0.5B	Acetone	2.4 ug/L	2.4U ug/L
RSAI2009-10B	Acetone	4.3 ug/L	4.3U ug/L

Samples TB062509-SO1, TB062509-SO1RE, TB062609-SO1, TB062609-SO1RE, TB062609-SO2, TB062609-SO2RE, TB063009-SO2, and TB063009-SO2RE 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
TB062509-SO1	6/25/09	Methylene chloride Toluene	0.30 ug/L 0.58 ug/L	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B
TB062509-SO1RE	6/25/09	Methylene chloride 2-Methyl-2-propanol	0.26 ug/L 1.4 ug/L	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B
TB062609-SO1	6/26/09	Acetone Chloroform Methylene chloride Toluene	16 ug/L 0.53 ug/L 0.87 ug/L 0.26 ug/L	SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
TB062609-SO1RE	6/26/09	Acetone Methylene chloride 2-Butanone	18 ug/L 2.8 ug/L 1.5 ug/L	SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB062609-SO2	6/26/09	Methylene chloride Toluene	0.23 ug/L 0.39 ug/L	SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
TB062609-SO2RE	6/26/09	Methylene chloride Toluene	0.23 ug/L 0.26 ug/L	SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B
TB063009-SO2	6/30/09	Methylene chloride Toluene	0.37 ug/L 0.46 ug/L	SA202-10B
TB063009-SO2RE	6/30/09	Methylene chloride Toluene 2-Methyl-2-propanol	0.29 ug/L 0.21 ug/L 1.4 ug/L	SA202-10B

Samples EB062609-SO and EB062609-SORE were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB062609-SO	6/26/09	Acetone Toluene	1.6 ug/L 0.24 ug/L	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB062609-SORE	6/26/09	Acetone 2-Methyl-2-propanol	8.1 ug/L 1.2 ug/L	RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B RSAI2-10B RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B SA202-10B

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
RSAI3-10B	Toluene	0.71 ug/L	0.71U ug/L
RSAI3-20B	Toluene	0.54 ug/L	0.54U ug/L
RSAI3-32B	Toluene Acetone	0.63 ug/L 7.2 ug/L	0.63U ug/L 7.2U ug/L
SA188-0.5B	Acetone Methylene chloride Toluene	3.6 ug/L 0.78 ug/L 0.76 ug/L	3.6U ug/L 0.78U ug/L 0.76U ug/L
SA172-0.5B	Acetone Methylene chloride	6.0 ug/L 1.4 ug/L	6.0U ug/L 1.4U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
SA41-0.5B	Acetone Methylene chloride	3.2 ug/L 1.6 ug/L	3.2U ug/L 1.6U ug/L
SA44-0.5B	Acetone Methylene chloride	2.4 ug/L 1.0 ug/L	2.4U ug/L 1.0U ug/L
SA42-0.5B	Acetone Methylene chloride	5.8 ug/L 1.2 ug/L	5.8U ug/L 1.2U ug/L
RSAI2-10B	Acetone Chloroform Methylene chloride Toluene	6.4 ug/L 0.68 ug/L 0.52 ug/L 0.51 ug/L	6.4U ug/L 0.68U ug/L 0.52U ug/L 0.51U ug/L
RSAI2009-10B	Acetone Chloroform Methylene chloride Toluene	4.3 ug/L 0.40 ug/L 0.33 ug/L 0.27 ug/L	4.3U ug/L 0.40U ug/L 0.33U ug/L 0.27U ug/L
RSAI2-20B	Acetone Methylene chloride Toluene	9.1 ug/L 0.40 ug/L 0.34 ug/L	9.1U ug/L 0.40U ug/L 0.34U ug/L
RSAI2-31B	Acetone Methylene chloride	36 ug/L 0.90 ug/L	36U ug/L 0.90U ug/L
RSAJ2-10B	Acetone	7.9 ug/L	7.9U ug/L
RSAJ2-20B	Acetone 2-Butanone	24 ug/L 2.6 ug/L	24U ug/L 2.6U ug/L
RSAJ2-33B	Acetone	10 ug/L	10U ug/L
RSAJ2009-33B	Acetone	21 ug/L	21U ug/L
SA202-10B	Methylene chloride Toluene Acetone	0.65 ug/L 0.35 ug/L 7.4 ug/L	0.65U ug/L 0.35U ug/L 7.4U ug/L

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 with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
159618LCS	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 1,2-Dibromo-3-chloropropane Bromoform Hexachlorobutadiene	72 (75-125) 74 (75-125) 70 (75-125) 73 (75-125) 71 (75-125)	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B 159618MB	J- (all detects) UJ (all non-detects)	P
159999LCS	Acetone	133 (75-125)	RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B 159999MB	J+ (all detects)	P
159999LCS	Hexachlorobutadiene	67 (75-125)	RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B 159999MB	J- (all detects) UJ (all non-detects)	P
160052LCS	Vinyl chloride	130 (75-125)	SA202-10B 160052MB	J+ (all detects)	P
160416LCS	2,2-Dichloropropane Bromoform Carbon tetrachloride Chloromethane	153 (75-125) 127 (75-125) 131 (75-125) 126 (75-125)	TB062509-SO1 TB062609-SO1 TB062609-SO2 EB062609-SO 160416MB	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	P

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
162407LCS	2-Hexanone 4-Methyl-2-pentanone	70 (75-125) 70 (75-125)	TB062509-SO1RE TB062609-SO2RE EB062609-SORE 162407MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All 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 R0903584	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
TB062509-SO1RE TB062609-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples RSAI2-10B and RSAI2009-10B and samples RSAJ2-33B and RSAJ2009-33B 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
	RSAI2-10B	RSAI2009-10B				
Acetone	6.4	4.3	-	2.1 (≤16)	-	-
Chloroform	0.68	0.40	-	0.28 (≤4.1)	-	-
Methylene chloride	0.52	0.33	-	0.19 (≤4.1)	-	-
Dimethylphthalate	0.51	0.27	-	0.24 (≤4.1)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAJ2-33B	RSAJ2009-33B				
1,1-Dichloroethane	2.2	2.2	-	0 (≤9.6)	-	-
1,2-Dichlorobenzene	9.7	1.5	-	8.2 (≤9.6)	-	-
1,2-Dichloroethane	1.2	1.4	-	0.2 (≤9.6)	-	-
1,4-Dichlorobenzene	10	1.6	-	8.4 (≤9.6)	-	-
Acetone	10	21	-	11 (≤38)	-	-
Benzene	0.70	9.6U	-	8.9 (≤9.6)	-	-
Chlorobenzene	210	2.8	-	207 (≤9.6)	J (all detects)	A

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0903584

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903584	TB062509-SO1 TB062609-SO1RE TB062609-SO1 TB062609-SO2 EB062609-SO	Benzene Toluene Chlorobenzene Ethylbenzene Styrene Isopropylbenzene Bromobenzene 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 1,2,3-Trichlorobenzene m,p-Xylenes o-Xylene Naphthalene	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903584	TB062509-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R0903584	TB062509-SO1RE TB062609-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903584	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B	Dichlorodifluoromethane Trichlorofluoromethane Acetone 2,2-Dichloropropane	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0903584	TB062509-SO1 TB062609-SO1 TB062609-SO2 EB062609-SO TB063009-SO2	2,2-Dichloropropane Carbon tetrachloride trans-1,3-Dichloropropene	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903584	TB062509-SO1RE TB062609-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903584	SA202-28B RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene 1,2-Dibromo-3-chloropropane Bromoform Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903584	RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B	Acetone	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903584	RSAI2009-10B RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0903584	SA202-10B	Vinyl chloride	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903584	TB062509-SO1 TB062609-SO1 TB062609-SO2 EB062609-SO	2,2-Dichloropropane Bromoform Carbon tetrachloride Chloromethane	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903584	TB062509-SO1RE TB062609-SO2RE EB062609-SORE	2-Hexanone 4-Methyl-2-pentanone	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903584	SA202-28B TB062509-SO1 TB062509-SO1RE RSAI3-10B RSAI3-20B RSAI3-32B SA188-0.5B SA172-0.5B TB062609-SO1 TB062609-SO1RE SA41-0.5B SA44-0.5B SA42-0.5B RSAI2-10B RSAI2009-10B TB062609-SO2 TB062609-SO2RE RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2009-33B EB062609-SO EB062609-SORE TB063009-SO2 TB063009-SO2RE SA202-10B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903584	TB062509-SO1RE TB062609-SO1RE TB062609-SO2RE EB062609-SORE TB063009-SO2RE	All TCL compounds	X	A	Overall assessment of data (o)
R0903584	RSAJ2-33B RSAJ2009-33B	Chlorobenzene	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903584

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903584	SA188-0.5B	Acetone	3.6U ug/L	A	bl
R0903584	SA41-0.5B	Acetone	3.2U ug/L	A	bl
R0903584	SA44-0.5B	Acetone	2.4U ug/L	A	bl
R0903584	RSAI2009-10B	Acetone	4.3U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903584

	Sample	Compound	Modified Final Concentration	Code
R0903584	RSAI3-10B	Toluene	0.71U ug/L	bt
R0903584	RSAI3-20B	Toluene	0.54U ug/L	bt
R0903584	RSAI3-32B	Toluene	0.63U ug/L	bt
R0903584	RSAI3-32B	Acetone	7.2U ug/L	bf
R0903584	SA188-0.5B	Acetone Methylene chloride Toluene	3.6U ug/L 0.78U ug/L 0.76U ug/L	bt
R0903584	SA172-0.5B	Acetone Methylene chloride	6.0U ug/L 1.4U ug/L	bt
R0903584	SA41-0.5B	Acetone Methylene chloride	3.2U ug/L 1.6U ug/L	bt
R0903584	SA44-0.5B	Acetone Methylene chloride	2.4U ug/L 1.0U ug/L	bt
R0903584	SA42-0.5B	Acetone Methylene chloride	5.8U ug/L 1.2U ug/L	bt
R0903584	RSAI2-10B	Acetone	6.4U ug/L	bt,be,bf
R0903584	RSAI2-10B	Chloroform Methylene chloride Toluene	0.68U ug/L 0.52U ug/L 0.51U ug/L	bt
R0903584	RSAI2009-10B	Acetone	4.3U ug/L	bt,be,bf
R0903584	RSAI2009-10B	Chloroform Methylene chloride	0.40U ug/L 0.33U ug/L	bt
R0903584	RSAI2009-10B	Toluene	0.27U ug/L	bt,be
R0903584	RSAI2-20B	Acetone Toluene	9.1U ug/L 0.34U ug/L	bt,be
R0903584	RSAI2-20B	Methylene chloride	0.40U ug/L	bt

	Sample	Compound	Modified Final Concentration	Code
R0903584	RSAI2-31B	Acetone Methylene chloride	36U ug/L 0.90U ug/L	bt
R0903584	RSAJ2-10B	Acetone	7.9U ug/L	bt,be
R0903584	RSAJ2-20B	Acetone 2-Butanone	24U ug/L 2.6U ug/L	bt
R0903584	RSAJ2-33B	Acetone	10U ug/L	bt,be
R0903584	RSAJ2009-33B	Acetone	21U ug/L	bt
R0903584	SA202-10B	Methylene chloride Toluene	0.65U ug/L 0.35U ug/L	bt
R0903584	SA202-10B	Acetone	7.4U ug/L	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495K1
SDG #: R0903584
Laboratory: Columbia Analytical Services

Date: 9/21/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 6/25-30/09
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	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	SW	
XVI.	Field duplicates	SW	D_1 = 14, 15 D_2 = 22, 23
XVII.	Field blanks	SW	TB = 2, 3, 9, 10, 16, 17, 26, 27 EB = 24, 25 FB = FB072109-SO from R0904016

TB = TB062609-WI from R0903561

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

Validated Samples: Soil + Water

1	1	SA202-28B	S	11	1	SA41-0.5B	S	21	5	RSAJ2-20B	S	31	1	159618	MB
2	7	TB062509-SO1	W	12	1	SA44-0.5B		22	5	RSAJ2-33B	D7	32	7	160416	
3	3	TB062509-SO1RE		13	1	SA42-0.5B		23	5	RSAJ2009-33B	D7	33	3	162407	
4	1	RSAI3-10B	S	14	1	RSAI2-10B	D1	24	2	EB062609-SO	W	34	4	160676	
5	1	RSAI3-20B		15	5	RSAI2009-10B	D1	25	3	EB062609-SORE		35	5	159999	
6	1	RSAI3-32B		16	2	TB062609-SO2	W	26	2	TB063009-SO2		36	6	160052	
7	1	SA188-0.5B		17	3	TB062609-SO2RE		27	3	TB063009-SO2RE		37			
8	1	SA172-0.5B		18	5	RSAI2-20B	S	28	4	SA202-10B	S	38			
9	7	TB062609-SO1	W	19	5	RSAI2-31B		29				39			
10	4	TB062609-SO1RE		20	2	RSAJ2-10B		30				40			

(no ICV)

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.

Aromatics

LDC #: 21495K1
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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

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

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2	W	N	6/25/09	—	7/07/09	12	J-/UJ/R (h)
9, 16, 24			6/26/09			11	
10					7/08/09	12	
						Aromatics	only)
3			6/25/09		7/21/09	26	J-/UJ/R (h)
17, 25			6/26/09			25	
27			6/30/09			21	
							(All TCL)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Both within 14 days of sample collection.
Soil:	Both within 14 days of sample collection.

LDC #: 21495K1
SDG #: See Cover

Reviewer: SVG
2nd Reviewer: ________

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

- (Y) N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
- (Y) N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
- (Y) N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? r ≥ 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
	6/18/09	ICAL	NNNN		0.026	10, 160676 MB,	J/UJ/A (C)
						3, 17, 25, 27, 162407MB	↓

LDC #: 21495k1
SDG #: Spec Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVL
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
	6/29/09	M9060	JJ (+)	27.5		1,4-8,11-14,159618MB	J+ dets/A (c)
			KK (+)	33.0		↓	↓
			F (+)	25.2			
			OO (+)	26.7			
	7/07/09	X2677	OO (+)	45.3		2,9,16,24,26,160416MB	J+ dets/A
			O (+)	28.1		↓	↓
			W (+)	25.3			
	7/08/09	B9295	NNNN		0.025	10,160676MB,	J/UJ/A
	7/21/09	B9651	NNNN		0.023	3,17,25,27,162407MB	J/UJ/A ↓

LDC #: 21495k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 2
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: 6/29/09
Conc. units: ug/kg
Associated Samples: 1, 4-8, 11-14

	Compound	Blank ID	Sample Identification								
		159618 MB	1	7	11	12					
5.6	~~Methylene chloride~~ F	2.8	(15)	3.6/U	3.2/U	2.4/U					
	Acetone										
				(All others > MB)							
	CRQL										

Blank analysis date: 7/01/09
Conc. units: ug/kg
Associated Samples: 15, 18-23

	Compound	Blank ID	Sample Identification								
		159999 MB	15								
4.6	~~Methylene chloride~~ F	2.3	4.3/U								
	Acetone		(All others > MB)								
	CRQL										

LDC #: 21465K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 2 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: 7/02/09
Conc. units: ug/kg Associated Samples: 28

Compound	Blank ID	Sample Identification								
	160052MB									
5.4 Methylene chloride F	2.7		(> MB)							
Acetone										
CRQL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21495K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer:

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

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

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

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

Associated Samples: ~~1, 14-15, 18-23~~ 14-15, 18-23 (be)

Compound	Blank ID 24	Blank ID 25	Sample Identification							
Sampling Date	6/26/09		~~7~~	~~8~~	~~11~~	~~12~~	~~13~~	14	15	18
16.7 F	1.6	8.1	~~3.6/4~~	~~6.0/4~~	~~3.2/4~~	~~2.4/4~~	~~5.8/4~~	6.4/4	4.3/4	9.1/4
0.98 CC	0.24		~~0.76~~					0.51	0.27/4	0.34/4
2.4 NNNN		1.2								

Blank units: _____ **Associated sample units:** same as above (be)

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

Associated Samples: _____

Compound	Blank ID 24	Blank ID 25	Sample Identification							
Sampling Date	6/26/09		19	20	21	22	23			
16.7 F	1.6	8.1	36	7.9/4	24	10/4	21			
0.98 CC	0.24		0.89		2.6					
2.4 NNNN		1.2								

LDC #: 21495 k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer:

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1, 28, 4-6, 14, 15, 18-23

Compound	Blank ID FB072109-SO	Blank ID	Sample Identification							
Sampling Date	7/21/09		28	6	14	15				
F	3.7		7.4/U	7.2/U	6.4/U	4.3/U				
X	0.28									
			(All others either ND or > FB)							

(2X)
7.4
0.56

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: None 28 (bt)

Compound	Blank ID 26	Blank ID 27	Sample Identification							
Sampling Date	6/30/09		28							
E	0.37	0.29	0.65/U							
CC	0.46	0.21	0.35/U							
NNNN		1.4								

0.74

LDC #: 21495 K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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
		159618 LCS	NNN	72 (75-125)	( )	( )	1, 4-8, 11-14, 159618MB	J-/UJ/P (1)
			KKK	74 ( )	( )	( )		
			MM	70 ( )	( )	( )		
			X	73 ( )	( )	( )		
			LLL	71 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		159999 LCS	F	133 ( )	( )	( )	15, 18-23, 159999MB	J+dets/P
			LLL	67 ( )	( )	( )		J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
		160052 LCS	C	130 ( )	( )	( )	28, 160052 LCS	J+dets/P
				( )	( )	( )		
				( )	( )	( )		
		160416 LCS	OO	153 ( )	( )	( )	2, 9, 16, 24, 160416 MB	J+dets/P
			X	127 ( )	( )	( )		
			O	131 ( )	( )	( )		
			A	126 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		162407 LCS	Z	70 ( )	( )	( )	3, ~~10~~ 17, 25, 162407 MB	J-/UJ/P
			Y	70 (✓)	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495k1
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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, 10, 17, 25, 27	Confirmation runs		X /A (o)

Comments: _____

OVR.1SB

LDC #: 21495k1
SDG #: Sy Cmw

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVL
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) 14	15	RPD
F	6.4	4.3	2.1 (≤16 Diff)
K	0.68	0.40	0.28 (≤4.1 Diff)
E	0.52	0.33	0.19
CC	0.51	0.27	0.24

Compound	Concentration (ug/kg) 22	23	RPD (Parent only)
I	2.2	2.2	0 (≤9.6 Diff)
JJJ	9.7	1.5	8.2
L	1.2	1.4	0.2
HHH	10	1.6	8.4
F	10	21	11 (≤38 Diff)
V	0.70	9.6 U	8.9 (≤9.6 Diff)

Compound	Concentration ( )		RPD
DD	210	2.8	207 (≤9.6 Diff) J (fd)

Compound	Concentration ( )		RPD

LDC #: 21495K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer:

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

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

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

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

cont'd from p. 1

Compound	Blank ID 9	Blank ID 10	16	17	Sample Identification						
Sampling Date:	←	6/26/09	→		15	18	19	20	21	22	23
F	16	18			4.3/U	9.1/U	36/U	7.9/U	24/U	10/U	21/U
K	0.53	.			0.40/U	(1.5)	(1.3)				
E	0.87	2.8	0.23	0.23	0.33/U	0.40/U	0.90/U				
CC	0.26		0.39	0.26	0.27/U	0.34/U	(0.89)				
M		1.5							2.6/U		

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

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: ~~24, 25~~ (bt)

Compound	TB062609-GW1 Blank ID	Blank ID	Sample Identification							
Sampling Date:	6/26/09		24							
E	0.26									
CC	0.39		0.24/U							

LDC #: 21495K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 4
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: 1, 4-6, ~~28~~ (bt)

	Compound	Blank ID 2	Blank ID 3	Sample Identification							
	Sampling Date	6/25/09	→	1	4	5	6	~~28~~ JVG			
0.6	E	0.30	0.26	(1.6)	(0.98)	(0.67)	(0.71)	(0.65)			
1.16	CC	0.58		(1.5)	0.71/U	0.54/U	0.63/U	~~0.35/U~~			
	NNNN		1.4								

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: ____ Associated Samples: 7, 8, 11-15, 18-23 (bt)

	Compound	Blank ID 9	Blank ID 10	16	17	Sample Identification					
	Sampling Date	←	6 /	26 /09	→	7	8	11	12	13	14
36	F	16	18			3.6/U	6.0/U	3.2/U	2.4/U	5.8/U	6.4/U
1.06	K	0.53									0.68/U
5.6	E	0.87	2.8	0.23	0.23	0.78/U	1.4/U	1.6/U	1.0/U	1.2/U	0.52/U
0.78	CC	0.26		0.39	0.26	0.76/U					0.51/U
3.0	M		1.5								

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 6 through July 7, 2009

LDC Report Date: September 25, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903729

Sample Identification

SA206-0.5B
SA206-10B
SA206-25B
SA206-25BDL
SA206-30B
RSAK4-10B
RSAK4-20B
RSAK4-31B
TB070609-SO
RSAL4-0.5B
RSAL4009-0.5B
RSAL4009-0.5BRE
TB070709-S1
RSAL4-10B
RSAL4-28B
RSAL4-28BDL
SA100-10B
SA100-30B
SA100-30BDL
SA69-0.5B
SA69-10B
SA69-29B
SA206-30BMS
SA206-30BMSD

Introduction

This data review covers 15 soil samples and 9 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
6/18/09	2-Methyl-2-propanol	0.026 (≥0.05)	SA206-25BDL SA206-30B TB070609-SO TB070709-S1 RSAL4-28BDL SA100-30BDL SA69-29B	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
7/10/09	Dichlorodifluoromethane	25.3	TB070609-SO TB070709-S1 161113MB	J+ (all detects)	A
7/15/09	Acetone	26.7	SA206-25BDL 161553MB	J- (all detects) UJ (all non-detects)	A
7/17/09	Acetone	30.2	SA206-30B RSAL4-28BDL SA100-30BDL SA69-29B SA206-30BMS SA206-30BMSD 161952MB	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
7/10/09	2-Methyl-2-propanol	0.023 (≥0.05)	TB070609-SO TB070709-S1 161113MB	J (all detects) UJ (all non-detects)	A
7/15/09	2-Methyl-2-propanol	0.024 (≥0.05)	SA206-25BDL 161553MB	J (all detects) UJ (all non-detects)	A
7/17/09	2-Methyl-2-propanol	0.023 (≥0.05)	SA206-30B RSAL4-28BDL SA100-30BDL SA69-29B SA206-30BMS SA206-30BMSD 161952MB	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
161394MB	7/14/09	Acetone	3.2 ug/Kg	SA206-0.5B SA206-10B SA206-25B RSAK4-20B RSAK4-31B
161553MB	7/15/09	2-Butanone	120 ug/Kg	SA206-25BDL
161557MB	7/15/09	1,3,5-Trimethylbenzene 4-Methyl-2-pentanone Acetone	0.34 ug/Kg 0.87 ug/Kg 4.3 ug/Kg	RSAK4-10B RSAL4009-0.5B RSAL4-10B RSAL4-28B SA100-30B
161786MB	7/16/09	Acetone	4.0 ug/Kg	RSAL4-0.5B RSAL4009-0.5BRE SA100-10B SA69-0.5B SA69-10B
161952MB	7/17/09	2-Butanone	120 ug/Kg	SA206-30B RSAL4-28BDL SA100-30BDL SA69-29B

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
SA206-0.5B	Acetone	5.3 ug/Kg	5.3U ug/Kg
RSAK4-20B	Acetone	4.1 ug/Kg	4.1U ug/Kg
RSAK4-31B	Acetone	4.2 ug/Kg	4.2U ug/Kg
SA206-25BDL	2-Butanone	170 ug/Kg	170U ug/Kg
RSAL4009-0.5B	Acetone	6.0 ug/Kg	6.0U ug/Kg
RSAL4-0.5B	Acetone	6.8 ug/Kg	6.8U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA69-0.5B	Acetone	6.4 ug/Kg	6.4U ug/Kg
SA206-30B	2-Butanone	140 ug/Kg	140U ug/Kg
RSAL4-28BDL	2-Butanone	150 ug/Kg	150U ug/Kg
SA100-30BDL	2-Butanone	99 ug/Kg	99U ug/Kg
SA69-29B	2-Butanone	150 ug/Kg	150U ug/Kg

Samples TB070609-SO and TB070709-S1 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
TB070609-SO	7/6/09	Acetone Dichloromethane Toluene Chloroform	2.9 ug/L 0.68 ug/L 0.45 ug/L 0.28 ug/L	SA206-0.5B SA206-10B SA206-25B SA206-25BDL SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B
TB070709-S1	7/7/09	Chloroform Dichloromethane	0.22 ug/L 0.40 ug/L	RSAL4-0.5B RSAL4009-0.5B RSAL4009-0.5BRE RSAL4-10B RSAL4-28B RSAL4-28BDL SA100-10B SA100-30B SA100-30BDL SA69-0.5B SA69-10B SA69-29B

Sample FB072109-SO (from SDG R0904016) 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
FB072109-SO	7/21/09	Acetone Bromoform	3.7 ug/L 0.28 ug/L	All soil samples in SDG R0903729

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
SA206-0.5B	Acetone Dichloromethane Toluene	5.3 ug/Kg 0.48 ug/Kg 0.28 ug/Kg	5.3U ug/Kg 0.48U ug/Kg 0.28U ug/Kg
SA206-10B	Dichloromethane Toluene	1.0 ug/Kg 0.51 ug/Kg	1.0U ug/Kg 0.51U ug/Kg
SA206-25B	Dichloromethane	1.0 ug/Kg	1.0U ug/Kg
RSAK4-10B	Dichloromethane Toluene	0.36 ug/Kg 0.29 ug/Kg	0.36U ug/Kg 0.29U ug/Kg
RSAK4-20B	Acetone Dichloromethane Toluene	4.1 ug/Kg 0.30 ug/Kg 0.26 ug/Kg	4.1U ug/Kg 0.30U ug/Kg 0.26U ug/Kg
RSAK4-31B	Acetone Dichloromethane Toluene	4.2 ug/Kg 0.45 ug/Kg 0.31 ug/Kg	4.2U ug/Kg 0.45U ug/Kg 0.31U ug/Kg
RSAL4-0.5B	Chloroform Dichloromethane Acetone	0.23 ug/Kg 0.59 ug/Kg 6.8 ug/Kg	0.23U ug/Kg 0.59U ug/Kg 6.8U ug/Kg
RSAL4009-0.5B	Dichloromethane Acetone	0.29 ug/Kg 6.0 ug/Kg	0.29U ug/Kg 6.0U ug/Kg
SA69-0.5B	Acetone	6.4 ug/Kg	6.4U 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 with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
RSAL4009-0.5BRE	Dibromofluoromethane	141 (70-130)	All TCL compounds	J+ (all 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 or MSD percent recoveries (%R) were not within QC limits for several compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) 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
161394LCS (SA206-0.5B SA206-10B SA206-25B RSAK4-20B RSAK4-31B 161394MB)	1,2,4-Trichlorobenzene Styrene Vinyl chloride	127 (75-125) 127 (75-125) 130 (75-125)	- - -	- - -	J+ (all detects) J+ (all detects) J+ (all detects)	P
161786LCS (RSAL4-0.5B RSAL4009-0.5BRE SA100-10B SA69-0.5B SA69-10B 161786MB)	Acetone	127 (75-125)	-	-	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 with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAL4009-0.5B	Pentafluorobenzene 1,4-Difluorobenzene	215002 (215453-861810) 347576 (349214-1396854)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 2-Methyl-2-propanol 1,2-Dichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane cis-1,3-Dichloropropene Trichloroethene Benzene 1,1-Dichloropropene Dibromomethane	J (all detects) UJ (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAL4-28B	Pentafluorobenzene 1,4-Dichlorobenzene-d4	129619 (215453-861810) 138138 (156782-627128)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A
RSAL4009-0.5BRE	Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	14752 (205089-820356) 24723 (333000-1332000) 23807 (272391-1089562) 12164 (149468-597872)	All TCL compounds	J (all detects) R (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
SA206-25B	Chlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
RSAL4-28B SA100-30B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903729	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
SA206-25B	Chlorobenzene	X	A
SA206-25BDL	All TCL compounds except Chlorobenzene	X	A
RSAL4-28B SA100-30B	Chloroform	X	A
RSAL4-28BDL SA100-30BDL	All TCL compounds except Chloroform	X	A
RSAL4009-0.5BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples RSAL4-0.5B and RSAL4009-0.5B and samples RSAL4-0.5B and RSAL4009-0.5BRE 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
	RSAL4-0.5B	RSAL4009-0.5B				
1,2-Dichlorobenzene	0.26	0.25	-	0.01 (≤3.3)	-	-
Acetone	6.8	6.0	-	0.8 (≤13)	-	-
Chloroform	0.23	3.3U	-	3.07 (≤3.3)	-	-
Chlorobenzene	3.3U	0.64	-	2.66 (≤3.3)	-	-
Dichloromethane	0.59	0.29	-	0.3 (≤3.3)	-	-
Toluene	0.44	0.23	-	0.21 (≤3.3)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL4-0.5B	RSAL4009-0.5B				
1,2-Dichlorobenzene	0.26	3.7U	-	3.44 (≤3.7)	-	-
Acetone	6.8	38	-	31.2 (≤15)	J (all detects)	A
Chloroform	0.23	3.7U	-	3.47 (≤3.7)	-	-
Dichloromethane	0.59	3.7U	-	3.11 (≤3.7)	-	-
Toluene	0.44	3.7U	-	3.26 (≤3.7)	-	-
Naphthalene	3.3U	1.4	-	1.9 (≤3.3)	-	-

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Volatiles - Data Qualification Summary - SDG R0903729

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903729	SA206-25BDL SA206-30B TB070609-SO TB070709-S1 RSAL4-28BDL SA100-30BDL SA69-29B	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0903729	TB070609-SO TB070709-S1	Dichlorodifluoromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903729	SA206-25BDL SA206-30B RSAL4-28BDL SA100-30BDL SA69-29B	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0903729	TB070609-SO TB070709-S1 SA206-25BDL SA206-30B RSAL4-28BDL SA100-30BDL SA69-29B	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0903729	RSAL4009-0.5BRE	All TCL compounds	J+ (all detects)	A	Surrogate spikes (%R) (s)
R0903729	SA206-0.5B SA206-10B SA206-25B RSAK4-20B RSAK4-31B	1,2,4-Trichlorobenzene Styrene Vinyl chloride	J+ (all detects) J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0903729	RSAL4-0.5B RSAL4009-0.5BRE SA100-10B SA69-0.5B SA69-10B	Acetone	J+ (all detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903729	RSAL4009-0.5B	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 2-Methyl-2-propanol 1,2-Dichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane cis-1,3-Dichloropropene Trichloroethene Benzene 1,1-Dichloropropene Dibromomethane	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903729	RSAL4-28B	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Amyl-methyl ether Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene 2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R0903729	RSAL4009-0.5BRE	All TCL compounds	J (all detects) R (all non-detects)	A	Internal standards (area) (i)
R0903729	SA206-25B	Chlorobenzene	J (all detects)	A	Project Quantitation Limit (e)
R0903729	RSAL4-28B SA100-30B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903729	SA206-0.5B SA206-10B SA206-25B SA206-25BDL SA206-30B RSAK4-10B RSAK4-20B RSAK4-31B TB070609-SO RSAL4-0.5B RSAL4009-0.5B RSAL4009-0.5BRE TB070709-S1 RSAL4-10B RSAL4-28B RSAL4-28BDL SA100-10B SA100-30B SA100-30BDL SA69-0.5B SA69-10B SA69-29B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R0903729	SA206-25B	Chlorobenzene	X	A	Overall assessment of data (o)
R0903729	SA206-25BDL	All TCL compounds except Chlorobenzene	X	A	Overall assessment of data (o)
R0903729	RSAL4-28B SA100-30B	Chloroform	X	A	Overall assessment of data (o)
R0903729	RSAL4-28BDL SA100-30BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R0903729	RSAL4009-0.5BRE	All TCL compounds	X	A	Overall assessment of data (o)
R0903729	RSAL4-0.5B RSAL4009-0.5BRE	Acetone	J (all detects)	A	Field duplicates (RPD) (fd)

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Volatiles - Laboratory Blank Data Qualification Summary - SDG R0903729

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Acetone	5.3U ug/Kg	A	bl
R0903729	RSAK4-20B	Acetone	4.1U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0903729	RSAK4-31B	Acetone	4.2U ug/Kg	A	bl
R0903729	SA206-25BDL	2-Butanone	170U ug/Kg	A	bl
R0903729	RSAL4009-0.5B	Acetone	6.0U ug/Kg	A	bl
R0903729	RSAL4-0.5B	Acetone	6.8U ug/Kg	A	bl
R0903729	SA69-0.5B	Acetone	6.4U ug/Kg	A	bl
R0903729	SA206-30B	2-Butanone	140U ug/Kg	A	bl
R0903729	RSAL4-28BDL	2-Butanone	150U ug/Kg	A	bl
R0903729	SA100-30BDL	2-Butanone	99U ug/Kg	A	bl
R0903729	SA69-29B	2-Butanone	150U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0903729

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903729	SA206-0.5B	Acetone	5.3U ug/Kg	A	bt, bf
R0903729	SA206-0.5B	Dichloromethane Toluene	0.48U ug/Kg 0.28U ug/Kg	A	bt
R0903729	SA206-10B	Dichloromethane Toluene	1.0U ug/Kg 0.51U ug/Kg	A	bt
R0903729	SA206-25B	Dichloromethane	1.0U ug/Kg	A	bt
R0903729	RSAK4-10B	Dichloromethane Toluene	0.36U ug/Kg 0.29U ug/Kg	A	bt
R0903729	RSAK4-20B	Acetone	4.1U ug/Kg	A	bt, bf
R0903729	RSAK4-20B	Dichloromethane Toluene	0.30U ug/Kg 0.26U ug/Kg	A	bt

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903729	RSAK4-31B	Acetone	4.2U ug/Kg	A	bt, bf
R0903729	RSAK4-31B	Dichloromethane Toluene	0.45U ug/Kg 0.31U ug/Kg	A	bt
R0903729	RSAL4-0.5B	Chloroform Dichloromethane	0.23U ug/Kg 0.59U ug/Kg	A	bt
R0903729	RSAL4-0.5B	Acetone	6.8U ug/Kg	A	bf
R0903729	RSAL4009-0.5B	Dichloromethane	0.29U ug/Kg	A	bt
R0903729	RSAL4009-0.5B	Acetone	6.0U ug/Kg	A	bf
R0903729	SA69-0.5B	Acetone	6.4U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495L1
SDG #: R0903729
Laboratory: Columbia Analytical Services

Date: 9/23/09
Page: 1 of 1
Reviewer: JG
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: 7/06 – 07/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	
IV.	Continuing calibration ~~4CV~~	SW	CCV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	M-12 from R0903561
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 10, 11 D_2 = 10, 12
XVII.	Field blanks	SW	TB = 9, 13 FB = FB072109-SO from R0904016

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	7	SA206-0.5B	S	11	4	RSAL4009-0.5B	D_1 S	21	5	SA69-10B	S	31	1	161113 MD
2	7	SA206-10B		12	5	RSAL4009-0.5BRE	D_2	22	6	SA69-29B		+32	7	161394
3	7	SA206-25B		13	1	TB070709-S1	W	23	6	SA206-30BMS		+33	3	161553
4	3	SA206-25BDL		14	4	RSAL4-10B		24	6	SA206-30BMSD		+34	4	161557
5	6	SA206-30B		15	4	RSAL4-28B		25				+35	5	161786
6	4	RSAK4-10B		16	6	RSAL4-28BDL		26				+36	6	161952
7	7	RSAK4-20B		17	5	SA100-10B		27				37		
8	7	RSAK4-31B		18	4	SA100-30B		28				38		
9	1	TB070609-SO	W	19	6	SA100-30BDL		29				39		
10	5	RSAL4-0.5B	D_1 D_2 S	20	5	SA69-0.5B		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 X	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene X	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene X	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene X	FFFF. Acrolein
E. ~~Methylene chloride~~ Dichloromethane	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene X	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene X	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* X	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene X	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane X	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene X	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene X	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 X	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene X	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene X	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene X	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene X	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene X	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane X	GGG. p-Isopropyltoluene X	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene X	BBBB. tert-Amyl methyl ether	VVVV.

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

PBF [redacted] CBZ

DFB X - 4DCB

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 7
Reviewer: [illegible]
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
	6/18/09	ICAL	NNNN		0.026	4, 5, 9, 13, 16, 19, 22	J/UJ/A (C)
						161113MB	
						161553MB	
						161952MB	

INICAL.1SB

LDC #: 21495 L
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
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
	7/10/09	B9347	JJ (+)	25.3		9, 13, 161113MB	J+dets/A (c)
			NNNN		0.023	↓	J/UJ /A
	7/15/09	B9448	F (-)	26.7		4, 161553 MB	J-/UJ /A
			NNNN		0.024	↓	J/UJ /A
	7/17/09	B9549	F (-)	30.2		5, 16, 19, 22-24,	J-/UJ /A
			NNNN		0.023	161952 MB	J/UJ /A

LDC #: 21495 L1
SDG #: See Cover

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

VALIDATION FINDINGS WORKSHEET
Blanks

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: 7/14/09
Conc. units: ug/kg
Associated Samples: 1-3, 7, 8 (bl)

(2x) 6.4

Compound	Blank ID	Sample Identification									
	161394MB	1	7	8							
~~Methylene chloride~~ F	3.2	5.3/U	4.1/U	4.2/U							
Acetone											
		(All others > MB)									
CRQL											

Blank analysis date: 7/15/09
Conc. units: ug/kg
Associated Samples: 4 (bl)

Compound	Blank ID	Sample Identification									
	161553MB	4									
~~Methylene chloride~~ M	120	170/U									
Acetone											
CRQL											

LDC #: 21495 L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

Blank analysis date: 7/15/09
Conc. units: ug/Kg
Associated Samples: 6, 11, 14, 15, 18 (bl)

Compound	Blank ID	Sample Identification								
	161557 MB	6	11	14	15	18				
~~Methylene chloride~~ AAA	0.34									
~~Acetone~~ Y	0.87									
F	4.3	(30)	6.0/4	(18)	(19)	(15)				
CROL										

8.6

Blank analysis date: 7/16/09
Conc. units: ug/Kg
Associated Samples: 10, 12, 18, 20, 21 (bl)

Compound	Blank ID	Sample Identification								
	161786 MB	10	12	18	20	21				
~~Methylene chloride~~ F	4.0	6.8/4	(38)	(22)	6.4/4	(25)				
Acetone										
CROL										

8.0

LDC #: 21495L1
SDG #: See Cover

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: 7/17/09
Conc. units: ug/kg
Associated Samples: 5, 16, 19, 22 (bl)

Compound	Blank ID	Sample Identification								
	16/952MB	5	16	19	22					
~~Methylene chloride~~ M	126	140/U	150/U	99/U	150/U					
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21495 L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 2
Reviewer: JVC
2nd Reviewer: [illegible]

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

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

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

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

Compound	Blank ID: FB072109-SO	Blank ID	Sample Identification							
Sampling Date	7/21/09		1	7	8	10	11	20		
F (2X)	3.7		5.3/U	4.1/U	4.2/U	6.8/U	6.0/U	6.4/U		
X (7.4)	0.28									
(0.56)			(All others either ND or > FB)							

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

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										

LDC #: 21495 L1
SDG #: Ru Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: [signature]

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

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

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 1-8 (bt)

	Compound	Blank ID 9	Blank ID	Sample Identification							
	Sampling Date:	7/06/09		1	2	3	6	7	8		
5.8	F	2.9		5.3/U	(48)	(22)	(30)	4.1/U	4.2/U		
1.36	E	0.68		0.48/U	1.0/U	1.0/U	0.36/U	0.30/U	0.45/U		
0.90	CC	0.45		0.28/U	0.51/U		0.29/U	0.26/U	0.31/U		
6.5✓	K	0.26			(0.51)		(0.61)	(0.60)	(75)		

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 10-12 14-22 (bt)

	Compound	Blank ID 13	Blank ID	Sample Identification							
	Sampling Date:	7/07/09		10	11						
6.49	K	0.22		0.23/U							
0.80	E	0.40		0.59/U	0.29/U						
			C All others either ND or > TB)								

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: JV6
2nd Reviewer: 9

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 surrogate %R within QC limits?

(Y) N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		12	DFM	141 (70-130)	J+ Acts/A (S)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	QC Limits (Soil)	QC Limits (Water)
SMC1 (TOL) = Toluene-d8	81-117	88-110
SMC2 (BFB) = Bromofluorobenzene	74-121	86-115
SMC3 (DCE) = 1,2-Dichloroethane-d4	80-120	80-120
SMC4 (DFM) = Dibromofluoromethane	80-120	86-118

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: SVG
2nd Reviewer: [illegible]

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
(16195)		23/24	B	19 (50-150)	14 (50-150)	( )	5	No qual, LCS in
			D	43 (70-130)	36 (70-130)	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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%

LDC #: 21495 L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: JVC
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 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
		161113 LCS	MM	73 (75-125)	( )	( )	9, 13, 161113MD	~~J-/UJ~~/No qual (MS/MSD)
				( )	( )	( )		
				( )	( )	( )		
		161394 LCS	kkk	127 (75-125)	( )	( )	1-3, 7, 8, 161394MB	J+ dets/P (L)
			FF	127 ( )	( )	( )		
			C	130 ( )	( )	( )		
				( )	( )	( )		
		161786 LCS	F	127 ( )	( )	( )	10, 12, 17, 20, 21,	J+ dets /P (L)
				( )	( )	( )	161786 MB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21495 L1
SDG #: Sq Creek

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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
		11	PFB	215002 (215453 - 861810)		J/UJ/A (select compounds)
			DFB	347576 (349214 - 1396854)		
		15	PFB	129619 (215453 - 861810)		
			4DCB	138138 (156782 - 627128)		
3,6		12	PFB	14752 (205089 - 820356)		J/R/A (all TCL)
3,7			DFB	24723 (333000 - 1332000)		
4,6			CBZ	23807 (272391 - 1089562)		
4,7			4DCB	12164 (149468 - 597872)		

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

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		3	DD > cal range		J DD/A (e)
		15, 18	K > cal range		J K/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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
		3	DD > cal range		X /A (o)
		4	All except DD dil		
		15, 18	K > cal range		
		16, 19	All except K dil		
		12	All TCL confirmation run (IS outside limits)		↓ ↓

Comments: _____

OVR.1SB

LDC #: 21495L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 10	11	RPD
JJJ	0.26	0.25	0.01 (≤ 3.3 Diff)
F	6.8	6.0	0.8 (≤ 13 Diff)
K	0.23	3.3U	3.07 (≤ 3.3 Diff)
DD	3.3U	0.64	2.66
E	0.59	0.29	0.3
CC	0.44	0.23	0.21

Compound	Concentration (ug/kg) 10	12	RPD
JJJ	0.26	3.7U	3.44 (≤ 3.7 Diff)
F	6.8	38	31.2 (≤ 15 Diff) J det/A (fd)
K	0.23	3.7U	3.47 (≤ 3.7 Diff)
E	0.59		3.11
CC	0.44		3.26
MMM	3.3U	1.4	1.9 (≤ 3.3 Diff)

Parent only

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD