Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC #21991

Volatiles

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: August 3 through August 4, 2009

LDC Report Date: December 8, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0904290

Sample Identification

M-31AB
M-31ABDL
TB080309-GW1
M-50B
M-50BDL
M-21B
FB080409-GW
TB080409-GW1

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.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/18/09	2-Methyl-2-propanol	0.026 (≤0.05)	All samples in SDG R0904290	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
8/12/09	Styrene	25.4	M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1 165454-MB	J+ (all detects)	A
8/14/09	Hexachlorobutadiene	25.6	M-31ABDL M-50BDL M-21B 165930-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
8/21/09	2-Methyl-2-propanol	0.024 (≥0.05)	M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1 165454-MB	J (all detects) UJ (all non-detects)	A
8/14/09	2-Methyl-2-propanol	0.021 (≥0.05)	M-31ABDL M-50BDL M-21B 165930-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Samples TB080309-GW1 and TB080409-GW1 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample FB080409-GW 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
FB080409-GW	8/4/09	Acetone Chloromethane Dichloromethane Toluene	12 ug/L 0.31 ug/L 0.28 ug/L 0.78 ug/L	M-21B

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-21B	Acetone	6.6 ug/L	6.6U 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-31AB M-50B	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 R0904290	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-31AB M-50B	Chloroform	X	A
M-31ABDL M-50BDL	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 R0904290

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0904290	M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0904290	M-31AB TB080309-GW1 M-50B FB080409-GW TB080409-GW1	Styrene	J+ (all detects)	A	Continuing calibration (%D) (c)
R0904290	M-31ABDL M-50BDL M-21B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0904290	M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0904290	M-31AB M-50B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0904290	M-31AB M-31ABDL TB080309-GW1 M-50B M-50BDL M-21B FB080409-GW TB080409-GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0904290	M-31AB M-50B	Chloroform	X	A	Overall assessment of data (o)
R0904290	M-31ABDL M-50BDL	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 R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0904290

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0904290

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0904290	M-21B	Acetone	6.6U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991A1
SDG #: R0904290
Laboratory: Columbia Analytical Services

Date: 11/25/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: CF

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 8/03-04/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD (no rr)
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	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, 8 FB = 7

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-31AB	11	165754-MB	21 (7412)		31	
2	M-31ABDL	12	165930	22 (7288)		32	
3	TB080309-GW1	13		23		33	
4	M-50B	14		24		34	
5	M-50BDL	15		25		35	
6	M-21B	16		26		36	
7	FB080409-GW	17		27		37	
8	TB080409-GW1	18		28		38	
9		19		29		39	
10		20		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.

LDC #: 57191 R1
SDG #: Sea Cove

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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
	6/18/09	ICAL	NNNN		0.026	All + Blks	J/NJ/A (C)

LDC #: 21991A1
SDG #: Cu Cover

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	8/12/09	CO130	NNNN		0.024	1,3,4,7,8,16547-MB	J/UJ/A (C)
			FF (+)	25.4		↓	J+ acft/A
	8/14/09	CO155	NNNN		0.021	2,5,6,165930-MB	J/UJ/A
			LLL (-)	25.6		↓	J-/UJ/A

CONCAL 1SB

LDC #: 21991A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV6
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: 6 (bf)

Compound	Blank ID 7	Blank ID	Sample Identification							
Sampling Date	8/04/09		6							
F	12		6.6/U							
A	0.31									
E	0.28									
CC	0.78									

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 #: 21991A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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) 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, 3, 4	K > cal range		J (all compounds) (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21991A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: SVL
2nd Reviewer: CL

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, 3, 4	K > cal range		X/A (o)
					↓ ↓
		2, 4, 5	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: September 8, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905115

Sample Identification

EB090809-SO1
SA54-10B
SA54-20B
SA54-31B
SA50-12B
SA50009-12B
SA50-25B
SA50-36B
SA170-20B
SA170-31B
SA170-0.5B
SA170-10B
SA135-0.5B
SA135-10B
SA135009-10B
SA135-25B
SA135-37B
TB090809-SO1
TB090809-SO2
TB090809-SO3
SA54-31BMSD

Introduction

This data review covers 17 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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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
8/28/09	2-Methyl-2-propanol	0.027 (≤0.05)	EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB	J (all detects) UJ (all non-detects)	A
7/17/09	2-Methyl-2-propanol	0.017 (≤0.05)	TB090809-SO2 170232-MB	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
9/11/09	Dibromochloromethane	30.1	EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB	J+ (all detects)	A
9/14/09	Trichlorofluoromethane 2-Hexanone Hexachlorobutadiene	29.2 30.62 27.9	TB090809-SO2 170232-MB	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
9/11/09	2-Methyl-2-propanol	0.025 (≥0.05)	EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB	J (all detects) UJ (all non-detects)	A
9/14/09	2-Methyl-2-propanol	0.013 (≥0.05)	TB090809-SO2 170232-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
170003-MB	9/11/09	Hexachlorobutadiene	0.30 ug/L	EB090809-SO1 TB090809-SO1 TB090809-SO3
170232-MB	9/14/09	1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene	0.29 ug/L 0.35 ug/L	TB090809-SO2

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

Samples TB090809-SO1, TB090809-SO2, and TB090809-SO3 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
TB090809-SO2	9/8/09	Bromoform Chloromethane Dibromochloromethane	1.4 ug/L 0.25 ug/L 0.76 ug/L	SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B

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

Sample EB090809-SO1 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
EB090809-SO1	9/8/09	Chloroform Dichloromethane	0.55 ug/L 0.49 ug/L	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA50009-12B	Chloroform	0.81 ug/Kg	0.81U ug/Kg
SA170-0.5B	Dichloromethane	0.57 ug/Kg	0.57U ug/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B

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
SA54-20B	Acetone Toluene	5.0 ug/Kg 0.47 ug/Kg	5.0U ug/Kg 0.47U ug/Kg
SA50-12B	Toluene	0.60 ug/Kg	0.60U ug/Kg
SA50009-12B	Toluene	0.36 ug/Kg	0.36U ug/Kg
SA50-36B	Toluene	0.74 ug/Kg	0.74U ug/Kg
SA170-20B	Acetone	4.4 ug/Kg	4.4U ug/Kg
SA170-31B	Acetone	6.3 ug/Kg	6.3U ug/Kg
SA170-0.5B	Acetone Dichloromethane Toluene	2.4 ug/Kg 0.57 ug/Kg 0.51 ug/Kg	2.4U ug/Kg 0.57U ug/Kg 0.51U 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
SA54-31BMS/MSD (SA54-31B)	Chloromethane	57 (70-130)	54 (70-130)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
170003-LCS	Bromomethane Dibromochloromethane	134 (75-125) 136 (75-125)	EB090809-SO1 TB090809-SO1 TB090809-SO3 170003-MB	J+ (all detects) J+ (all detects)	P
170142-LCS	Chloromethane	65 (75-125)	SA54-31B 170142-MB	J- (all detects) UJ (all non-detects)	P
170337-LCS	Carbon tetrachloride	74 (75-125)	SA54-10B SA54-20B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B 170337-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905115	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 SA50-12B and SA50009-12B and samples SA135-10B and SA135009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA50-12B	SA50009-12B				
Acetone	8.1	18U	-	9.9 (≤18)	-	-
Chloroform	2.1	0.81	-	1.29 (≤5.2)	-	-
Toluene	0.60	0.36	-	0.24 (≤5.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA50-12B	SA50009-12B				
2-Butanone	10U	1.2	-	8.8 (≤10)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA135-10B	SA135009-10B				
2-Butanone	2.8	13U	-	10.2 (≤13)	-	-
Acetone	6.1	27U	-	20.9 (≤27)	-	-
Toluene	4.0	2.4	-	1.6 (≤7.1)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905115

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1 TB090809-SO1 TB090809-SO3 TB090809-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905115	EB090809-SO1 TB090809-SO1 TB090809-SO3	Dibromochloromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905115	TB090809-SO2	Trichlorofluoromethane 2-Hexanone Hexachlorobutadiene	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0905115	EB090809-SO1 TB090809-SO1 TB090809-SO3 TB090809-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905115	SA54-31B	Chloromethane	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905115	EB090809-SO1 TB090809-SO1 TB090809-SO3	Bromomethane Dibromochloromethane	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905115	SA54-31B	Chloromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905115	SA54-10B SA54-20B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B	Carbon tetrachloride	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905115	EB090809-SO1 SA54-10B SA54-20B SA54-31B SA50-12B SA50009-12B SA50-25B SA50-36B SA170-20B SA170-31B SA170-0.5B SA170-10B SA135-0.5B SA135-10B SA135009-10B SA135-25B SA135-37B TB090809-SO1 TB090809-SO2 TB090809-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905115

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905115

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905115	SA50009-12B	Chloroform	0.81U ug/Kg	A	be
R0905115	SA170-0.5B	Dichloromethane	0.57U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905115

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905115	SA54-20B	Acetone Toluene	5.0U ug/Kg 0.47U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905115	SA50-12B	Toluene	0.60U ug/Kg	A	bf
R0905115	SA50009-12B	Toluene	0.36U ug/Kg	A	bf
R0905115	SA50-36B	Toluene	0.74U ug/Kg	A	bf
R0905115	SA170-20B	Acetone	4.4U ug/Kg	A	bf
R0905115	SA170-31B	Acetone	6.3U ug/Kg	A	bf
R0905115	SA170-0.5B	Acetone Dichloromethane Toluene	2.4U ug/Kg 0.57U ug/Kg 0.51U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991B1
SDG #: R0905115
Laboratory: Columbia Analytical Services

Date: 11/30/09
Page: 1 of 1
Reviewer: SW
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: 9/08/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD rr
IV.	Continuing calibration ~~ICV~~	SW	CW ≤ 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 = 5, 6 D_2 = 14, 15
XVII.	Field blanks	SW	EB = 1 TB = 18*, 19, 20* FB = FB072909-SO (from R09 ↓ = FB080309-SO (from R09042

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

Validated Samples: Water + Soil

1	EB090809-SO1	W	11	SA170-0.5B	S	21	SA54-31BMSD	S	31	170003 - MB	(85
2	SA54-10B	S	12	SA170-10B		22	SA54-31BMS		32	170337 -	(86
3	SA54-20B		13	SA135-0.5B		23			33	170142 -	(85
4	SA54-31B		14	SA135-10B	D_2	24			34	170485 -	(86
5	SA50-12B	D_1	15	SA135009-10B	D_2	25			35	170232 -	(85
6	SA50009-12B	D_1	16	SA135-25B		26			36		
7	SA50-25B		17	SA135-37B		27			37		
8	SA50-36B		18	TB090809-SO1	W	28			38		
9	SA170-20B		19	TB090809-SO2		29			39		
10	SA170-31B		20	TB090809-SO3		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.

.DC #: 21991B1
SDG #: Sun Cove

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	8/28/09	ICAL	NNNN		0.027	1, 18, 20, 170003-MB	J/UJ/A (C)
	9/17/09	ICAL	NNNN		0.017	19, 170232-MB	↓ ↓

INICAL.1SB

LDC #: 21991B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/11/09	C0701	T (+)	30.1		1, 18, 20 170003-MB	J+ dets /A (c)
			NNNN		0.025	↓	J/UJ /A
	9/14/09	F2540	KK (+)	29.2		19, 170232-MB	J+ dets/A
			NNNN		0.013	↓	J/UJ /A
			Z (+)	30.62			J+ dets /A
			LLL (+)	27.9		↓	↓

LDC #: 21991B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: VV
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: 9/11/09
Conc. units: ug/L
Associated Samples: 1, 18, 20 (ND)

Compound	Blank ID	Sample Identification								
	170003-MB									
LLL	0.30									

Blank analysis date: 9/14/09
Conc. units: ug/L
Associated Samples: 19 (ND)

Compound	Blank ID	Sample Identification								
	170232-MB									
KKK	0.29									
NNN	0.35									

LDC #: 21991 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
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: EB Associated Samples: 2-12 (6e)

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	9/08/09		6	11						
K	0.55		0.81/U							
E	0.49			0.57/U						
			(All others either ND or > EB)							

1
98

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 9-17 (ND)

Compound	Blank ID 19	Blank ID	Sample Identification							
Sampling Date	9/08/09									
X	1.4									
A	0.25									
T	0.76									

LDC #: 21991 B1
SDG #: Eq Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 7
Reviewer: JV6
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: 2-~~10~~ 12 (bf)

Compound	FB 072909-SO Blank ID	Blank ID	Sample Identification							
Sampling Date	7/29/09		3	5	6	8	9	10	11	
F	3.5		5.0/U				4.4/U	6.3/U	2.4/U	
E	0.30								0.57/U	
CC	0.44		0.47/U	0.60/U	0.36/U	0.74/U			0.51/U	
			(All others either ND or > FB)							

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 13 - 17

Compound	FB 080309-SO Blank ID	Blank ID	Sample Identification							
Sampling Date	8/03/09									
F	2.1		(All results either ND or > FB)							
CC	0.30									

LDC #: 21991 B1
SDG #: Eq Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 7
Reviewer: JV6
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: 2-~~10~~ 12 (bf)

Compound	FB 072909-SO Blank ID	Blank ID	Sample Identification							
Sampling Date	7/29/09		3	5	6	8	9	10	11	
F	3.5		5.0/U				4.4/U	6.3/U	2.4/U	
E	0.30								0.57/U	
CC	0.44		0.47/U	0.60/U	0.36/U	0.74/U			0.51/U	
			(All others either ND or > FB)							

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 13 - 17

Compound	FB 080309-SO Blank ID	Blank ID	Sample Identification							
Sampling Date	8/03/09									
F	2.1		(All results either ND or > FB)							
CC	0.30									

DC #: 21991B1
DG #: Fig Comy

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

(N) N/A Was a LCS required?
(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
		170003 LCS	T	136 (75-125)	( )	( )	1, 18, 20, 170003MB	J+ dcts/p (L)
			B	134 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		170142 LCS	F	68 (75-125)	( )	( )	4, 170142-MB	No qual (MS/MSD in
			A	65 ( )	( )	( )		J-/UJ/p (m)
			MMM	126 ( )	( )	( )		No qual (MS/MSD in
				( )	( )	( )		
				( )	( )	( )		
		170337 LCS	O	74 (75-125)	( )	( )	2, 3, 5-12	J-/UJ/p (L)
				( )	( )	( )	170337 MB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991B1
SDG #: Su Cmv

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 5	6	RPD	Parent only
F	8.1	18 U	9.9 (≤ 18 D)	-
K	2.1	0.81	1.29 (≤ 5.2 D)	-
CC	0.60	0.36	0.24	-
M	10 U	1.2	8.8 (≤ 10 D)	-

Compound	Concentration (ug/kg) 14	15	RPD	Parent only
M	2.8	13 U	10.2 (≤ 13 D)	-
F	6.1	27 U	20.9 (≤ 27 D)	-
CC	4.0	2.4	1.6 (≤ 7.1 D)	-

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 3, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905072

Sample Identification

SA58-0.5B
SA58-10B
SA58009-28B
SA58-28B
SA53-10B
SA53-25B
SA53-32B
SA106-12B
SA106-20B
SA106-35B
RSAU7-0.5B
RSAU7009-0.5B
RSAU7-10B
RSAU7-25B
RSAU7-40B
RSAU7-54B
SA204-0.5B
SA204-10B
SA204009-10B
SA204-30B
SA204-45B
EB090309-SO2
TB090309-SO1
TB090309-SO2
TB090309-SO3
TB090309-SO4

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
8/28/09	2-Methyl-2-propanol	0.027 (≤0.05)	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 170003-MB	J (all detects) UJ (all non-detects)	A
7/17/09	2-Methyl-2-propanol	0.017 (≤0.05)	TB090309-SO2 170232-MB	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
9/11/09 (H0701)	2-Chlorotoluene	25.5	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B 169909-MB	J+ (all detects)	A
9/11/09 (C0701)	Dibromochloromethane	30.1	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 17003-MB	J+ (all detects)	A
9/14/09	Trichlorofluoromethane Hexachlorobutadiene 2-Hexanone	29.2 27.9 30.62	TB090309-SO2 170232-MB	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
9/11/09 (C0701)	2-Methyl-2-propanol	0.025 (≥0.05)	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 17003-MB	J (all detects) UJ (all non-detects)	A
9/14/09	2-Methyl-2-propanol	0.013 (≥0.05)	TB090309-SO2 170232-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
170003-MB	9/11/09	Hexachlorobutadiene	0.30 ug/L	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4
170232-MB	9/14/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	0.35 ug/L 0.29 ug/L	TB090309-SO2

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

Samples TB090309-SO1, TB090309-SO2, TB090309-SO3, and TB090309-SO4 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample EB090309-SO2 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
EB090309-SO2	9/3/09	Acetone Dichloromethane	12 ug/L 0.27 ug/L	RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAU7-0.5B	Acetone	12 ug/Kg	12U ug/Kg
RSAU7009-0.5B	Acetone	11 ug/Kg	11U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
RSAU7-10B	Acetone	23 ug/Kg	23U ug/Kg
RSAU7-54B	Acetone	3.1 ug/Kg	3.1U ug/Kg
SA204-30B	Acetone	14 ug/Kg	14U ug/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B

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
SA58-0.5B	Toluene	0.54 ug/Kg	0.54U ug/Kg
SA58009-28B	Acetone	3.4 ug/Kg	3.4U ug/Kg
SA58-28B	Acetone	6.6 ug/Kg	6.6U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA53-10B	Acetone	6.5 ug/Kg	6.5U ug/Kg
SA106-12B	Toluene	0.65 ug/Kg	0.65U ug/Kg
RSAU7-54B	Acetone	3.1 ug/Kg	3.1U 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 not within QC limits. Since there were no associated samples, 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
169909-LCS	Acetone Vinyl chloride	129 (75-125) 127 (75-125)	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B 169909-MB	J+ (all detects) J+ (all detects)	P
170003-LCS	Bromomethane Dibromochloromethane	134 (75-125) 136 (75-125)	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 170003-MB	J+ (all detects) J+ (all detects)	P

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
170142-LCS	Chloromethane	65 (75-125)	RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B 170142-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905072	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 SA58009-28B and SA58-28B, samples RSAU7-0.5B and RSAU7009-0.5B, and samples SA204-10B and SA204009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA58009-28B	SA58-28B				
Acetone	3.4	6.6	-	3.2 (≤30)	-	-
Chloroform	3.4	3.8	-	0.4 (≤7.6)	-	-
Dichloromethane	7.6U	1.2	-	6.4 (≤7.6)	-	-
Toluene	1.8	6.7U	-	4.9 (≤6.7)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAU7-0.5B	RSAU7009-0.5B				
2-Butanone	1.8	0.92	-	0.88 (≤14)	-	-
Acetone	1.2	11	-	1.0 (≤27)	-	-
Toluene	2.8	1.6	-	1.2 (≤6.8)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA204-10B	SA204009-10B				
2-Butanone	3.4	13U	-	9.6 (≤13)	-	-
Toluene	1.0	6.4U	-	5.4 (≤6.4)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905072

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905072	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 TB090309-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905072	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B	2-Chlorotoluene	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905072	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4	Dibromochloromethane	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905072	TB090309-SO2	Trichlorofluoromethane Hexachlorobutadiene 2-Hexanone	J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0905072	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4 TB090309-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905072	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B	Acetone Vinyl chloride	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905072	EB090309-SO2 TB090309-SO1 TB090309-SO3 TB090309-SO4	Bromomethane Dibromochloromethane	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905072	RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B	Chloromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905072	SA58-0.5B SA58-10B SA58009-28B SA58-28B SA53-10B SA53-25B SA53-32B SA106-12B SA106-20B SA106-35B RSAU7-0.5B RSAU7009-0.5B RSAU7-10B RSAU7-25B RSAU7-40B RSAU7-54B SA204-0.5B SA204-10B SA204009-10B SA204-30B SA204-45B EB090309-SO2 TB090309-SO1 TB090309-SO2 TB090309-SO3 TB090309-SO4	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905072

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905072

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905072	RSAU7-0.5B	Acetone	12U ug/Kg	A	be
R0905072	RSAU7009-0.5B	Acetone	11U ug/Kg	A	be
R0905072	RSAU7-10B	Acetone	23U ug/Kg	A	be
R0905072	RSAU7-54B	Acetone	3.1U ug/Kg	A	be
R0905072	SA204-30B	Acetone	14U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905072

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905072	SA58-0.5B	Toluene	0.54U ug/Kg	A	bf
R0905072	SA58009-28B	Acetone	3.4U ug/Kg	A	bf
R0905072	SA58-28B	Acetone	6.6U ug/Kg	A	bf
R0905072	SA53-10B	Acetone	6.5U ug/Kg	A	bf
R0905072	SA106-12B	Toluene	0.65U ug/Kg	A	bf
R0905072	RSAU7-54B	Acetone	3.1U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991C1
SDG #: R0905072
Laboratory: Columbia Analytical Services

Date: 11/30/09
Page: 1 of 1
Reviewer: JVG
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: 9/03/09
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	SW	No associated sample, NO qual
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 = 3,4 D_2 = 11,12 D_3 = 18,19
XVII.	Field blanks	SW	EB = 22 TB = 23, 24, 25, 26 FB = FB072909-SO (from RO904226) = FB080309-SO (from RO904279)

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	SA58-0.5B	S	11	1	RSAU7-0.5B	D_2 S	21	3	SA204-45B	S	31	1	IC 9909 - MB
2	1	SA58-10B	B2	12	1	RSAU7009-0.5B	D_2	22	2	EB090309-SO2	W	32	2	170003 -
3	1	SA58009-28B	b_1	13	1	RSAU7-10B		23	2	TB090309-SO1		33	2	170142 -
4	1	SA58-28B	D_1	14	3	RSAU7-25B		24	4	TB090309-SO2		34	4	170232 -
5	1	SA53-10B		15	3	RSAU7-40B		25	2	TB090309-SO3		35		
6	1	SA53-25B		16	3	RSAU7-54B		26	2	TB090309-SO4		36		
7	1	SA53-32B		17	3	SA204-0.5B		27				37		
8	1	SA106-12B		18	3	SA204-10B	D_3	28				38		
9	1	SA106-20B		19	3	SA204009-10B	D_3	29				39		
10	1	SA106-35B		20	3	SA204-30B		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.

DC #:
DG #: Eq Cmpy

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

Y (N) N/A 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 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
	8/28/09	ICAL	NNNN		0.027	22, 23, 25, 26, 170003-MB	J/UJ/A (C)
	7/17/09	ICAL	NNNN		0.017	24, 170232-MB	J/UJ/A (C)

LDC #: 21991C1
SDG #: Sy Cmpd

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/11/09	H0701	ZZ (+)	25.5		1-13, 169909-MB	J+ dets/A (CC)
	9/11/09	C0701	NNNN		0.025	22, 23, 25, 26,	J/NJ/A
			T (+)	30.1		170003-MB	J+ dets/A
	9/14/09	F2540	KK (+)	29.2		24, 170232-MB	J+ dets/A
			NNNN		0.013		J/NJ/A
			LLL (+)	27.9			J+ dets/A
			Z (+)	30.62			

CONCAL 1SB

LDC #: 21991C1
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: 9/11/09
Conc. units: ug/L Associated Samples: 22, 23, 25, 26 (ND)

Compound	Blank ID	Sample Identification								
	170003-MB									
LLL	0.30									

Blank analysis date: 9/14/09
Conc. units: ug/L Associated Samples: 24 (ND)

Compound	Blank ID	Sample Identification								
	170232-MB									
NNN	0.35									
kkk	0.29									

LDC #: 21991C1
SDG #: Ca Comm

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VG
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: EB Associated Samples: 11-21 (be)

Compound	Blank ID 22	~~Blank ID~~	Sample Identification							
Sampling Date	9/03/09	11	12	13	16	20				
F	12	12/U	11/U	23/U	3.1/U	14/U				
E	0.27									
			(All others ND)							

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-10 (bf)

Compound	FB072901-SO Blank ID	~~Blank ID~~	Sample Identification							
Sampling Date	7/29/09	1	3	4	5	8				
F	3.5		3.4/U	6.6/U	6.5/U					
E	0.30									
CC	0.44	0.54/U				0.65/U				
		(All others either ND or > FB								

LDC #: 21991C1
SDG #: Sw 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/Kg

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 11-21 (bf)

Compound	Blank ID FB080309-SO	Blank ID	Sample Identification							
Sampling Date	8/03/09		16							
F	2.1		3.1/U							
CC	0.30									

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 #: 21991C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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".

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
		169909-LCS	F	129 (75-125)	( )	( )	1-13 169909-MB	J+ dets/P (L)
			C	127 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		170003-LCS	B	134 ( )	( )	( )	22, 23, 25, 26	
			T	136 ( )	( )	( )	170003-MB	
				( )	( )	( )		
				( )	( )	( )		
		170142-LCS	F	68 ( )	( )	( )	14-21 17142-MB	No qual (MS/MSD in)
			A	65 ( )	( )	( )		J-/NJ/P (L)
			MMM	126 (✓)	( )	( )		No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991 C1
SDG #: Lab Group

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: [signature]

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

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	3	4	
F	3.4	6.6	3.2 (≤ 30 D) –
K	3.4	3.8	0.4 (≤ 7.6 D) –
E	7.6 U	1.2	6.4 ↓ –
CC	1.8	6.7 U	4.9 (≤ 6.7 D) –

Compound	Concentration (ug/kg)		RPD
	11	12	
M	1.8	0.92	0.88 (≤ 14 D) –
F	1.2	11	1.0 (≤ 27 D) –
CC	2.8	1.6	1.2 (≤ 6.8 D) –

Compound	Concentration (ug/kg)		RPD
	18	19	
M	3.4	13 U	9.6 (≤ 13 D) –
CC	1.0	6.4 U	5.4 (≤ 6.4 D) –

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 10, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905177

Sample Identification

EB091009-SO1
EB091009-SO2
SA102-10B
SA102-30B
SA109-10B
SA109-25B
SA109-25BDL
SA109-34B
SA124009-10B
SA124-0.5B
SA124-10B
SA125-25B
SA125-39B
SA125009-39B
SA125-0.5B
SA125-10B
SA126-0.5B
SA126-10B
SA126-18B
SA126-25B
SA126-40B
TB091009-SO2
TB091009-SO3
TB091009-SO4
TB091009-SO5
SA126-40BMS
SA126-40BMSD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/09	2-Methyl-2-propanol	0.017 (≤0.05)	All water samples in SDG R0905177	J (all detects) UJ (all non-detects)	A
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	SA109-25BDL 171659-MB	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
9/18/09 (H0910)	Hexachlorobutadiene	26.1	SA102-10B SA102-30B SA109-10B SA109-25B 170888-MB	J- (all detects) UJ (all non-detects)	A
9/19/09	Hexachlorobutadiene 1,2,3-Trichlorobenzene	35.2 27.1	SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA126-40B SA126-40BMS SA126-40BMSD 171072-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
9/18/09 (F2667)	2-Methyl-2-propanol	29.4	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170939-MB	J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09 (F2667)	2-Methyl-2-propanol	0.022 (≥0.05)	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170939-MB	J (all detects) UJ (all non-detects)	A
9/18/09 (F2693)	2-Methyl-2-propanol	0.020 (≥0.05)	TB091009-SO4 TB091009-SO5 170939-MB	J (all detects) UJ (all non-detects)	A
9/23/09	2-Methyl-2-propanol	0.027 (≥0.05)	SA109-25BDL 171659-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
170936-MB	9/18/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Acetone Bromomethane Naphthalene	0.29 ug/L 0.21 ug/L 2.8 ug/L 0.42 ug/L 0.31 ug/L	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3
170939-MB	9/19/09	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene Naphthalene	0.33 ug/L 0.28 ug/L 0.32 ug/L	TB091009-SO4 TB091009-SO5
171110-MB	9/21/09	Dichloromethane	0.77 ug/Kg	SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B
171659-MB	9/23/09	2-Butanone	80 ug/Kg	SA109-25BDL

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
EB091009-SO1	Acetone	4.7 ug/L	4.7U ug/L
EB091009-SO2	Acetone	4.0 ug/L	4.0U ug/L
SA109-25BDL	2-Butanone	170 ug/Kg	170U ug/Kg

Samples TB091009-SO2, TB091009-SO3, TB091009-SO4, and TB091009-SO5 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
TB091009-SO3	9/10/09	Acetone	6.9 ug/L	EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B
TB091009-SO4	9/10/09	Acetone	2.4 ug/L	EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
EB091009-SO1	Acetone	4.7 ug/L	4.7U ug/L
EB091009-SO2	Acetone	4.0 ug/L	4.0U ug/L
SA109-10B	Acetone	5.5 ug/Kg	5.5U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA109-25B	Acetone	13 ug/Kg	13U ug/Kg
SA109-34B	Acetone	13 ug/Kg	13U ug/Kg
SA125-10B	Acetone	8.9 ug/Kg	8.9U ug/Kg
SA126-0.5B	Acetone	4.8 ug/Kg	4.8U ug/Kg
SA126-25B	Acetone	12 ug/Kg	12U ug/Kg

Samples EB091009-SO1 and EB091009-SO2 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
EB091009-SO1	9/10/09	1,4-Dichlorobenzene Acetone Benzene Dichloromethane Toluene	0.51 ug/L 4.7 ug/L 0.36 ug/L 8.3 ug/L 1.9 ug/L	All soil samples in SDG R0905177
EB091009-SO2	9/10/09	Acetone Toluene Trichlorofluoromethane	4.0 ug/L 0.32 ug/L 4.4 ug/L	All soil samples in SDG R0905177

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA102-10B	Toluene	0.48 ug/Kg	0.48U ug/Kg
SA102-30B	Toluene	0.50 ug/Kg	0.50U ug/Kg
SA109-10B	Acetone Toluene	5.5 ug/Kg 0.58 ug/Kg	5.5U ug/Kg 0.58U ug/Kg
SA109-25B	Dichloromethane Toluene	0.80 ug/Kg 0.82 ug/Kg	0.80U ug/Kg 0.82U ug/Kg
SA109-34B	Toluene	0.58 ug/Kg	0.58U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA124009-10B	Toluene	0.49 ug/Kg	0.49U ug/Kg
SA124-0.5B	Toluene	1.3 ug/Kg	1.3U ug/Kg
SA124-10B	Toluene	3.7 ug/Kg	3.7U ug/Kg
SA125-25B	Toluene	0.36 ug/Kg	0.36U ug/Kg
SA125-39B	Dichloromethane Toluene	0.55 ug/Kg 0.48 ug/Kg	0.55U ug/Kg 0.48U ug/Kg
SA125009-39B	Trichlorofluoromethane	1.8 ug/Kg	1.8U ug/Kg
SA125-0.5B	Toluene	0.47 ug/Kg	0.47U ug/Kg
SA125-10B	Acetone Trichlorofluoromethane	8.9 ug/Kg 1.8 ug/Kg	8.9U ug/Kg 1.8U ug/Kg
SA126-0.5B	Acetone Toluene	4.8 ug/Kg 0.61 ug/Kg	4.8U ug/Kg 0.61U ug/Kg
SA126-10B	Toluene	1.0 ug/Kg	1.0U ug/Kg
SA126-18B	Toluene	0.45 ug/Kg	0.45U ug/Kg
SA126-25B	Toluene	0.49 ug/Kg	0.49U ug/Kg
SA126-40B	Toluene	0.53 ug/Kg	0.53U ug/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905177

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
SA102-10B	Toluene	0.48 ug/Kg	0.48U ug/Kg
SA102-30B	Toluene	0.50 ug/Kg	0.50U ug/Kg
SA109-10B	Acetone Toluene	5.5 ug/Kg 0.58 ug/Kg	5.5U ug/Kg 0.58U ug/Kg
SA109-25B	Toluene	0.82 ug/Kg	0.82U ug/Kg
SA109-34B	Toluene	0.58 ug/Kg	0.58U ug/Kg
SA124009-10B	Toluene	0.49 ug/Kg	0.49U ug/Kg
SA125-25B	Toluene	0.36 ug/Kg	0.36U ug/Kg
SA125-39B	Dichloromethane Toluene	0.55 ug/Kg 0.48 ug/Kg	0.55U ug/Kg 0.48U ug/Kg
SA125-0.5B	Toluene	0.47 ug/Kg	0.47U ug/Kg
SA126-0.5B	Acetone Toluene	4.8 ug/Kg 0.61 ug/Kg	4.8U ug/Kg 0.61U ug/Kg
SA126-18B	Toluene	0.45 ug/Kg	0.45U ug/Kg
SA126-25B	Toluene	0.49 ug/Kg	0.49U ug/Kg
SA126-40B	Toluene	0.53 ug/Kg	0.53U 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
SA126-40BMS/MSD (SA126-40B)	Dichlorodifluoromethane	49 (70-130)	49 (70-130)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
170936-LCS	2-Methyl-2-propanol	130 (75-125)	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170936-MB	J+ (all detects)	P
170936-LCS	Dichlorodifluoromethane	70 (75-125)	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 170936-MB	J- (all detects) UJ (all non-detects)	P
170939-LCS	Dichlorodifluoromethane	64 (75-125)	TB091009-SO4 TB091009-SO5 170939-MB	J- (all detects) UJ (all non-detects)	P
170888-LCS	Carbon tetrachloride Dichlorodifluoromethane	66 (75-125) 71 (75-125)	SA102-10B SA102-30B SA109-10B SA109-25B 170888-MB	J- (all detects) UJ (all non-detects)	P
171072-LCS	Dichlorodifluoromethane	73 (75-125)	SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA126-40B 171072-MB	J- (all detects) UJ (all non-detects)	P
171110-LCS	Dichlorodifluoromethane	67 (75-125)	SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B 171110-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA109-25B	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 R0905177	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
SA109-25B	Chloroform	X	A
SA109-25BDL	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 SA124009-10B and SA124-10B and samples SA125-39B and SA125009-39B 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
	SA124009-10B	SA124-10B				
2-Butanone	1.3	1.6	-	0.3 (≤13)	-	-
Acetone	63	19	-	44 (≤26)	J (all detects)	A
Chloroform	0.97	0.87	-	0.10 (≤6.5)	-	-
Toluene	0.49	3.7	-	3.21 (≤6.5)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA125-39B	SA125009-39B				
Chloroform	44	41	7 (≤50)	-	-	-
Dichloromethane	0.55	4.8U	-	4.25 (≤4.8)	-	-
Toluene	0.48	4.8U	-	4.32 (≤4.8)	-	-
2-Butanone	11U	0.96	-	10.04 (≤11)		
Trichlorofluoromethane	5.6U	1.8	-	3.8 (≤5.6)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905177	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-25BDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905177	SA102-10B SA102-30B SA109-10B SA109-25B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905177	SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA126-40B	Hexachlorobutadiene 1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905177	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3	2-Methyl-2-propanol	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905177	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-25BDL	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905177	SA126-40B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905177	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3	2-Methyl-2-propanol	J+ (all detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905177	EB091009-SO1 EB091009-SO2 TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5 SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA126-40B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905177	SA102-10B SA102-30B SA109-10B SA109-25B	Carbon tetrachloride Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905177	SA109-25B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0905177	EB091009-SO1 EB091009-SO2 SA102-10B SA102-30B SA109-10B SA109-25B SA109-25BDL SA109-34B SA124009-10B SA124-0.5B SA124-10B SA125-25B SA125-39B SA125009-39B SA125-0.5B SA125-10B SA126-0.5B SA126-10B SA126-18B SA126-25B SA126-40B TB091009-SO2 TB091009-SO3 TB091009-SO4 TB091009-SO5	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905177	SA109-25B	Chloroform	X	A	Overall assessment of data (o)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905177	SA109-25BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R0905177	SA124-10B SA124009-10B	Acetone	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905177

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905177	EB091009-SO1	Acetone	4.7U ug/L	A	bl
R0905177	EB091009-SO2	Acetone	4.0U ug/L	A	bl
R0905177	SA109-25BDL	2-Butanone	170U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905177	EB091009-SO1	Acetone	4.7U ug/L	A	bt
R0905177	EB091009-SO2	Acetone	4.0U ug/L	A	bt
R0905177	SA109-10B	Acetone	5.5U ug/Kg	A	bt
R0905177	SA109-25B	Acetone	13U ug/Kg	A	bt
R0905177	SA109-34B	Acetone	13U ug/Kg	A	bt
R0905177	SA125-10B	Acetone	8.9U ug/Kg	A	bt
R0905177	SA126-0.5B	Acetone	4.8U ug/Kg	A	bt
R0905177	SA126-25B	Acetone	12U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905177	SA102-10B	Toluene	0.48U ug/Kg	A	be
R0905177	SA102-30B	Toluene	0.50U ug/Kg	A	be
R0905177	SA109-10B	Acetone Toluene	5.5U ug/Kg 0.58U ug/Kg	A	be
R0905177	SA109-25B	Dichloromethane Toluene	0.80U ug/Kg 0.82U ug/Kg	A	be
R0905177	SA109-34B	Toluene	0.58U ug/Kg	A	be
R0905177	SA124009-10B	Toluene	0.49U ug/Kg	A	be
R0905177	SA124-0.5B	Toluene	1.3U ug/Kg	A	be
R0905177	SA124-10B	Toluene	3.7U ug/Kg	A	be
R0905177	SA125-25B	Toluene	0.36U ug/Kg	A	be
R0905177	SA125-39B	Dichloromethane Toluene	0.55U ug/Kg 0.48U ug/Kg	A	be
R0905177	SA125009-39B	Trichlorofluoromethane	1.8U ug/Kg	A	be
R0905177	SA125-0.5B	Toluene	0.47U ug/Kg	A	be
R0905177	SA125-10B	Acetone Trichlorofluoromethane	8.9U ug/Kg 1.8U ug/Kg	A	be
R0905177	SA126-0.5B	Acetone Toluene	4.8U ug/Kg 0.61U ug/Kg	A	be
R0905177	SA126-10B	Toluene	1.0U ug/Kg	A	be
R0905177	SA126-18B	Toluene	0.45U ug/Kg	A	be
R0905177	SA126-25B	Toluene	0.49U ug/Kg	A	be
R0905177	SA126-40B	Toluene	0.53U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905177

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905177	SA102-10B	Toluene	0.48U ug/Kg	A	bf
R0905177	SA102-30B	Toluene	0.50U ug/Kg	A	bf
R0905177	SA109-10B	Acetone Toluene	5.5U ug/Kg 0.58U ug/Kg	A	bf
R0905177	SA109-25B	Toluene	0.82U ug/Kg	A	bf
R0905177	SA109-34B	Toluene	0.58U ug/Kg	A	bf
R0905177	SA124009-10B	Toluene	0.49U ug/Kg	A	bf
R0905177	SA125-25B	Toluene	0.36U ug/Kg	A	bf
R0905177	SA125-39B	Dichloromethane Toluene	0.55U ug/Kg 0.48U ug/Kg	A	bf
R0905177	SA125-0.5B	Toluene	0.47U ug/Kg	A	bf
R0905177	SA126-0.5B	Acetone Toluene	4.8U ug/Kg 0.61U ug/Kg	A	bf
R0905177	SA126-18B	Toluene	0.45U ug/Kg	A	bf
R0905177	SA126-25B	Toluene	0.49U ug/Kg	A	bf
R0905177	SA126-40B	Toluene	0.53U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991D1
SDG #: R0905177
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: CL

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/10/09
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	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_1 = 9, 11 D_2 = 13, 14
XVII.	Field blanks	SW	EB = 1, 2 TB = 22, 23, 24, 25 FB = FB072909-S1 (R0904226)

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	1	EB091009-SO1	W	11	4	SA124-10B	D1 S	21	4	SA126-40B	S	+ 31	1	170936-MB
+ 2	1	EB091009-SO2		12	4	SA125-25B		− 22	1	TB091009-SO2	W	− 32	2	170888-
3	2	SA102-10B	S	13	4	SA125-39B	D2	+ 23	1	TB091009-SO3		33	3	171659-
4	2	SA102-30B		14	4	SA125009-39B	D2	+ 24	6	TB091009-SO4		− 34	4	171072-
5	2	SA109-10B		15	4	SA125-0.5B		− 25	6	TB091009-SO5		+ 35	5	171110-
6	2	SA109-25B		16	5	SA125-10B		26	4	SA126-40BMS	S	+ 36	6	170939-
7	3	SA109-25BDL		17	5	SA126-0.5B		27	4	SA126-40BMSD		37		
8	4	SA109-34B		18	5	SA126-10B		28				38		
9	4	SA124009-10B	D	19	5	SA126-18B		29				39		
10	4	SA124-0.5B		20	6	SA126-25B		30				40		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

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

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

.DC #: 170491 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
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 Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	7/17/09	ICAL	NNNN		0.017	1, 2, 22-25, 170936-MB, 170939-MB	J/UJ/A (C)
	9/18/09	ICAL	NNNN		0.028	7, 171659-MB	

LDC #: 21991 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 continuing calibration standard analyzed at least once every 12 hours for each instrument?

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/18/09	H0910	LLL (-)	26.1		3-6, 170888-MB	J-/NJ/A (c)
	9/19/09	H0946	LLL (-)	35.2		8-15, 21, 26, 27,	
			NNN (-)	27.1		171072-MB	
	9/12/09	F2667	NNNN		0.022	1, 2, 22, 23, 170939-MB	J/NJ/A
			NNNN (H)	29.4			J+ (c)/A
	9/18/09	F2693	NNNN		0.020	24, 25, 170939-MB	J/NJ A
	9/23/09	C0946	NNNN		0.027	7, 171659-MB	J/NJ/A

LDC #: 21991D1
SDG #: Sq Cmpd

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
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: wa 9/18/09
Conc. units: ug L
Associated Samples: 1, 2, 22, 23 (bl)

Compound	Blank ID	Sample Identification								
	170936-MB	1	2							
NNN	0.29									
KKK	0.21									
F	2.8	4.7 /U	4.0/U							
B	0.4 J									
MMM	0.31									

Blank analysis date: 9/9/09
Conc. units: ug/L
Associated Samples: 24, ~~26~~ 25 (ND)

Compound	Blank ID	Sample Identification								
	170939-MB									
NNN	0.33									
KKK	0.28									
MMM	0.32									

LDC #: 21191 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: VK
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 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: 9/21/09
Conc. units: ug/kg Associated Samples: 16 - 20 (ND)

Compound	Blank ID	Sample Identification								
	171110-MB									
E	0.77									

Blank analysis date: 9/23/09
Conc. units: ug/kg Associated Samples: 7

Compound	(50x) Blank ID	Sample Identification								
	171659-MB	(10x) 7								
M	80	170/4								

LDC #: 21991 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV
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 (be)

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

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/10/09	9 →	3	4	5	6	8	9	10	11
HHH	0.51									
F	4.7	4.0			5.5/U					
V	0.36									
E	8.3					0.80/U				
CC	1.9	0.32	0.48/U	0.50/U	0.58/U	0.82/U	0.58/U	0.49/U	1.3/U	3.7/U
KK		4.4								

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

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

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/10/09		12	13	14	15	16	17	18	19
HHH	0.51									
F	4.7	4.0					8.9/U	4.8/U		
V	0.36									
E	8.3			0.55/U						
CC	1.9	0.32	0.36/U	0.48/U		0.47/U		0.61/U	1.0/U	0.45/U
KK		4.4			1.8/U		1.8/U			

LDC #: 21491J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VG
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 (be)

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

Compound	Blank ID 1	Blank ID 2	Sample Identification							
Sampling Date	9/10/09	10/09	20	21						
HHH	0.51									
F	4.7	4.0								
V	0.36									
E	8.3									
CC	1.9	0.32	0.49/U	0.53/U						
KK		4.4								

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: All except 22 - 25

Compound	Blank ID 23	Blank ID 24	Sample Identification							
Sampling Date	9/10/09	→	1	2	5	6	8	16	17	20
F	6.9	2.4	4.7/U	4.0/U	5.5/U	13/U	13/U	8.9/U	4.8/U	12/U

LDC #: 4491 D1
SDG #: Sw Cmy

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 (bf)

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

Compound	Blank ID: FB072909-50	Blank ID:	Sample Identification							
Sampling Date	7/29/09		3	4	5	6	8	9	12	13
F	3.5				5.5/U	*				
E	0.30									0.55/U
CC	0.44		0.48/U	0.50/U	0.58/U	0.82/U	0.58/U	0.49/U	0.36/U	0.48/U

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

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

Compound	Blank ID: FB072909-50	Blank ID:	Sample Identification							
Sampling Date	7/29/09		15	17	19	20	21			
F	3.5			4.8/U						
E	0.30									
CC	0.44		0.47/U	0.61/U	0.45/U	0.49/U	0.53/U			

LDC #: 21491D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		26/27	NNN	63 (70-130)	62 (70-130)	( )	21	No qual (LCS in)
			KKK	69 ( )	69 ( )	( )		
			Z	61 ( )	59 ( )	( )		
			F	( )	172 (50-150)	64 (30)		(MS in
			K	58 ( )	62 (70-130)	( )		LCS in)
			JJ	49 ( )	49 ( )	( )		J-/UJ/A (m)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

LDC #: 21991D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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
		170936-LCS	NNNN	130 (75-125)	( )	( )	1, 2, 22, 23, 170936-MB	J+ (all detects)/P (all)
			JJ	70 ( )	( )	( )		J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
		170939-LCS	JJ	64 ( )	( )	( )	24, 25, 170939-MB	J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
		170888-LCS	JJ	66 ( )	( )	( )	3-6, 170888-MB	J-/UJ/P
			JJ	71 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		171072-LCS	JJ	73 ( )	( )	( )	8-15, 21, 171072-MB	J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
		171110-LCS	JJ	67 ( )	( )	( )	16-20, 171110-MB	J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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
		6	K > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21991 DJ
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: JV
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
		6	K > cal range		X / A (6)
		7	All except K dil		↓ ↓

Comments: _____

OVR.1SB

LDC #: 31191D1
SDG #: Sun Cross

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVB
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) 9	11	RPD	Parent only
M	1.3	1.6	0.3 (≤ 13D)	-
F	63	19	44 (≤ 26 D)	J (all detects)
K	0.97	0.87	0.10 (≤ 6.5D)	-
CC	0.49	3.7	3.21 ↓	-

Compound	Concentration (ug/kg) 13	14	RPD	Parent only
K	44	41	7 (≤ 50% RPD)	-
E	0.55	4.8 U	4.25 (≤ 4.8 D)	-
CC	0.48	4.8 U	4.32 ↓	-
M	11 U	0.96	10.04 (≤ 11 D)	-
~~K~~ K	5.6 U	1.8	9.8 (≤ 5.6 D)	-

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 9, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905138

Sample Identification

SA187-10B
SA187-25B
SA187-39B
SA45-10B
SA45-25B
SA45-36B
SA186-10B
SA186-25B
SA186-37B
SA188-10B
SA188-25B
SA188-37B
RSAQ5-0.5B
RSAQ5-10B
RSAQ5-25B
RSAQ5-41B
SA31-20B
SA31-32B
SA31-0.5B
SA31-10B
SA122-0.5B
SA122-10B
SA122-20B
SA122-31B
TB090909-SO1
TB090909-SO2
TB090909-SO3
RSAQ5-41BMS
RSAQ5-41BMSD

Introduction

This data review covers 26 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.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≥0.05)	All water samples in SDG R0905138	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
9/17/09	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene n-Butylbenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	25.2 25.5 25.3 25.8 43.7 25.5 26.5	SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B RSAQ5-41BMS RSAQ5-41BMSD 170690-MB	J- (all detects) UJ (all non-detects)	A
9/18/09	Hexachlorobutadiene	26.1	RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B 170888-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/22/09	2-Methyl-2-propanol	0.025 (≥0.05)	All water samples in SDG R0905138	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 TB090909-SO1, TB090909-SO2, and TB090909-SO3 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
TB090909-SO1	9/9/09	2-Methyl-2-propanol Acetone	6.0 ug/L 9.1 ug/L	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B
TB090909-SO2	9/9/09	Bromoform Chloromethane Dibromochloromethane	1.1 ug/L 0.92 ug/L 0.70 ug/L	RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA45-36B	Acetone	9.7 ug/Kg	9.7U ug/Kg
SA186-10B	Acetone	12 ug/Kg	12U ug/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905138

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
SA187-10B	Toluene	0.60 ug/Kg	0.60U ug/Kg
SA187-39B	Toluene	0.61 ug/Kg	0.61U ug/Kg
SA186-10B	Toluene	0.37 ug/Kg	0.37U ug/Kg
SA188-10B	Toluene	0.33 ug/Kg	0.33U ug/Kg
SA188-25B	Toluene	0.51 ug/Kg	0.51U ug/Kg
RSAQ5-41B	Acetone Toluene	4.0 ug/Kg 0.36 ug/Kg	4.0U ug/Kg 0.36U ug/Kg
SA122-0.5B	Acetone Dichloromethane Toluene	3.0 ug/Kg 0.59 ug/Kg 0.65 ug/Kg	3.0U ug/Kg 0.59U ug/Kg 0.65U ug/Kg
SA122-10B	Dichloromethane Toluene	0.55 ug/Kg 0.54 ug/Kg	0.55U ug/Kg 0.54U ug/Kg
SA122-20B	Acetone	2.8 ug/Kg	2.8U ug/Kg
SA122-31B	Toluene	0.41 ug/Kg	0.41U 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
RSAQ5-41BMS/MSD (RSAQ5-41B)	Chloromethane Dichlorodifluoromethane Hexachlorobutadiene	59 (70-130) 41 (70-130) 49 (70-130)	64 (70-130) 45 (70-130) 49 (70-130)	- - -	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
170690-LCS	Chloromethane Dichlorodifluoromethane Hexachlorobutadiene	71 (75-125) 69 (75-125) 69 (75-125)	SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B 170690-MB	J- (all detects) UJ (all non-detects)	P
170888-LCS	Carbon tetrachloride Dichlorodifluoromethane	66 (75-125) 71 (75-125)	RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B 170888-MB	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

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905138	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905138

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905138	TB090909-SO1 TB090909-SO2 TB090909-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905138	SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene n-Butylbenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905138	RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905138	TB090909-SO1 TB090909-SO2 TB090909-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905138	RSAQ5-41B	Chloromethane Dichlorodifluoromethane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905138	SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-41B	Chloromethane Dichlorodifluoromethane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905138	RSAQ5-25B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B	Carbon tetrachloride Dichlorodifluoromethane	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)
R0905138	SA187-10B SA187-25B SA187-39B SA45-10B SA45-25B SA45-36B SA186-10B SA186-25B SA186-37B SA188-10B SA188-25B SA188-37B RSAQ5-0.5B RSAQ5-10B RSAQ5-25B RSAQ5-41B SA31-20B SA31-32B SA31-0.5B SA31-10B SA122-0.5B SA122-10B SA122-20B SA122-31B TB090909-SO1 TB090909-SO2 TB090909-SO3	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 R0905138

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905138

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905138	SA45-36B	Acetone	9.7U ug/Kg	A	bt
R0905138	SA186-10B	Acetone	12U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905138

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905138	SA187-10B	Toluene	0.60U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905138	SA187-39B	Toluene	0.61U ug/Kg	A	bf
R0905138	SA186-10B	Toluene	0.37U ug/Kg	A	bf
R0905138	SA188-10B	Toluene	0.33U ug/Kg	A	bf
R0905138	SA188-25B	Toluene	0.51U ug/Kg	A	bf
R0905138	RSAQ5-41B	Acetone Toluene	4.0U ug/Kg 0.36U ug/Kg	A	bf
R0905138	SA122-0.5B	Acetone Dichloromethane Toluene	3.0U ug/Kg 0.59U ug/Kg 0.65U ug/Kg	A	bf
R0905138	SA122-10B	Dichloromethane Toluene	0.55U ug/Kg 0.54U ug/Kg	A	bf
R0905138	SA122-20B	Acetone	2.8U ug/Kg	A	bf
R0905138	SA122-31B	Toluene	0.41U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21991E1
SDG #: R0905138
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JVG
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: 9/09/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD ~~r~~
IV.	Continuing calibration/~~ccv~~	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	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 25, 26, 27 FB = FB072909-SO (R0904226)

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	SA187-10B	S	11	SA188-25B	S	21	SA122-0.5B	S	31	170485-MD	
2	SA187-25B		12	SA188-37B		22	SA122-10B		32	170690-	
3	SA187-39B		13	RSAQ5-0.5B		23	SA122-20B		33	170858-	
4	SA45-10B		14	RSAQ5-10B		24	SA122-31B		34	171241-	
5	SA45-25B		15	RSAQ5-25B		25	TB090909-SO1	W	35		
6	SA45-36B		16	RSAQ5-41B		26	TB090909-SO2		36		
7	SA186-10B		17	SA31-20B		27	TB090909-SO3		37		
8	SA186-25B		18	SA31-32B		28	RSAQ5-41BMS	S	38		
9	SA186-37B		19	SA31-0.5B		29	RSAQ5-41BMSD		39		
10	SA188-10B		20	SA31-10B		30			40		

DC #: 21991 E
DG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

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?	✓			

DC #: 21991 E1
DG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JG
2nd Reviewer: [illegible]

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

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	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-2propanol
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 #: 2[illegible]
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET

Initial Calibration

Page: [illegible]
Reviewer: JG
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
	9/18/09	ICAL	NNNN		0.028	25-27, 171241-MB	J/UJ/A (c)

INICAL.1SB

LDC #: 21991 E1
SDG #: See Cover

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/17/09	H0875	CCC (-)	25.2		7-14, 16, 28, 29,	J-/UJ/A (c)
			EEE (-)	25.5		170690-MB	
			GGG (-)	25.3			
			III (-)	25.8			
			LLL (-)	43.7			
			MMM (-)	25.5			
			NNN (-)	26.5			
	9/18/09	H0910	LLL (-)	26.1		15, 17-24, 170888-MB	
	9/22/09	C0879	NNNN		0.025	25-27, 171241-MB	J/UJ/A

LDC #: 21991 E1
SDG #: Sa Cruz

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: 1-12 (bt)

Compound	Blank ID 25	Blank ID	Sample Identification							
Sampling Date	9/09/09		6	7						
NNN	6.0									
F	9.1		9.7 /U	12/U						

Blank units: ug/L **Associated sample units:** ug/Kg
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 13-24 (ND)

Compound	Blank ID 26	Blank ID	Sample Identification							
Sampling Date	9/09/09									
X	1.1									
A	0.92									
T	0.70									

LDC #: 47491 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
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: All soils (bf)

Compound	Blank ID FB072909-SO	Blank ID	Sample Identification								
Sampling Date	7/29/09	1	3	7	10	11	16	21	22	23	24
F	3.5						4.0/u	3.0/u		2.8/u	
E	0.30							0.59/u	0.55/u		
CC	0.44	0.60/u	0.61/u	0.37/u	0.33/u	0.51/u	0.36/u	0.65/u	0.54/u		0.41/u
	(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 #: 21111E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: VG
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
		28/29	Several compounds	have %R and RPD			16	No qual
			outside limits	( )	( )	( )		either MS/MSD/LCS
			(See attached	summary)		( )		
				( )	( )	( )		
			A	59 (70-130)	64 (70-130)	( )		J-/UJ A (m)
			JJ	41 ( )	45 ( )	( )		
			LLL	49 (✓)	49 (✓)	( )	✓	✓ ✓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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: R0905138
Date Collected: 9/9/09
Date Received: 9/10/09
Date Analyzed: 9/17/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAQ5-41B
Lab Code: R0905138-016

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0908733-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0908733-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	37.5	55.4	68	*	34.0	54.3	63	*	70 - 130	10	30
1,1,1-Trichloroethane (TCA)	ND	40.3	55.4	73		40.9	54.3	75		70 - 130	1	30
1,1,2,2-Tetrachloroethane	ND	37.7	55.4	68	*	38.4	54.3	71		70 - 130	2	30
1,1,2-Trichloroethane	ND	39.8	55.4	72		39.1	54.3	72		70 - 130	2	30
1,1-Dichloroethane (1,1-DCA)	ND	39.0	55.4	70		39.8	54.3	73		70 - 130	2	30
1,1-Dichloroethene (1,1-DCE)	ND	36.2	55.4	65	*	39.2	54.3	72		70 - 130	8	30
1,1-Dichloropropene	ND	39.9	55.4	72		37.6	54.3	69	*	70 - 130	6	30
1,2,3-Trichlorobenzene	ND	31.1	55.4	56	*	34.3	54.3	63	*	70 - 130	10	30
1,2,3-Trichloropropane	ND	36.7	55.4	66	*	38.8	54.3	72		70 - 130	6	30
1,2,4-Trichlorobenzene	ND	31.9	55.4	58	*	34.0	54.3	63	*	70 - 130	6	30
1,2,4-Trimethylbenzene	ND	33.1	55.4	60	*	32.3	54.3	59	*	70 - 130	2	30
1,2-Dibromo-3-chloropropane (DBC	ND	35.7	55.4	64		40.3	54.3	74		50 - 150	12	30
1,2-Dibromoethane	ND	39.3	55.4	71		38.1	54.3	70		70 - 130	3	30
1,2-Dichlorobenzene	ND	33.6	55.4	61	*	34.0	54.3	63	*	70 - 130	1	30
1,2-Dichloroethane	ND	38.1	55.4	69	*	38.4	54.3	71		70 - 130	1	30
1,2-Dichloropropane	ND	39.0	55.4	70		37.4	54.3	69	*	70 - 130	4	30
1,3,5-Trimethylbenzene	ND	34.3	55.4	62	*	33.0	54.3	61	*	70 - 130	4	30
1,3-Dichlorobenzene	ND	33.3	55.4	60	*	32.7	54.3	60	*	70 - 130	2	30
1,3-Dichloropropane	ND	38.7	55.4	70		37.4	54.3	69	*	70 - 130	4	30
1,4-Dichlorobenzene	ND	33.5	55.4	60	*	31.9	54.3	59	*	70 - 130	5	30
2,2-Dichloropropane	ND	38.6	55.4	70		41.6	54.3	77		70 - 130	8	30
2-Butanone (MEK)	ND	43.0	55.4	78		45.4	54.3	84		50 - 150	6	30
2-Chlorotoluene	ND	33.4	55.4	60	*	33.3	54.3	61	*	70 - 130	0	30
2-Hexanone	ND	41.1	55.4	74		42.2	54.3	78		70 - 130	3	30
2-Methyl-2-propanol	ND	777	1110	70		882	1090	81		50 - 150	13	30
4-Chlorotoluene	ND	33.6	55.4	61	*	32.9	54.3	61	*	70 - 130	2	30
4-Isopropyltoluene	ND	32.7	55.4	59	*	30.3	54.3	56	*	70 - 130	8	30
4-Methyl-2-pentanone	ND	41.6	55.4	75		41.9	54.3	77		70 - 130	1	30
Acetone	4.0	52.3	55.4	87		66.7	54.3	116		50 - 150	24	30
Benzene	ND	36.6	55.4	66	*	37.3	54.3	69	*	70 - 130	2	30
Bromobenzene	ND	34.5	55.4	62	*	34.8	54.3	64	*	70 - 130	1	30
Bromochloromethane	ND	37.1	55.4	67	*	38.5	54.3	71		70 - 130	4	30
Bromodichloromethane	ND	38.2	55.4	69	*	39.2	54.3	72		70 - 130	2	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905138
Date Collected: 9/9/09
Date Received: 9/10/09
Date Analyzed: 9/17/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: RSAQ5-41B
Lab Code: R0905138-016

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0908733-03 Result	Matrix Spike RQ0908733-03 Amount	Matrix Spike RQ0908733-03 % Rec		Duplicate Matrix Spike RQ0908733-04 Result	Duplicate Matrix Spike RQ0908733-04 Amount	Duplicate Matrix Spike RQ0908733-04 % Rec		% Rec Limits	RPD	RPD Limit
Bromoform	ND	40.3	55.4	73		37.7	54.3	70		70 - 130	7	30
Bromomethane	ND	30.0	55.4	54		33.0	54.3	61		50 - 150	10	30
Carbon Tetrachloride	ND	40.2	55.4	73		40.9	54.3	75		70 - 130	2	30
Chlorobenzene	ND	36.6	55.4	66	*	34.2	54.3	63	*	70 - 130	7	30
Chloroethane	ND	34.8	55.4	63	*	35.2	54.3	65	*	70 - 130	1	30
Chloroform	ND	39.4	55.4	71		39.6	54.3	73		70 - 130	1	30
Chloromethane	ND	32.8	55.4	59	*	34.7	54.3	64	*	70 - 130	6	30
Dibromochloromethane	ND	40.5	55.4	73		38.4	54.3	71		70 - 130	5	30
Dibromomethane	ND	38.5	55.4	69	*	38.3	54.3	71		70 - 130	0	30
Dichlorodifluoromethane (CFC 12)	ND	22.9	55.4	41	*	24.5	54.3	45	*	70 - 130	7	30
Dichloromethane	ND	36.4	55.4	66	*	38.1	54.3	70		70 - 130	4	30
Diisopropyl Ether	ND	40.5	55.4	73		41.0	54.3	75		70 - 130	1	30
Ethyl tert-Butyl Ether	ND	41.2	55.4	74		41.4	54.3	76		70 - 130	0	30
Ethylbenzene	ND	38.3	55.4	69	*	33.7	54.3	62	*	70 - 130	13	30
Hexachlorobutadiene	ND	26.9	55.4	49	*	26.4	54.3	49	*	70 - 130	2	30
Isopropylbenzene (Cumene)	ND	36.9	55.4	67	*	33.7	54.3	62	*	70 - 130	9	30
Methyl tert-Butyl Ether	ND	39.2	55.4	71		38.2	54.3	70		70 - 130	2	30
Naphthalene	ND	35.1	55.4	63		40.5	54.3	75		50 - 150	14	30
Styrene	ND	38.3	55.4	69	*	35.3	54.3	65	*	70 - 130	8	30
Tetrachloroethene (PCE)	ND	40.0	55.4	72		36.4	54.3	67	*	70 - 130	10	30
Toluene	0.36	38.7	55.4	69	*	36.6	54.3	67	*	70 - 130	5	30
Trichloroethene (TCE)	ND	38.6	55.4	70		38.1	54.3	70		70 - 130	1	30
Trichlorofluoromethane (CFC 11)	ND	38.3	55.4	69	*	41.4	54.3	76		70 - 130	8	30
Vinyl Chloride	ND	35.1	55.4	63	*	38.8	54.3	72		70 - 130	10	30
cis-1,2-Dichloroethene	ND	35.7	55.4	64	*	38.0	54.3	70		70 - 130	6	30
cis-1,3-Dichloropropene	ND	39.1	55.4	71		37.2	54.3	69	*	70 - 130	5	30
m,p-Xylenes	ND	73.3	111	66	*	66.7	109	61	*	70 - 130	9	30
n-Butylbenzene	ND	32.0	55.4	58	*	29.4	54.3	54	*	70 - 130	8	30
n-Propylbenzene	ND	33.5	55.4	60	*	32.0	54.3	59	*	70 - 130	5	30
o-Xylene	ND	36.3	55.4	65	*	33.8	54.3	62	*	70 - 130	7	30
sec-Butylbenzene	ND	33.5	55.4	60	*	31.4	54.3	58	*	70 - 130	6	30
tert-Amyl Methyl Ether	ND	39.8	55.4	72		40.4	54.3	74		70 - 130	1	30
tert-Butylbenzene	ND	33.2	55.4	60	*	32.1	54.3	59	*	70 - 130	3	30
trans-1,2-Dichloroethene	ND	35.7	55.4	65	*	37.7	54.3	69	*	70 - 130	5	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Northgate Environmental	**Service Request:**	R0905138
Project:	Tronox LLC Henderson/2027.001	**Date Collected:**	9/9/09
Sample Matrix:	Soil	**Date Received:**	9/10/09
		Date Analyzed:	9/17/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	RSAQ5-41B	**Units:**	µg/Kg
Lab Code:	R0905138-016	**Basis:**	Dry

Analytical Method: 8260B

		Matrix Spike			Duplicate Matrix Spike					
	Sample	RQ0908733-03			RQ0908733-04			% Rec		RPD
Analyte Name	**Result**	**Result**	**Amount**	**% Rec**	**Result**	**Amount**	**% Rec**	**Limits**	**RPD**	**Limit**
trans-1,3-Dichloropropene	ND	39.3	55.4	71	36.5	54.3	67	* 70 - 130	7	30

Comments:

)C #: 21941 E)
)G #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

N N/A Was a LCS required?
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
		170690-LCS	O	70 (75-125)	( )	( )	7-14, 16, 170690-MB	No qual (MS/MSD in
			A	71 ( )	( )	( )		J-/UJ/P (l)
			JJ	69 ( )	( )	( )		
			LLL	69 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		170888-LCS	O	66 ( )	( )	( )	15, 17-24, 170888-MB	J-/UJ/P (l)
			JJ	71 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS7	9/13/09	C (1st internal standard)	0.427	0.427	0.414	0.414	11.9	11.9
			S (2nd internal standard)	0.327	0.327	0.319	0.319	11.7	11.7
			EE (3rd internal standard)	1.576	1.576	1.497	1.497	9.2	9.2
2			BB (1st internal standard)	1.159	1.159	1.143	1.143	10.8	10.8
			(2nd internal standard)						
			(3rd internal standard)						
3	ICAL MS10	9/18/09	C (1st internal standard)	0.523	0.523	0.521	0.521	7.7	7.7
			S (2nd internal standard)	0.250	0.250	0.275	0.275	6.6	6.6
			EE (3rd internal standard)	0.395	0.395	0.415	0.416	6.0	6.0
4			BB (1st internal standard)	0.543	0.543	0.547	0.547	3.5	3.5
			(2nd internal standard)						
			(3rd internal standard)						

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

LDC #: 24991 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: 9

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	H0842	9/16/09	C (1st internal standard)	0.414	0.412	0.412	0.5	0.4
			S (2nd internal standard)	0.319	0.303	0.303	5.0	5.0
			EE (3rd internal standard)	1.497	1.335	1.335	10.8	10.8
			BB (4th internal standard)	1.143	1.071	1.071	6.3	6.3
2	H0875	9/17/09	C (1st internal standard)		0.410	0.410	1.0	1.0
			S (2nd internal standard)		0.261	0.261	18.2	18.3
			EE (3rd internal standard)		1.212	1.212	19.0	19.1
			BB (4th internal standard)		0.998	0.998	12.7	12.7
3	H0910	9/18/09	C (1st internal standard)		0.383	0.383	7.5	7.4
			S (2nd internal standard)		0.277	0.277	13.2	13.3
			EE (3rd internal standard)		1.338	1.338	10.6	10.6
			BB (4th internal standard)	√	1.053	1.053	7.9	7.7
4	C0879	9/22/09	C (1st internal standard)	0.521	0.553	0.553	6.1	6.2
			S (2nd internal standard)	0.275	0.299	0.299	8.7	8.7
			EE (3rd internal standard)	0.415	0.445	0.445	7.2	7.2
			BB (4th internal standard)	0.547	0.503	0.503	8.0	8.0

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 #: 21491 E 1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	51.48	103	103	0
Bromofluorobenzene	↓	46.33	93	93	↓
1,2-Dichloroethane-d4	↓				↓
Dibromofluoromethane	↓	50.65	101	101	↓

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 #: 71991 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

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

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

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

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

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 28/29

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	55.4	54.3	0	36.2	39.2	65	65	72	72	8	8
Trichloroethene				38.6	38.1	70	70	70	70	1	1
Benzene				36.6	37.3	66	66	69	69	2	2
Toluene			0.36	38.7	36.6	69	69	67	67	5	5
Chlorobenzene			0	36.6	34.2	66	66	63	63	7	7

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

LDC #: 21991 E)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer: CL

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

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

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

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

LCS ID: 171241-LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	20.0	NA	21.2	NA	106	106				
Trichloroethene			21.8		109	109				
Benzene			19.6		98	98				
Toluene			20.9		105	105				
Chlorobenzene			20.1		107	107				

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 #: 21991E1

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JM

2nd reviewer: K

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?

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

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. #2 , K :

$$\text{Conc.} = \frac{(4378)(50)(\quad)}{(456666)(0.902)(0.912)(\quad)}$$

$$= 0.58 \text{ ug/kg}$$

#	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: September 10 through September 16, 2009

LDC Report Date: January 7, 2010

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905192

Sample Identification

SA102-10BSPLP3
SA102-30BSPLP3
SA30-9BSPLP3
SA128-10BSPLP3
SA128-29BSPLP3

Samples in this SDG underwent SPLP extraction

Introduction

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

*Indicates change as the result of report review.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
9/30/09	Bromomethane	35.2	SA128-10BSPLP3 SA128-29BSPLP3 172647-MB SPLP-BLK2	J- (all detects) UJ (all non-detects)	A

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

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SPLP-BLK1	9/28/09	4-Methyl-2-pentanone Acetone Chloroform	1.1 ug/L 4.7 ug/L 2.9 ug/L	SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3
SPLP-BLK2	9/30/09	Acetone Chloroform Dichloromethane	4.0 ug/L 2.4 ug/L 4.0 ug/L	SA128-10BSPLP3 SA128-29BSPLP3

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
SA102-10BSPLP3	Acetone Chloroform	4.8 ug/L 2.8 ug/L	4.8U ug/L 2.8U ug/L
SA102-30BSPLP3	Acetone Chloroform	4.8 ug/L 2.9 ug/L	4.8U ug/L 2.9U ug/L
SA30-9BSPLP3	Acetone Chloroform	4.1 ug/L 2.7 ug/L	4.1U ug/L 2.7U ug/L
SA128-10BSPLP3	Acetone Chloroform Dichloromethane	7.0 ug/L 2.1 ug/L 3.8 ug/L	7.0U ug/L 2.1U ug/L 3.8U ug/L
SA128-29BSPLP3	Acetone Chloroform Dichloromethane	4.8 ug/L 3.1 ug/L 4.0 ug/L	4.8U ug/L 3.1U ug/L 4.0U ug/L

*Indicates change as the result of report review.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905192	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

*Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905192

SDG	Sample	Compound	Flag	A or P	Reason (Code)
*R0905192	SA128-10BSPLP3 SA128-29BSPLP3	Bromomethane	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905192	SA102-10BSPLP3 SA102-30BSPLP3 SA30-9BSPLP3 SA128-10BSPLP3 SA128-29BSPLP3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

*Corrected Samples for Continuing Calibration qualification.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905192

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905192	SA102-10BSPLP3	Acetone Chloroform	4.8U ug/L 2.8U ug/L	A	bl
R0905192	SA102-30BSPLP3	Acetone Chloroform	4.8U ug/L 2.9U ug/L	A	bl
R0905192	SA30-9BSPLP3	Acetone Chloroform	4.1U ug/L 2.7U ug/L	A	bl
R0905192	SA128-10BSPLP3	Acetone Chloroform Dichloromethane	7.0U ug/L 2.1U ug/L 3.8U ug/L	A	bl
R0905192	SA128-29BSPLP3	Acetone Chloroform Dichloromethane	4.8U ug/L 3.1U ug/L 4.0U ug/L	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905192

No Sample Data Qualified in this SDG

*Indicates change as the result of report review.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21991F1
SDG #: R0905192
Laboratory: Columbia Analytical Services

Date: 12/03/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer: CY

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/10 - 16/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD ✓
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	SA102-10BSPLP3	11	172327-MB	21		31	
2	SA102-30BSPLP3	12	SPLP-BLK 1	22		32	
3	SA30-9BSPLP3	13	172697-MB	23		33	
4	SA128-10BSPLP3	14	SPLP-BLK 2	24		34	
5	SA128-29BSPLP3	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

DC #: 21991F1
DG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JF
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 $\geq$ 0.990?	✓			
Were all percent relative standard deviations (%RSD) $\leq$ 30% and relative response factors (RRF) $\geq$ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) $<$ 25% and relative response factors (RRF) $>$ 0.05?		✓		
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed 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?	✓			

DC #: 21991 F1
DG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	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.
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 #: 21991F1
SDG #: Sw Cmpy

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: DVG
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
	9/30/09	X456r	B (-)	35.r		45, 172647-MB, SPLP-BLKr	J-/UJ/A (c)

CONCAL 1SB

LDC #: 21991F1
SDG #: See Cover

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: 9/28/09
Conc. units: ug/L
Associated Samples: 1-3 (bl)

Compound	Blank ID	Sample Identification								
	SPLP-BLK1	1	2	3						
Y	1.1									
F	4.7	4.8/U	4.8/U	4.1/U						
K	2.9	2.8/U	2.9/U	2.7/U						

Blank analysis date: 9/30/09
Conc. units: ug/L
Associated Samples: 4, 5 (bl)

Compound	Blank ID	Sample Identification								
	SPLP-BLK2	4	5							
F	4.0	7.0/U	4.8/U							
K	2.4	2.1/U	3.1/U							
E	4.0	3.8/U	4.0/U							

LDC #: 21991 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVR
2nd Reviewer: [signature]

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

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	9/15/04	C (1st internal standard)	0.699	0.699	0.648	0.648	6.8	6.8
			S (2nd internal standard)	0.308	0.308	0.306	0.307	4.4	4.4
			EE (3rd internal standard)	0.571	0.571	0.558	0.558	3.7	3.7
2			BB (1st internal standard)	0.594	0.594	0.581	0.581	4.3	4.3
			(2nd internal standard)						
			(3rd internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						

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

LDC #: 21991 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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	X4565	9/28/09	C (1st internal standard)	0.648	0.607	0.607	7.1	7.0
			S (2nd internal standard)	0.306	0.283	0.283	7.5	7.5
			EE (3rd internal standard)	0.558	0.512	0.512	8.2	8.2
2			BB (1st internal standard)	0.581	0.539	0.539	7.2	7.3
			(2nd internal standard)					
			(3rd internal standard)					
3	X4657	9/30/09	C (1st internal standard)		0.651	0.651	0.5	0.5
			S (2nd internal standard)		0.307	0.307	0.3	0.3
			EE (3rd internal standard)		0.565	0.565	1.3	1.2
4			BB (1st internal standard)		0.574	0.576	0.9	0.8
			(2nd internal standard)					
			(3rd internal standard)					

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

LDC #: 21991 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	52.00	104	104	0
Bromofluorobenzene		50.98	102	102	
1,2-Dichloroethane-d4					
Dibromofluoromethane		51.52	103	103	

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 #: 21991F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer: CL

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: 172647-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	22.9	NA	114	114				
Trichloroethene			21.0		105	105				
Benzene			20.7		104	104				
Toluene			21.5		107	107				
Chlorobenzene			21.7		108	108				

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 #: 21991 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JW
2nd reviewer:

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

Y N N/A Were all reported results recalculated and verified for all level IV samples?

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

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

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

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

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

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. #1 , K :

Conc. = $\frac{(38238)(50)(\quad)(\quad)}{(710708)(0.960)(\quad)(\quad)}$

= 2.80 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: September 11, 2009

LDC Report Date: December 7, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905198

Sample Identification

RSAQ6-0.5B
RSAQ6-10B
RSAQ6-25B
RSAQ6-38B
RSAQ6009-38B
SA41-12B
SA41-25B
SA41-38B
SA40-10B
SA40-25B
SA40-41B
SA114-10B
SA114-30B
SA124-25B
SA124-42B
TB091109-SO1
TB091109-SO2
SA40-41BMS
SA40-41BMSD

Introduction

This data review covers 17 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	All water samples in SDG R0905198	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
9/22/09 (H1021)	Dichlorodifluoromethane	34.6	RSAQ6009-38B	J+ (all detects)	A
	Carbon tetrachloride	29.4	SA41-12B	J+ (all detects)	
	n-Propylbenzene	25.3	SA41-25B	J+ (all detects)	
	2-Chlorotoluene	28.4	SA41-38B	J+ (all detects)	
	n-Butylbenzene	27.0	SA40-10B	J+ (all detects)	
			SA40-25B		
			SA114-10B		
			SA114-30B		
			SA124-25B		
			SA124-42B		
			171297-MB		

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/22/09 (C0879)	2-Methyl-2-propanol	0.025 (≤0.05)	All water samples in SDG R0905198	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
171110-MB	9/21/09	Dichloromethane	0.77 ug/Kg	RSAQ6-0.5B
				RSAQ6-10B
				RSAQ6-25B
				RSAQ6-38B
				SA40-41B

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

Samples TB091109-SO1 and TB091109-SO2 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
TB091109-SO2	9/11/09	Bromoform Chloromethane	0.23 ug/L 0.22 ug/L	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA124-25B SA124-42B

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

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905198

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
RSAQ6009-38B	Toluene	0.54 ug/Kg	0.54U ug/Kg
SA41-12B	Toluene	0.56 ug/Kg	0.56U ug/Kg
SA40-10B	Acetone	1.6 ug/Kg	1.6U ug/Kg
SA114-10B	Acetone Toluene	6.0 ug/Kg 0.44 ug/Kg	6.0U ug/Kg 0.44U ug/Kg
SA124-42B	Toluene	0.77 ug/Kg	0.77U 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
SA40-41BMS/MSD (SA40-41B)	Dichlorodifluoromethane	53 (70-130)	50 (70-130)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
171110-LCS	Dichlorodifluoromethane	67 (75-125)	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B SA40-41B 171110-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905198	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 RSAQ6-38B and RSAQ6009-38B 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
	RSAQ6-38B	RSAQ6009-38B				
Chloroform	43	33	-	10 (≤7.3)	-	-
2-Butanone	14U	1.4	-	12.6 (≤14)	-	-
Toluene	7.2U	0.54	-	6.66 (≤7.2)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905198

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905198	TB091109-SO1 TB091109-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905198	RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA114-10B SA114-30B SA124-25B SA124-42B	Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0905198	TB091109-SO1 TB091109-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905198	SA40-41B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B SA40-41B	Dichlorodifluoromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905198	RSAQ6-0.5B RSAQ6-10B RSAQ6-25B RSAQ6-38B RSAQ6009-38B SA41-12B SA41-25B SA41-38B SA40-10B SA40-25B SA40-41B SA114-10B SA114-30B SA124-25B SA124-42B TB091109-SO1 TB091109-SO2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905198

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905198

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905198	RSAQ6009-38B	Toluene	0.54U ug/Kg	A	bf
R0905198	SA41-12B	Toluene	0.56U ug/Kg	A	bf
R0905198	SA40-10B	Acetone	1.6U ug/Kg	A	bf
R0905198	SA114-10B	Acetone Toluene	6.0U ug/Kg 0.44U ug/Kg	A	bf
R0905198	SA124-42B	Toluene	0.77U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991G1
SDG #: R0905198
Laboratory: Columbia Analytical Services

Date: 12/02/09
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: 9/11/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD r²
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	SW	TB = 16, 17 FB = FB072909-SO (R0904226)

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	RSAQ6-0.5B	S	11	1	SA40-41B	S	+ 21	1	171110 - MB	31
2	1	RSAQ6-10B		12	3	SA114-10B		- 22	2	171241 -	32
3	1	RSAQ6-25B		13	3	SA114-30B		- 23	3	171297 -	33
+ 4	1	RSAQ6-38B	D	14	3	SA124-25B		24			34
+ 5	3	RSAQ6009-38B	D	15	3	SA124-42B		25			35
6	3	SA41-12B		- 16	2	TB091109-SO1	W	26			36
7	3	SA41-25B		+ 17	2	TB091109-SO2		27			37
8	3	SA41-38B		18	1	SA40-41BMS	S	28			38
9	3	SA40-10B		19	1	SA40-41BMSD		29			39
10	3	SA40-25B		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.

.DC #: 21119/

SDG #: Cu Cmv

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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 Did the laboratory perform a 5 point calibration prior to sample analysis?

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

Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? $r^2 \geq 0.99$

Y N N/A Did the initial calibration meet the acceptance criteria?

Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: <30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/18/09	ICAL	NNNN		0.028	16, 17, 171241-MB	J/NJ/A (c)

INICAL.1SB

LDC #: 21991 G1
SDG #: Sy Creek

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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 Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/22/09	C0879	NNNN		0.025	16, 17, 171291-MB	J/UJ/A (C)
	9/22/09	H1021	JJ (+)	34.6		5 - 10, 12-15, 171297-MB	J+ dets/A
			O (+)	29.4			
			YY (+)	25.3			
			ZZ (+)	28.4			
			III (+)	27.0			

LDC #: 21991 G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

Blank analysis date: MB 9/21/09
Conc. units: ug/Kg Associated Samples: 1-4, 11 (ND)

Compound	Blank ID	Sample Identification								
	171110-MB									
E	0.77									

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 21991 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
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: 1-5, 14, 15 (ND)

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	9/11/09									
X	0.23									
A	0.22									

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 FB072909-SO	Blank ID	Sample Identification							
Sampling Date	7/29/09		5	6	9	12	15			
F	3.5				1.6/4	6.0/4				
E	0.30									
CC	0.44		0.54/4	0.56/4		0.44/4	0.77/4			
			(All others either ND or < FB)							

LDC #: 21991G1
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
		18/19	Several compounds have %R and %RPD				11	No qual (either MS/MSD or LCS
			outside limits	( )	( )	( )		
				(see attached Summary)		( )		
				( )	( )	( )		
			JJ	53 (70-130)	50 (70-130)	( )		J-/UJ/A (m)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905198
Date Collected: 9/11/09
Date Received: 9/12/09
Date Analyzed: 9/21/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA40-41B
Lab Code: R0905198-011

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0908828-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0908828-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	58.9	78.8	75		59.6	79.6	75		70 - 130	1	30
1,1,1-Trichloroethane (TCA)	ND	74.0	78.8	94		74.3	79.6	93		70 - 130	0	30
1,1,2,2-Tetrachloroethane	ND	58.7	78.8	74		64.6	79.6	81		70 - 130	10	30
1,1,2-Trichloroethane	ND	58.0	78.8	74		60.7	79.6	76		70 - 130	5	30
1,1-Dichloroethane (1,1-DCA)	ND	69.6	78.8	88		68.4	79.6	86		70 - 130	2	30
1,1-Dichloroethene (1,1-DCE)	0.88	67.8	78.8	85		67.8	79.6	84		70 - 130	0	30
1,1-Dichloropropene	ND	62.8	78.8	80		65.7	79.6	83		70 - 130	5	30
1,2,3-Trichlorobenzene	ND	41.1	78.8	52	*	47.1	79.6	59	*	70 - 130	14	30
1,2,3-Trichloropropane	ND	54.2	78.8	69	*	58.2	79.6	73		70 - 130	7	30
1,2,4-Trichlorobenzene	ND	44.0	78.8	56	*	51.1	79.6	64	*	70 - 130	15	30
1,2,4-Trimethylbenzene	ND	53.9	78.8	68	*	61.4	79.6	77		70 - 130	13	30
1,2-Dibromo-3-chloropropane (DBC	ND	49.3	78.8	63		55.4	79.6	70		50 - 150	12	30
1,2-Dibromoethane	ND	55.7	78.8	71		57.8	79.6	73		70 - 130	4	30
1,2-Dichlorobenzene	ND	52.9	78.8	67	*	61.4	79.6	77		70 - 130	15	30
1,2-Dichloroethane	ND	58.3	78.8	74		63.2	79.6	79		70 - 130	8	30
1,2-Dichloropropane	ND	59.3	78.8	75		64.2	79.6	81		70 - 130	8	30
1,3,5-Trimethylbenzene	ND	57.2	78.8	73		60.8	79.6	76		70 - 130	6	30
1,3-Dichlorobenzene	ND	54.2	78.8	69	*	60.5	79.6	76		70 - 130	11	30
1,3-Dichloropropane	ND	55.9	78.8	71		57.8	79.6	73		70 - 130	3	30
1,4-Dichlorobenzene	ND	55.4	78.8	70		60.4	79.6	76		70 - 130	9	30
2,2-Dichloropropane	ND	70.1	78.8	89		66.6	79.6	84		70 - 130	5	30
2-Butanone (MEK)	1.6	56.9	78.8	70		52.6	79.6	64		50 - 150	8	30
2-Chlorotoluene	ND	55.8	78.8	71		60.9	79.6	77		70 - 130	9	30
2-Hexanone	ND	34.4	78.8	44	*	38.5	79.6	48	*	70 - 130	11	30
2-Methyl-2-propanol	ND	1210	1580	77		1130	1590	71		50 - 150	7	30
4-Chlorotoluene	ND	55.6	78.8	71		63.9	79.6	80		70 - 130	14	30
4-Isopropyltoluene	ND	53.6	78.8	68	*	59.4	79.6	75		70 - 130	10	30
4-Methyl-2-pentanone	ND	50.1	78.8	64	*	51.9	79.6	65	*	70 - 130	4	30
Acetone	ND	83.2	78.8	106		61.8	79.6	78		50 - 150	30	30
Benzene	ND	57.8	78.8	73		63.4	79.6	80		70 - 130	9	30
Bromobenzene	ND	57.0	78.8	72		63.4	79.6	80		70 - 130	11	30
Bromochloromethane	ND	62.4	78.8	79		60.0	79.6	75		70 - 130	4	30
Bromodichloromethane	ND	61.5	78.8	78		65.4	79.6	82		70 - 130	6	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Northgate Environmental	**Service Request:**	R0905198
Project:	Tronox LLC Henderson/2027.001	**Date Collected:**	9/11/09
Sample Matrix:	Soil	**Date Received:**	9/12/09
		Date Analyzed:	9/21/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	SA40-41B	**Units:**	µg/Kg
Lab Code:	R0905198-011	**Basis:**	Dry

Analytical Method: 8260B

		Matrix Spike RQ0908828-03				Duplicate Matrix Spike RQ0908828-04					
Analyte Name	**Sample Result**	**Result**	**Amount**	**% Rec**		**Result**	**Amount**	**% Rec**		**% Rec Limits**	**RPD**	**RPD Limit**
Bromoform	ND	56.2	78.8	71		59.6	79.6	75		70 - 130	6	30
Bromomethane	ND	52.9	78.8	67		56.8	79.6	71		50 - 150	7	30
Carbon Tetrachloride	ND	70.2	78.8	89		72.1	79.6	91		70 - 130	3	30
Chlorobenzene	ND	57.0	78.8	72		59.2	79.6	74		70 - 130	4	30
Chloroethane	ND	64.9	78.8	82		60.0	79.6	75		70 - 130	8	30
Chloroform	61	134	78.8	94		148	79.6	110		70 - 130	10	30
Chloromethane	ND	61.4	78.8	78		59.4	79.6	75		70 - 130	3	30
Dibromochloromethane	ND	60.2	78.8	76		62.0	79.6	78		70 - 130	3	30
Dibromomethane	ND	54.5	78.8	69	*	60.2	79.6	76		70 - 130	10	30
Dichlorodifluoromethane (CFC 12)	ND	42.1	78.8	53	*	40.0	79.6	50	*	70 - 130	5	30
Dichloromethane	ND	69.0	78.8	88		64.9	79.6	82		70 - 130	6	30
Diisopropyl Ether	ND	69.3	78.8	88		67.4	79.6	85		70 - 130	3	30
Ethyl tert-Butyl Ether	ND	71.0	78.8	90		69.7	79.6	88		70 - 130	2	30
Ethylbenzene	ND	59.1	78.8	75		61.8	79.6	78		70 - 130	5	30
Hexachlorobutadiene	ND	45.3	78.8	57	*	51.3	79.6	64	*	70 - 130	13	30
Isopropylbenzene (Cumene)	ND	59.9	78.8	76		64.1	79.6	81		70 - 130	7	30
Methyl tert-Butyl Ether	ND	63.0	78.8	80		63.3	79.6	80		70 - 130	1	30
Naphthalene	ND	48.3	78.8	61		58.8	79.6	74		50 - 150	20	30
Styrene	ND	59.1	78.8	75		65.0	79.6	82		70 - 130	9	30
Tetrachloroethene (PCE)	ND	58.6	78.8	74		63.3	79.6	79		70 - 130	8	30
Toluene	ND	61.1	78.8	77		61.9	79.6	78		70 - 130	1	30
Trichloroethene (TCE)	12	72.8	78.8	78		80.9	79.6	87		70 - 130	11	30
Trichlorofluoromethane (CFC 11)	ND	70.0	78.8	89		66.7	79.6	84		70 - 130	5	30
Vinyl Chloride	ND	60.1	78.8	76		63.6	79.6	80		70 - 130	6	30
cis-1,2-Dichloroethene	ND	67.3	78.8	85		63.6	79.6	80		70 - 130	6	30
cis-1,3-Dichloropropene	ND	57.4	78.8	73		62.9	79.6	79		70 - 130	9	30
m,p-Xylenes	ND	113	158	72		118	159	74		70 - 130	4	30
n-Butylbenzene	ND	52.4	78.8	66	*	58.1	79.6	73		70 - 130	10	30
n-Propylbenzene	ND	57.4	78.8	73		62.6	79.6	79		70 - 130	9	30
o-Xylene	ND	56.8	78.8	72		59.6	79.6	75		70 - 130	5	30
sec-Butylbenzene	ND	56.4	78.8	71		62.9	79.6	79		70 - 130	11	30
tert-Amyl Methyl Ether	ND	66.6	78.8	85		64.5	79.6	81		70 - 130	3	30
tert-Butylbenzene	ND	57.5	78.8	73		61.3	79.6	77		70 - 130	6	30
trans-1,2-Dichloroethene	ND	65.3	78.8	83		66.1	79.6	83		70 - 130	1	30

Comments:

LDC #: 21991 G1
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
		171110-LCS	JJ	67 (75-125)	( )	( )	1-4, 11, 171110-MB	J-/UJ/P (d)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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LDC #: 21991H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	4	5	
K	43	33	10 (≤ 7.3D)
M	14 U	1.4	12.6 (≤ 14D)
CC	7.2 U	0.54	6.66 (≤ 7.2D)

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 14, 2009

LDC Report Date: December 8, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905218

Sample Identification

EB091409-SO1
SA42-10B
SA42009-10B
SA42-25B
SA42-38B
SA43-10B
SA43-25B
SA43-25BRE
SA43-43B
SA44-10B
SA44-25B
SA44-42B
RSAR6-37B
RSAR6-25B
RSAR6-0.5B
RSAR6-9B
RSAO8-43B
RSAO8-11.5B
RSAO8-21.5B
TB091409-SO1
TB091409-SO2
TB091409-SO3
RSAR6-37BMS
RSAR6-37BMSD

Introduction

This data review covers 20 soil samples and 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met 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
SA43-25BRE	All TCL compounds	17	14	J- (all detects) UJ (all non-detects)	A

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 RSAR6-37BMS RSAR6-37BMSD 171241-WMB 171241-SMB	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
9/22/09 (H1021)	Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene	34.6 29.4 25.3 28.4 27.0	SA42-10B SA42009-10B SA42-38B 171297-MB	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A
9/24/09	Hexachlorobutadiene	31.6	RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B 171735-MB	J- (all detects) UJ (all non-detects)	A
10/1/09	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	28.1 25.2 25.5 25.6 45.9	SA43-25BRE 172787-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/22/09 (C0879)	2-Methyl-2-propanol	0.025 (≤0.05)	EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3 RSAR6-37BMS RSAR6-37BMSD 171241-WMB 171241-SMB	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
171241-SMB	9/22/09	2-Butanone	88 ug/Kg	RSAR6-37B

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
RSAR6-37B	2-Butanone	140 ug/Kg	140U ug/Kg

Samples TB091409-SO1, TB091409-SO2, and TB091409-SO3 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
TB091409-SO1	9/14/09	Acetone	11 ug/L	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB091409-SO2	9/14/09	Acetone	2.0 ug/L	RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B
TB091409-SO3	9/14/09	Chloromethane	0.21 ug/L	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
EB091409-SO1	Acetone	7.9 ug/Kg	7.9U ug/Kg
SA42-25B	Acetone	2.1 ug/Kg	2.1U ug/Kg
SA42-38B	Acetone	17 ug/Kg	17U ug/Kg
SA43-10B	Acetone	9.8 ug/Kg	9.8U ug/Kg
SA44-10B	Acetone	7.9 ug/Kg	7.9U ug/Kg
SA44-42B	Acetone	13 ug/Kg	13U ug/Kg

Sample EB091409-SO1 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
EB091409-SO1	9/14/09	Acetone Dichloromethane Chlorobenzene	7.9ug/L 0.21 ug/L 0.42 ug/L	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA42-25B	Acetone	2.1 ug/Kg	2.1U ug/Kg
SA43-10B	Acetone	9.8 ug/Kg	9.8U ug/Kg
SA44-10B	Acetone	7.9 ug/Kg	7.9U ug/Kg
SA44-42B	Acetone	13 ug/Kg	13U ug/Kg
RSAR6-0.5B	Acetone	14 ug/Kg	14U ug/Kg

Samples FB072909-SO (from SDG R0904226) and FB082809-SO (from SDG R0904894) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B
FB082809-SO	8/28/09	Acetone Toluene	9.2 ug/L 0.44 ug/L	RSAO8-43B RSAO8-11.5B RSAO8-21.5B

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
SA42-10B	Dichloromethane	0.48 ug/Kg	0.48U ug/Kg
SA42-25B	Acetone Dichloromethane	2.1 ug/Kg 0.43 ug/Kg	2.1U ug/Kg 0.43U ug/Kg
SA43-43B	Toluene	0.70 ug/Kg	0.70U ug/Kg
SA44-42B	Dichloromethane	0.50 ug/Kg	0.50U ug/Kg
RSAR6-25B	Toluene	0.70 ug/Kg	0.70U ug/Kg
RSAR6-9B	Toluene	0.61 ug/Kg	0.61U ug/Kg
RSAO8-43B	Toluene	0.73 ug/Kg	0.73U ug/Kg
RSAO8-11.5B	Acetone	8.6 ug/Kg	8.6U ug/Kg
RSAO8-21.5B	Toluene	0.51 ug/Kg	0.51U 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 some compounds, the 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 LCS percent recoveries (%R) for a second LCS analysis 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 with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA43-25B	Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	124883 (285820-1143278) 229271 (473981-1895922) 203306 (424973-1699892) 86736 (190690-762760)	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 compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905218	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
SA43-25B	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA42-10B and SA42009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA42-10B	SA42009-10B				
Dichloromethane	0.48	5.7U	-	5.22 (≤5.7)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905218

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905218	SA43-25BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Technical holding times (h)
R0905218	EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905218	SA42-10B SA42009-10B SA42-38B	Dichlorodifluoromethane Carbon tetrachloride n-Propylbenzene 2-Chlorotoluene n-Butylbenzene	J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R0905218	RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905218	SA43-25BRE	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905218	EB091409-SO1 RSAR6-37B TB091409-SO1 TB091409-SO2 TB091409-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905218	SA43-25B	All TCL compounds	J (all detects) R (all non-detects)	A	Internal standards (area) (i)
R0905218	SA43-25B	All TCL compounds	X	A	Overall assessment of data (o)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905218	EB091409-SO1 SA42-10B SA42009-10B SA42-25B SA42-38B SA43-10B SA43-25B SA43-25BRE SA43-43B SA44-10B SA44-25B SA44-42B RSAR6-37B RSAR6-25B RSAR6-0.5B RSAR6-9B RSAO8-43B RSAO8-11.5B RSAO8-21.5B TB091409-SO1 TB091409-SO2 TB091409-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905218

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905218	RSAR6-37B	2-Butanone	140U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905218

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905218	EB091409-SO1	Acetone	7.9U ug/Kg	A	bt
R0905218	SA42-25B	Acetone	2.1U ug/Kg	A	bt
R0905218	SA42-38B	Acetone	17U ug/Kg	A	bt
R0905218	SA43-10B	Acetone	9.8U ug/Kg	A	bt
R0905218	SA44-10B	Acetone	7.9U ug/Kg	A	bt
R0905218	SA44-42B	Acetone	13U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905218

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905218	SA42-25B	Acetone	2.1U ug/Kg	A	be
R0905218	SA43-10B	Acetone	9.8U ug/Kg	A	be
R0905218	SA44-10B	Acetone	7.9U ug/Kg	A	be
R0905218	SA44-42B	Acetone	13U ug/Kg	A	be
R0905218	RSAR6-0.5B	Acetone	14U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905218

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R090218	SA42-10B	Dichloromethane	0.48U ug/Kg	A	bf
R090218	SA42-25B	Acetone Dichloromethane	2.1U ug/Kg 0.43U ug/Kg	A	bf
R090218	SA43-43B	Toluene	0.70U ug/Kg	A	bf
R090218	SA44-42B	Dichloromethane	0.50U ug/Kg	A	bf
R090218	RSAR6-25B	Toluene	0.70U ug/Kg	A	bf
R090218	RSAR6-9B	Toluene	0.61U ug/Kg	A	bf
R090218	RSAO8-43B	Toluene	0.73U ug/Kg	A	bf
R090218	RSAO8-11.5B	Acetone	8.6U ug/Kg	A	bf
R090218	RSAO8-21.5B	Toluene	0.51U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991H1
SDG #: R0905218
Laboratory: Columbia Analytical Services

Date: 12/02/09
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	SW	Sampling dates: 9/14/09
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	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D = 2,3
XVII.	Field blanks	SW	EB = 1 TB = 20, 21, 22 FB = FB072909-SO (RQ904; ↓ = FB082809-SO (RQ904

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	1	EB091409-SO1	W	11	3	SA44-25B	S	21	1	TB091409-SO2	W	+ 31	1	171241 - WMB
2	Y	SA42-10B	D S	12	3	SA44-42B		+ 22	1	TB091409-SO3	↓	32	Y	171297 - MB
3	Y	SA42009-10B	D	13	5	RSAR6-37B		23	5	RSAR6-37BMS	S	33	3	171498 -
4	3	SA42-25B		14	3	RSAR6-25B		24	5	RSAR6-37BMSD	↓	34	9	172787 -
5	Y	SA42-38B		15	3	RSAR6-0.5B		25				+ 35	5	171241 - SMB
6	3	SA43-10B		16	6	RSAR6-9B		26				36	6	171735 - MB
7	3	SA43-25B		17	6	RSAO8-43B		27				37		
8	4	SA43-25B ~~DL~~ RE		18	6	RSAO8-11.5B		28				38		
9	3	SA43-43B		19	6	RSAO8-21.5B	↓	29				39		
10	3	SA44-10B	↓	+ 20	1	TB091409-SO1	W	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 #: 21991 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: SVG
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
8	S	N	9/14/09	—	10/01/09	17	J-/UJ/A

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 #: 47141 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JW
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
	9/18/09	ICAL	NNNN		0.028	1, 13, 20-24, 171241-WMB, 171241-SMB	J/UJ/A (C)

INICAL.1SB

LDC #: 21491 H1
SDG #: Sg Conv

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/22/09	C0879	NNN		0.025	1, 13, 20-24, 171241-WMB, 171241-SMB	J/NJ/A (C)
	9/22/09	H1021	O (+)	29.4		2, 3, 5, 171297-MB	J+ dets/A
			YY (+)	25.3			
			ZZ (+)	28.4			
			III (+)	27.0			
			JJ (+)	34.6			
	9/24/09	H1081	LLL (-)	31.6		16-19, 171735-MB	J-/NJ/A
	10/01/09	H1236	CCC (-)	28.1		8, 172787-MB	J-/NJ/A
			EEE (-)	25.2			
			GGG (-)	25.5			
			MM (-)	25.6			
			LLL (-)	45.9			

LDC #: 21991H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

Blank analysis date: 9/22/09
Conc. units: ug/kg Associated Samples: 13 (61)

Compound	Blank ID	Sample Identification								
	171241-SMB	13								
M	88	140/4								

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 21991 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVB
2nd Reviewer: A

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 (be)

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

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	9/14/09	4	6	10	12	15				
F	7.9	2.1 /U	9.8 /U	7.9 /U	13/U	14 /U				
E	0.21									
DD	0.42									
			(All others either ND or > EB)							

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-12

Compound	Blank ID 20	Blank ID 22	Sample Identification							
Sampling Date	9/14/09	→	1	4	5	6	10	12		
F	11		7.9 /U	2.1 /U	17/U	9.8 /U	7.9 /U	13/U		
A		0.21								
			(All others		ND or	> TB)				

LDC #: 21991 #1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 3
Reviewer: JV6
2nd Reviewer: d

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: 13-19

Compound	Blank ID 21	Blank ID	Sample Identification							
Sampling Date	9/14/09									
F	2.0	(All results either ND or > TB)								

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) (Field Blank) / Rinsate / Trip Blank / Other: _____ Associated Samples: 2-16 (bf)

Compound	Blank ID FB072909-50	Blank ID	Sample Identification							
Sampling Date	7/29/09	2	4	9	12	14	16			
F	3.5		2.1/4							
E	0.30	0.48/4	0.43/4		0.50/4					
CC	0.44			0.70/4		0.70/4	0.61/4			

LDC #: 21791#1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
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: 17-19 (bf)

Compound	Blank ID FB082809-SO	Blank ID	Sample Identification							
Sampling Date	8/28/09		17	18	19					
F	9.2			8.6 /4						
CC	0.44		0.73/4		0.51 /4					

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 #: 21191 M1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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 associate 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
		23/24	OO	47 (70-130)	53 (70-130)	( )	13	No qual (LCS in)
			B	16 (50-150)	16 (50-150)	( )		
			D	27 (70-130)	29 (70-130)	( )		(MSD in)
			XX	47 ( )	( )	( )		
			KK	69 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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 #: 21991 H1
SDG #: See Cover

Reviewer: JVG
2nd Reviewer: Q

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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
		171498-LCS	O	66 (75-125)	( )	( )	4,6,7, 9-12, 14, 15,	No qual
			A	69 (↓)	( )	( )	171498-MB	(Another set
			LLL	63 (↓)	( )	( )		of LCS/D analyzed
				( )	( )	( )		in this batch all in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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

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

Y N N/A 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
		7	PFB	124883 (285820 - 1143278)		J/R/A (i)
			DFB	229271 (473981 - 1895922)		
			CBZ	203306 (424973 - 1699892)		
			4DCB	86736 (190690 - 762760)		
						(all TCL)

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

LDC #: 21991H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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	IS outside limits		X/A (O)

Comments: _____

LDC #: 21991A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVL
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) 2	3	RPD (Parent only)
E	0.48	5.7U	5.22 (≤ 5.7D) -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 15 through September 16, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905260

Sample Identification

EB091509-SO1
SA136-0.5B
SA136-10B
SA136-25B
SA136-40B
SA30-5B
SA30-9B
SA30-25B
SA30-38B
SA153-10B
SA153-25B
SA153-38B
SA172-10B
SA172-25B
SA172-40B
TB091509-SO1
TB091509-SO2
TB091509-SO3
EB091609-SO1
SA128-0.5B
SA128-10B
SA128-29B
SA65-0.5B
SA65009-0.5B
TB091609-SO1
SA153-25BMS
SA153-25BMSD

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 171659-SMB 171659-WMB	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
9/24/09	Hexachlorobutadiene	31.6	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA153-25B SA153-25BMS SA153-25BMSD 171735-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/23/09	2-Methyl-2-propanol	0.027 (≤0.05)	EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1 171659-SMB 171659-WMB	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
171659-SMB	9/23/09	2-Butanone	80 ug/Kg	SA128-29B

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
171962-MB	9/25/09	Dichloromethane	0.42 ug/Kg	SA30-9B SA30-25B SA30-38B SA153-10B SA153-38B SA172-10B SA172-25B SA172-40B SA128-0.5B SA128-10B SA65-0.5B SA65009-0.5B

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
SA128-29B	2-Butanone	130 ug/Kg	130U ug/Kg

Samples TB091509-SO1, TB091509-SO2, TB091509-SO3, and TB091609-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
TB091509-SO2	9/15/09	Bromoform Chloromethane Dibromochloromethane	1.6 ug/L 0.24 ug/L 0.77 ug/L	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B
TB091509-SO3	9/25/09	Chloromethane	0.22 ug/L	EB091509-SO1 SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B
TB091609-SO1	9/16/09	Acetone	1.9 ug/L	EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA30-38B	Dibromochloromethane	0.57 ug/Kg	0.57U ug/Kg
SA128-10B	Acetone	3.0 ug/Kg	3.0U ug/Kg
SA65009-0.5B	Acetone	3.4 ug/Kg	3.4U ug/Kg

Samples EB091509-SO1 and EB091609-SO1 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
EB091509-SO1	9/15/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.28 ug/L 0.41 ug/L	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B
EB091609-SO1	9/16/09	Acetone	4.9 ug/L	SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA136-10B	Toluene	0.60 ug/Kg	0.60U ug/Kg
SA136-25B	Toluene	0.54 ug/Kg	0.54U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA30-5B	Toluene	0.47 ug/Kg	0.47U ug/Kg
SA30-9B	Toluene	0.62 ug/Kg	0.62U ug/Kg
SA30-25B	Acetone Toluene	2.9 ug/Kg 0.67 ug/Kg	2.9U ug/Kg 0.67U ug/Kg
SA128-10B	Acetone	3.0 ug/Kg	3.0U ug/Kg
SA65009-0.5B	Acetone	3.4 ug/Kg	3.4U ug/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905260

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
SA136-10B	Toluene	0.60 ug/Kg	0.60U ug/Kg
SA136-25B	Toluene	0.54 ug/Kg	0.54U ug/Kg
SA30-5B	Toluene	0.47 ug/Kg	0.47U ug/Kg
SA30-9B	Toluene	0.62 ug/Kg	0.62U ug/Kg
SA30-25B	Acetone Toluene	2.9 ug/Kg 0.67 ug/Kg	2.9U ug/Kg 0.67U ug/Kg
SA128-10B	Acetone	3.0 ug/Kg	3.0U ug/Kg
SA65-0.5B	Toluene	0.45 ug/Kg	0.45U ug/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA65009-0.5B	Acetone Toluene	3.4 ug/Kg 0.63 ug/Kg	3.4U ug/Kg 0.63U ug/Kg

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) and relative percent differences (RPD) were not within QC limits for several compounds, the 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 R0905260	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 SA65-0.5B and SA65009-0.5B 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
	SA65-0.5B	SA65009-0.5B				
2-Butanone	1.3	1.2	-	0.1 (≤14)	-	-
Acetone	27U	3.4	-	23.6 (≤27)	-	-
Toluene	0.45	0.63	-	0.18 (≤6.8)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905260	EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905260	SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA153-25B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905260	EB091509-SO1 TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-29B TB091609-SO1	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905260	EB091509-SO1 SA136-0.5B SA136-10B SA136-25B SA136-40B SA30-5B SA30-9B SA30-25B SA30-38B SA153-10B SA153-25B SA153-38B SA172-10B SA172-25B SA172-40B TB091509-SO1 TB091509-SO2 TB091509-SO3 EB091609-SO1 SA128-0.5B SA128-10B SA128-29B SA65-0.5B SA65009-0.5B TB091609-SO1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905260

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905260	SA128-29B	2-Butanone	130U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905260	SA30-38B	Dibromochloromethane	0.57U ug/Kg	A	bt
R0905260	SA128-10B	Acetone	3.0U ug/Kg	A	bt
R0905260	SA65009-0.5B	Acetone	3.4U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905260	SA136-10B	Toluene	0.60U ug/Kg	A	be
R0905260	SA136-25B	Toluene	0.54U ug/Kg	A	be
R0905260	SA30-5B	Toluene	0.47U ug/Kg	A	be
R0905260	SA30-9B	Toluene	0.62U ug/Kg	A	be
R0905260	SA30-25B	Acetone Toluene	2.9U ug/Kg 0.67U ug/Kg	A	be
R0905260	SA128-10B	Acetone	3.0U ug/Kg	A	be
R0905260	SA65009-0.5B	Acetone	3.4U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905260

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905260	SA136-10B	Toluene	0.60U ug/Kg	A	bf
R0905260	SA136-25B	Toluene	0.54U ug/Kg	A	bf
R0905260	SA30-5B	Toluene	0.47U ug/Kg	A	bf
R0905260	SA30-9B	Toluene	0.62U ug/Kg	A	bf
R0905260	SA30-25B	Acetone Toluene	2.9U ug/Kg 0.67U ug/Kg	A	bf
R0905260	SA128-10B	Acetone	3.0U ug/Kg	A	bf
R0905260	SA65-0.5B	Toluene	0.45U ug/Kg	A	bf
R0905260	SA65009-0.5B	Acetone Toluene	3.4U ug/Kg 0.63U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991I1
SDG #: R0905260
Laboratory: Columbia Analytical Services

Date: 12/02/09
Page: 1 of 1
Reviewer: SVG
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: 9/15-16/09
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	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 = 23, 24
XVII.	Field blanks	SW	EB= 1, 19 TB = 16, 17, 18, 25 FB= FB072909-SO (from R0904226)

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	1	EB091509-SO1	W	11	2	SA153-25B	S	21	3	SA128-10B	S	31	1	171659 - WMB
2	2	SA136-0.5B	S	12	3	SA153-38B		22	4	SA128-29B		32	2	171735 -- MB
3	2	SA136-10B		13	3	SA172-10B		23	3	SA65-0.5B	D	33	3	171962 -
4	2	SA136-25B		14	3	SA172-25B		24	3	SA65009-0.5B	D	34	4	171659 - SMB
5	2	SA136-40B		15	3	SA172-40B		25	1	TB091609-SO1	W	35		
6	2	SA30-5B		16	1	TB091509-SO1	W	26	2	SA153-25BMS	S	36		
7	3	SA30-9B		17	1	TB091509-SO2		27	2	SA153-25BMSD		37		
8	3	SA30-25B		18	1	TB091509-SO3		28				38		
9	3	SA30-38B		19	1	EB091609-SO1		29				39		
10	3	SA153-10B		20	3	SA128-0.5B	S	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	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.
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 #: 21991 L1
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? 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
	9/18/09	ICAL	NNNN		0.028	1, 16-19, 22, 25, 171659-WMB, 171659-SMB	J/NJ/A (C)

LDC #: 21991I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/23/09	CO946	NNNN		0.027	1, 16-19, 22, 25, 171659-WMB, 171659-SMB	J/UJ/A (C)
	9/24/09	H1081	LLL (-)	31.6		2-6, 11, 26, 27, 171735-MB	J-/UJ/A (C)

CONCAL 1SB

LDC #: 21991 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: CF

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: 9/23/09
Conc. units: ug/kg
Associated Samples: 22 (bl)

Compound	Blank ID	Sample Identification								
	171659-SMB	22								
M	80	130/4								

Blank analysis date: 9/25/09
Conc. units: ug/kg
Associated Samples: 7-10, 12-15, 20, 21, 23, 24 (ND)

Compound	Blank ID	Sample Identification								
	171962-MB									
E	0.42									

LDC #: 21991 I1
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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 2-9 (bt)

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	9/15/09		9							
X	1.6									
A	0.24									
T	0.77		0.57 /U							

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1, 10-15 (ND)

Compound	Blank ID 18	Blank ID	Sample Identification							
Sampling Date	9/15/09									
A	0.22									

LDC #: 21951I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JW
2nd Reviewer: A

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 2-15 (be)

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	9/15/09	3	4	6	7	8				
F	3.5					2.9/U				
E	0.28									
CC	0.41	0.60/U	0.54/U	0.47/U	0.62/U	0.67/U				

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 20-24 (be)

Compound	Blank ID 19	Blank ID	Sample Identification							
Sampling Date	9/16/09	21	24							
F	4.9	3.0/U	3.4/U							

LDC #: 21991 I 1
SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SV6
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: 19, 20-24 (bt)

Compound	Blank ID 25	Blank ID	Sample Identification							
Sampling Date	9/16/09		21	24						
F	1.9		3.0/U	3.4/U						
			(All others either ND or > TB)							

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

Compound	Blank ID FB072909-50	Blank ID	Sample Identification							
Sampling Date	7/29/09		3	4	6	7	8	21	23	24
F	3.5						2.9/U	3.0/U		3.4/U
E	0.30									
CC	0.44		0.60/U	0.54/U	0.47/U	0.62/U	0.67/U		0.45/U	0.63/U

LDC #: 21991I1
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
		26/27	Several	compounds	have %R and	%RPDs	11	No qual
			outside limits in	( )	( )	( )		(LCS in)
			(see attached	summary)	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905260
Date Collected: 9/15/09
Date Received: 9/16/09
Date Analyzed: 9/24/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA153-25B
Lab Code: R0905260-011

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909047-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909047-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	39.3	57.4	68	*	39.7	58.9	67	*	70 - 130	1	30
1,1,1-Trichloroethane (TCA)	ND	43.2	57.4	75		44.4	58.9	75		70 - 130	3	30
1,1,2,2-Tetrachloroethane	ND	40.6	57.4	71		44.9	58.9	76		70 - 130	10	30
1,1,2-Trichloroethane	ND	42.1	57.4	73		44.2	58.9	75		70 - 130	5	30
1,1-Dichloroethane (1,1-DCA)	ND	42.4	57.4	74		42.2	58.9	72		70 - 130	0	30
1,1-Dichloroethene (1,1-DCE)	ND	37.3	57.4	65	*	40.1	58.9	68	*	70 - 130	7	30
1,1-Dichloropropene	ND	39.2	57.4	68	*	42.4	58.9	72		70 - 130	8	30
1,2,3-Trichlorobenzene	ND	28.2	57.4	49	*	29.5	58.9	50	*	70 - 130	4	30
1,2,3-Trichloropropane	ND	41.4	57.4	72		44.9	58.9	76		70 - 130	8	30
1,2,4-Trichlorobenzene	ND	27.5	57.4	48	*	29.0	58.9	49	*	70 - 130	5	30
1,2,4-Trimethylbenzene	ND	30.6	57.4	53	*	33.3	58.9	56	*	70 - 130	8	30
1,2-Dibromo-3-chloropropane (DBC	ND	41.2	57.4	72		47.6	58.9	81		50 - 150	14	30
1,2-Dibromoethane	ND	41.5	57.4	72		43.5	58.9	74		70 - 130	5	30
1,2-Dichlorobenzene	ND	33.7	57.4	59	*	34.0	58.9	58	*	70 - 130	1	30
1,2-Dichloroethane	ND	42.5	57.4	74		43.7	58.9	74		70 - 130	3	30
1,2-Dichloropropane	ND	43.3	57.4	75		43.8	58.9	74		70 - 130	1	30
1,3,5-Trimethylbenzene	ND	31.7	57.4	55	*	33.9	58.9	57	*	70 - 130	7	30
1,3-Dichlorobenzene	ND	32.6	57.4	57	*	33.5	58.9	57	*	70 - 130	3	30
1,3-Dichloropropane	ND	41.4	57.4	72		42.4	58.9	72		70 - 130	2	30
1,4-Dichlorobenzene	ND	32.3	57.4	56	*	33.9	58.9	58	*	70 - 130	5	30
2,2-Dichloropropane	ND	41.6	57.4	73		45.2	58.9	77		70 - 130	8	30
2-Butanone (MEK)	1.2	47.9	57.4	81		53.7	58.9	89		50 - 150	11	30
2-Chlorotoluene	ND	32.2	57.4	56	*	37.4	58.9	63	*	70 - 130	15	30
2-Hexanone	ND	42.0	57.4	73		47.0	58.9	80		70 - 130	11	30
2-Methyl-2-propanol	ND	917	1150	80		994	1180	84		50 - 150	8	30
4-Chlorotoluene	ND	31.6	57.4	55	*	34.3	58.9	58	*	70 - 130	8	30
4-Isopropyltoluene	ND	29.8	57.4	52	*	31.1	58.9	53	*	70 - 130	4	30
4-Methyl-2-pentanone	ND	43.2	57.4	75		48.1	58.9	82		70 - 130	11	30
Acetone	ND	56.3	57.4	98		64.2	58.9	109		50 - 150	13	30
Benzene	ND	38.9	57.4	68	*	40.8	58.9	69	*	70 - 130	5	30
Bromobenzene	ND	35.2	57.4	61	*	36.8	58.9	62	*	70 - 130	4	30
Bromochloromethane	ND	40.4	57.4	70		40.5	58.9	69	*	70 - 130	0	30
Bromodichloromethane	ND	43.1	57.4	75		44.3	58.9	75		70 - 130	3	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Northgate Environmental	**Service Request:**	R0905260
Project:	Tronox LLC Henderson/2027.001	**Date Collected:**	9/15/09
Sample Matrix:	Soil	**Date Received:**	9/16/09
		Date Analyzed:	9/24/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	SA153-25B	**Units:**	µg/Kg
Lab Code:	R0905260-011	**Basis:**	Dry

Analytical Method: 8260B

		Matrix Spike RQ0909047-03				Duplicate Matrix Spike RQ0909047-04					
Analyte Name	**Sample Result**	**Result**	**Amount**	**% Rec**		**Result**	**Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Bromoform	ND	43.8	57.4	76		45.7	58.9	77	70 - 130	4	30
Bromomethane	ND	34.9	57.4	61		37.2	58.9	63	50 - 150	6	30
Carbon Tetrachloride	ND	42.6	57.4	74		46.7	58.9	79	70 - 130	9	30
Chlorobenzene	ND	35.7	57.4	62	*	37.5	58.9	64	* 70 - 130	5	30
Chloroethane	ND	35.5	57.4	62	*	35.1	58.9	60	* 70 - 130	1	30
Chloroform	1.8	44.8	57.4	75		45.6	58.9	74	70 - 130	2	30
Chloromethane	ND	27.6	57.4	48	*	30.1	58.9	51	* 70 - 130	8	30
Dibromochloromethane	ND	42.0	57.4	73		44.1	58.9	75	70 - 130	5	30
Dibromomethane	ND	41.6	57.4	73		43.7	58.9	74	70 - 130	5	30
Dichlorodifluoromethane (CFC 12)	ND	23.9	57.4	42	*	25.3	58.9	43	* 70 - 130	6	30
Dichloromethane	ND	40.4	57.4	70		40.4	58.9	68	* 70 - 130	0	30
Diisopropyl Ether	ND	43.3	57.4	75		44.0	58.9	75	70 - 130	2	30
Ethyl tert-Butyl Ether	ND	46.4	57.4	81		46.6	58.9	79	70 - 130	0	30
Ethylbenzene	ND	37.4	57.4	65	*	38.0	58.9	64	* 70 - 130	2	30
Hexachlorobutadiene	ND	24.1	57.4	42	*	24.4	58.9	41	* 70 - 130	1	30
Isopropylbenzene (Cumene)	ND	36.4	57.4	63	*	38.0	58.9	64	* 70 - 130	4	30
Methyl tert-Butyl Ether	ND	43.4	57.4	76		43.7	58.9	74	70 - 130	1	30
Naphthalene	ND	34.6	57.4	60		41.6	58.9	71	50 - 150	18	30
Styrene	ND	38.6	57.4	67	*	39.5	58.9	67	* 70 - 130	2	30
Tetrachloroethene (PCE)	ND	37.6	57.4	66	*	37.9	58.9	64	* 70 - 130	1	30
Toluene	ND	37.9	57.4	66	*	39.9	58.9	68	* 70 - 130	5	30
Trichloroethene (TCE)	ND	39.6	57.4	69	*	42.3	58.9	72	70 - 130	7	30
Trichlorofluoromethane (CFC 11)	ND	40.6	57.4	71		41.6	58.9	71	70 - 130	3	30
Vinyl Chloride	ND	33.9	57.4	59	*	38.5	58.9	65	* 70 - 130	13	30
cis-1,2-Dichloroethene	ND	40.5	57.4	71		42.5	58.9	72	70 - 130	5	30
cis-1,3-Dichloropropene	ND	40.0	57.4	70		42.5	58.9	72	70 - 130	6	30
m,p-Xylenes	ND	71.5	115	62	*	73.4	118	62	* 70 - 130	3	30
n-Butylbenzene	ND	27.6	57.4	48	*	27.6	58.9	47	* 70 - 130	0	30
n-Propylbenzene	ND	31.9	57.4	56	*	34.2	58.9	58	* 70 - 130	7	30
o-Xylene	ND	36.4	57.4	63	*	36.9	58.9	63	* 70 - 130	1	30
sec-Butylbenzene	ND	31.7	57.4	55	*	34.3	58.9	58	* 70 - 130	8	30
tert-Amyl Methyl Ether	ND	44.0	57.4	77		45.0	58.9	76	70 - 130	2	30
tert-Butylbenzene	ND	32.8	57.4	57	*	34.8	58.9	59	* 70 - 130	6	30
trans-1,2-Dichloroethene	ND	38.1	57.4	66	*	39.0	58.9	66	* 70 - 130	2	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Northgate Environmental	**Service Request:**	R0905260
Project:	Tronox LLC Henderson/2027.001	**Date Collected:**	9/15/09
Sample Matrix:	Soil	**Date Received:**	9/16/09
		Date Analyzed:	9/24/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name:	SA153-25B	**Units:**	µg/Kg
Lab Code:	R0905260-011	**Basis:**	Dry

Analytical Method: 8260B

		Matrix Spike RQ0909047-03				Duplicate Matrix Spike RQ0909047-04					
Analyte Name	**Sample Result**	**Result**	**Amount**	**% Rec**		**Result**	**Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
trans-1,3-Dichloropropene	ND	39.8	57.4	69	*	41.1	58.9	70	70 - 130	3	30

Comments:

LDC #: 21991 I1
SDG #: see Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SVG
2nd reviewer:

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

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

Compound	Concentration (ug/kg) 23	24	RPD (Parent only)
M	1.3	1.2	0.1 (≤ 14 D) –
F	27 U	3.4	23.6 (≤ 27 D) –
CC	0.45	0.63	0.18 (≤ 6.8 D) –

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 17, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905331

Sample Identification

SA165-0.5B
SA165-10B
SA165-28B
SA151-0.5B
SA151-10B
SA151-25B
SA151-39B
SA151009-39B
SA51-10B
SA51009-10B
SA51-25B
SA51-36B
TB091709-SO1
TB091709-SO3
SA165-10BMS
SA165-10BMSD

Introduction

This data review covers 14 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	SA165-28B TB091709-SO1 TB091709-SO3 171659-SMB 171659-WMB	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
9/28/09	Hexachlorobutadiene	30.8	SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA165-10BMS SA165-10BMSD 172205-MB	J- (all detects) UJ (all non-detects)	A
9/29/09	Acetone	27.5	SA51009-10B SA51-25B 172392-MB	J+ (all detects)	A
9/29/09	Hexachlorobutadiene	28.4	SA51009-10B SA51-25B 172392-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/23/09	2-Methyl-2-propanol	0.027 (≤0.05)	SA165-28B TB091709-SO1 TB091709-SO3 171659-SMB 171659-WMB	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
171659-MB	9/23/09	2-Butanone	80 ug/Kg	SA165-28B

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
SA165-28B	2-Butanone	120 ug/Kg	120U ug/Kg

Samples TB091709-SO1 and TB091709-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905331

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
SA165-0.5B	Toluene	0.40 ug/Kg	0.40U ug/Kg
SA165-10B	Toluene	0.38 ug/Kg	0.38U ug/Kg
SA151-0.5B	Toluene	0.41 ug/Kg	0.41U ug/Kg
SA151-10B	Toluene	0.48 ug/Kg	0.48U ug/Kg
SA151-25B	Acetone	6.8 ug/Kg	6.8U ug/Kg
SA151009-39B	Toluene	0.38 ug/Kg	0.38U ug/Kg
SA51-10B	Acetone Toluene	1.5 ug/Kg 0.77 ug/Kg	1.5U ug/Kg 0.77U ug/Kg
SA51-25B	Acetone Toluene	1.9 ug/Kg 0.34 ug/Kg	1.9U ug/Kg 0.34U 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
SA165-10BMS/MSD (SA165-10B)	Hexachlorobutadiene	52 (70-130)	67 (70-130)	40 (≤30)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
172205-LCS	Hexachlorobutadiene	63 (75-125)	SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B 172205-MB	J- (all detects) UJ (all non-detects)	P
172392-LCS	Hexachlorobutadiene	74 (75-125)	SA51009-10B SA51-25B 172392-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905331	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 SA151-39B and SA151009-39B and samples SA51-10B and SA51009-10B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA151-39B	SA151009-39B				
2-Butanone	2.0	0.99	-	1.01 (≤14)	-	-
Acetone	10	23U	-	13 (≤23)	-	-
Chloroform	6.5	90	-	83.5 (≤6.9)	J (all detects)	A
Toluene	6.9U	0.38	-	6.52 (≤6.9)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA51-10B	SA51009-10B				
2-Butanone	1.4	11U	-	9.6 (≤11)	-	-
Acetone	1.5	21U	-	19.5 (≤21)	-	-
Chloroform	4.3	6.0	-	1.7 (≤5.3)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA51-10B	SA51009-10B				
Dichloromethane	0.61	5.3U	-	4.69 (≤5.3)	-	-
Toluene	0.77	5.3U	-	4.53 (≤5.3)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905331

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905331	SA165-28B TB091709-SO1 TB091709-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905331	SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA51009-10B SA51-25B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905331	SA51009-10B SA51-25B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905331	SA165-28B TB091709-SO1 TB091709-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905331	SA165-10B	Hexachlorobutadiene	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD) (m,ld)
R0905331	SA165-0.5B SA165-10B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51-36B SA51009-10B SA51-25B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905331	SA165-0.5B SA165-10B SA165-28B SA151-0.5B SA151-10B SA151-25B SA151-39B SA151009-39B SA51-10B SA51009-10B SA51-25B SA51-36B TB091709-SO1 TB091709-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905331	SA151-39B SA151009-39B	Chloroform	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905331

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905331	SA165-28B	2-Butanone	120U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905331

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905331

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905331	SA165-0.5B	Toluene	0.40U ug/Kg	A	bf
R0905331	SA165-10B	Toluene	0.38U ug/Kg	A	bf
R0905331	SA151-0.5B	Toluene	0.41U ug/Kg	A	bf
R0905331	SA151-10B	Toluene	0.48U ug/Kg	A	bf
R0905331	SA151-25B	Acetone	6.8U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905331	SA151009-39B	Toluene	0.38U ug/Kg	A	bf
R0905331	SA51-10B	Acetone Toluene	1.5U ug/Kg 0.77U ug/Kg	A	bf
R0905331	SA51-25B	Acetone Toluene	1.9U ug/Kg 0.34U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991J1
SDG #: R0905331
Laboratory: Columbia Analytical Services

Date: 12/02/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/17/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD ≤ 15%
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	
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 = 7, 8 D_2 = 9, 10
XVII.	Field blanks	SW	*TB = 13, 14 FB = FB072909-SO (from R0904226

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	SA165-0.5B	S	11	3	SA51-25B	S	21	1	172205-MB	31
2	1	SA165-10B		12	1	SA51-36B		22	2	171659-SMB	32
3	2	SA165-28B		13	4	TB091709-SO1	W	23	3	172392-MB	33
4	1	SA151-0.5B		14	4	TB091709-SO3		24	4	171659-WMB	34
5	1	SA151-10B		15	1	SA165-10BMS	S	25			35
6	1	SA151-25B		16	1	SA165-10BMSD		26			36
7	1	SA151-39B	D_1	17				27			37
8	1	SA151009-39B	D_1	18				28			38
9	1	SA51-10B	D_2	19				29			39
10	3	SA51009-10B	D_2	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 chloride**	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 #: 21991J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	9/18/09	ICAL	NNNN		0.028	3, 13, 14, 171659-SMB, 171659-WMB	J/UJ/A (c)

INICAL.1SB

LDC #: 21991J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/23/09	C0946	NNNN		0.027	3, 13, 14, 171659-SMB, 171659-WMB	J/UJ/A (c)
	9/28/09	H1166	LLL (-)	30.8		1, 2, 4-9, 12, 15, 16, 172205-MB	J-/UJ/A
	9/29/09	H1190	F (+)	27.5		10, 11, 172392-MB	J+ dets/A
			LLL (-)	28.4		↓	J-/UJ/A

LDC #: 21991J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of ____
Reviewer: VG
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: 9/23/09
Conc. units: ug/Kg Associated Samples: 3

Compound	Blank ID	Sample Identification								
	171659-5MB	3								
M	80		120/4							

Blank analysis date: ____
Conc. units: ____ Associated Samples: ____

Compound	Blank ID	Sample Identification								

LDC #: 21691 J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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 FB072909-50	Blank ID	Sample Identification							
Sampling Date	7/29/04	1	2	4	5	6	8	9	11	
F	3.5					6.8/4		1.5/4	1.9/4	
E	0.30									
CC	0.44	0.40/4	0.38/4	0.41/4	0.48/4		0.38/4	0.77/4	0.34/4	

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 #: 21491 J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		15/16	Several	compounds	have %R and RPD		2	No qual
			outside limits but LCS %R in (except LLL)					
				(see attached summary)	( )	( )		
				( )	( )	( )		
			LLL	52 (70-130)	67 (70-130)	40 (30)	↓	J/UJ/A (m,
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905331
Date Collected: 9/17/09
Date Received: 9/18/09
Date Analyzed: 9/28/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA165-10B
Lab Code: R0905331-002

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909187-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909187-04 Result	Amount	% Rec		% Rec Limits	RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	39.5	51.3	77		47.7	59.3	81		70 - 130	19		30
1,1,1-Trichloroethane (TCA)	ND	46.5	51.3	91		54.0	59.3	91		70 - 130	15		30
1,1,2,2-Tetrachloroethane	ND	40.1	51.3	78		47.4	59.3	80		70 - 130	17		30
1,1,2-Trichloroethane	ND	39.9	51.3	78		48.2	59.3	81		70 - 130	19		30
1,1-Dichloroethane (1,1-DCA)	ND	45.5	51.3	89		52.2	59.3	88		70 - 130	14		30
1,1-Dichloroethene (1,1-DCE)	ND	41.3	51.3	81		46.5	59.3	78		70 - 130	12		30
1,1-Dichloropropene	ND	41.0	51.3	80		49.3	59.3	83		70 - 130	18		30
1,2,3-Trichlorobenzene	ND	27.5	51.3	54	*	39.9	59.3	67	*	70 - 130	37	*	30
1,2,3-Trichloropropane	ND	38.7	51.3	75		47.6	59.3	80		70 - 130	21		30
1,2,4-Trichlorobenzene	ND	27.3	51.3	53	*	39.2	59.3	66	*	70 - 130	36	*	30
1,2,4-Trimethylbenzene	ND	35.1	51.3	69	*	45.9	59.3	77		70 - 130	27		30
1,2-Dibromo-3-chloropropane (DBC	ND	39.1	51.3	76		48.5	59.3	82		50 - 150	21		30
1,2-Dibromoethane	ND	40.0	51.3	78		47.8	59.3	81		70 - 130	18		30
1,2-Dichlorobenzene	ND	35.9	51.3	70		46.7	59.3	79		70 - 130	26		30
1,2-Dichloroethane	ND	42.0	51.3	82		49.2	59.3	83		70 - 130	16		30
1,2-Dichloropropane	ND	42.3	51.3	82		50.7	59.3	85		70 - 130	18		30
1,3,5-Trimethylbenzene	ND	35.9	51.3	70		47.0	59.3	79		70 - 130	27		30
1,3-Dichlorobenzene	ND	36.7	51.3	72		46.2	59.3	78		70 - 130	23		30
1,3-Dichloropropane	ND	39.7	51.3	77		46.3	59.3	78		70 - 130	15		30
1,4-Dichlorobenzene	ND	37.5	51.3	73		47.2	59.3	80		70 - 130	23		30
2,2-Dichloropropane	ND	45.8	51.3	89		53.4	59.3	90		70 - 130	15		30
2-Butanone (MEK)	0.87	47.6	51.3	91		55.2	59.3	92		50 - 150	15		30
2-Chlorotoluene	ND	37.8	51.3	74		47.2	59.3	80		70 - 130	22		30
2-Hexanone	ND	37.6	51.3	73		48.1	59.3	81		70 - 130	24		30
2-Methyl-2-propanol	ND	915	1030	89		1080	1190	91		50 - 150	17		30
4-Chlorotoluene	ND	38.8	51.3	76		49.5	59.3	83		70 - 130	24		30
4-Isopropyltoluene	ND	34.7	51.3	68	*	46.5	59.3	78		70 - 130	29		30
4-Methyl-2-pentanone	ND	40.4	51.3	79		49.5	59.3	83		70 - 130	20		30
Acetone	ND	58.7	51.3	114		73.4	59.3	124		50 - 150	22		30
Benzene	ND	39.7	51.3	77		46.5	59.3	78		70 - 130	16		30
Bromobenzene	ND	37.7	51.3	73		47.5	59.3	80		70 - 130	23		30
Bromochloromethane	ND	41.9	51.3	82		49.4	59.3	83		70 - 130	16		30
Bromodichloromethane	ND	42.7	51.3	83		49.6	59.3	84		70 - 130	15		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905331
Date Collected: 9/17/09
Date Received: 9/18/09
Date Analyzed: 9/28/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA165-10B
Lab Code: R0905331-002

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909187-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909187-04 Result	Amount	% Rec		% Rec Limits	RPD		RPD Limit
Bromoform	ND	41.4	51.3	81		49.8	59.3	84		70 - 130	19		30
Bromomethane	ND	32.8	51.3	64		36.9	59.3	62		50 - 150	12		30
Carbon Tetrachloride	ND	44.6	51.3	87		55.0	59.3	93		70 - 130	21		30
Chlorobenzene	ND	38.5	51.3	75		46.6	59.3	79		70 - 130	19		30
Chloroethane	ND	38.3	51.3	75		43.9	59.3	74		70 - 130	14		30
Chloroform	0.50	46.7	51.3	90		53.8	59.3	90		70 - 130	14		30
Chloromethane	ND	31.7	51.3	62	*	37.8	59.3	64	*	70 - 130	18		30
Dibromochloromethane	ND	41.1	51.3	80		50.5	59.3	85		70 - 130	20		30
Dibromomethane	ND	40.9	51.3	80		47.8	59.3	81		70 - 130	16		30
Dichlorodifluoromethane (CFC 12)	ND	24.4	51.3	48	*	25.2	59.3	43	*	70 - 130	3		30
Dichloromethane	ND	41.8	51.3	82		47.0	59.3	79		70 - 130	12		30
Diisopropyl Ether	ND	45.0	51.3	88		51.4	59.3	87		70 - 130	13		30
Ethyl tert-Butyl Ether	ND	46.7	51.3	91		54.1	59.3	91		70 - 130	15		30
Ethylbenzene	ND	41.1	51.3	80		49.3	59.3	83		70 - 130	18		30
Hexachlorobutadiene	ND	26.6	51.3	52	*	39.6	59.3	67	*	70 - 130	40	*	30
Isopropylbenzene (Cumene)	ND	41.6	51.3	81		50.6	59.3	85		70 - 130	20		30
Methyl tert-Butyl Ether	ND	42.2	51.3	82		49.6	59.3	84		70 - 130	16		30
Naphthalene	ND	34.3	51.3	67		49.0	59.3	83		50 - 150	35	*	30
Styrene	ND	42.6	51.3	83		50.6	59.3	85		70 - 130	17		30
Tetrachloroethene (PCE)	ND	39.5	51.3	77		47.3	59.3	80		70 - 130	18		30
Toluene	0.38	39.6	51.3	76		47.0	59.3	79		70 - 130	17		30
Trichloroethene (TCE)	ND	42.5	51.3	83		49.8	59.3	84		70 - 130	16		30
Trichlorofluoromethane (CFC 11)	ND	41.5	51.3	81		48.3	59.3	81		70 - 130	15		30
Vinyl Chloride	ND	39.1	51.3	76		39.0	59.3	66	*	70 - 130	0		30
cis-1,2-Dichloroethene	ND	43.1	51.3	84		50.4	59.3	85		70 - 130	15		30
cis-1,3-Dichloropropene	ND	41.9	51.3	82		49.2	59.3	83		70 - 130	16		30
m,p-Xylenes	ND	79.2	103	77		94.5	119	80		70 - 130	18		30
n-Butylbenzene	ND	32.2	51.3	63	*	44.2	59.3	74		70 - 130	31	*	30
n-Propylbenzene	ND	37.6	51.3	73		48.7	59.3	82		70 - 130	26		30
o-Xylene	ND	40.1	51.3	78		47.1	59.3	79		70 - 130	16		30
sec-Butylbenzene	ND	37.5	51.3	73		47.5	59.3	80		70 - 130	24		30
tert-Amyl Methyl Ether	ND	44.7	51.3	87		52.7	59.3	89		70 - 130	16		30
tert-Butylbenzene	ND	35.7	51.3	70		48.2	59.3	81		70 - 130	30		30
trans-1,2-Dichloroethene	ND	41.1	51.3	80		45.7	59.3	77		70 - 130	11		30

Comments:

LDC #: 21991J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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 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
		172205-LCS	LLL	63 (75-125)	( )	( )	1, 2, 4-9, 12, 172205-MB	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
		172392-LCS	LLL	74 ( )	( )	( )	10, 11, 172392-MB	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991 J1
SDG #: Su Cmor

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD (Parent only)
	7	8	
M	2.0	0.99	1.01 (≤14D) –
F	10	23 U	13 (≤23D) –
K	6.5	90	83.5 (≤6.9D) J det/A
CC	6.9 U	0.38	6.52 ↓

Compound	Concentration (ug/kg)		RPD (Parent only)
	9	10	
M	1.4	11 U	9.6 (≤11D) –
F	1.5	21 U	19.5 (≤21D) –
K	4.3	6.0	1.7 (≤5.3D) –
E	0.61	5.3 U	4.69 –
CC	0.77	5.3 U	4.53 –

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 18, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905348

Sample Identification

EB091809-SO1
SA117-0.5B
SA117-9B
SA117-25B
SA117-41B
SA161-0.5B
SA161-10B
SA161-25B
SA161-25BDL
SA161009-25B
SA161-37B
TB091809-SO1
TB091809-SO3
SA117-9BMS
SA117-9BMSD

Introduction

This data review covers 12 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.

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
9/29/09	Acetone	27.5	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B 12392-MB	J+ (all detects)	A
9/29/09	Hexachlorobutadiene	28.4	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B 12392-MB	J- (all detects) UJ (all non-detects)	A
9/30/09	Hexachlorobutadiene	29.7	SA117-9BMS SA117-9BMSD	J- (all detects) UJ (all non-detects)	A
10/1/09	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	28.1 25.2 25.5 25.6 45.9	SA161-25B 172787-MB	J- (all detects) UJ (all non-detects)	A

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

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
172495-MB	9/29/09	2-Butanone	110 ug/Kg	SA161-25BDL SA161009-25B SA161-37B

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
SA161-25BDL (135.5X)	2-Butanone	230 ug/Kg	230U ug/Kg
SA161009-25B (119.5X)	2-Butanone	220 ug/Kg	220U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA161-37B (105.5X)	2-Butanone	240 ug/Kg	240U ug/Kg

Samples TB091809-SO1 and TB091809-SO3 were identified as trip blanks. No volatile contaminants were found in these blanks.

Sample EB091809-SO1 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
EB091809-SO1	9/18/09	Acetone Dichloromethane	6.6 ug/L 0.27 ug/L	All soil samples in SDG R0905348

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
SA117-0.5B	Acetone	4.5 ug/Kg	4.5U ug/Kg
SA117-25B	Acetone	1.9 ug/Kg	1.9U ug/Kg
SA117-41B	Acetone	13 ug/Kg	13U ug/Kg
SA161-0.5B	Acetone	7.8 ug/Kg	7.8U ug/Kg
SA161-10B	Acetone	11 ug/Kg	11U ug/Kg
SA161-25B	Acetone	10 ug/Kg	10U ug/Kg

Sample FB072909-SO (from SDG R0904226) 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
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	All soil samples in SDG R0905348

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
SA117-0.5B	Acetone	4.5 ug/Kg	4.5U ug/Kg
SA117-25B	Acetone	1.9 ug/Kg	1.9U ug/Kg
SA117-41B	Toluene	0.33 ug/Kg	0.33U ug/Kg
SA161-0.5B	Toluene	0.71 ug/Kg	0.71U ug/Kg
SA161-10B	Toluene	0.78 ug/Kg	0.78U 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 percent recoveries (%R) and MS/MSD relative percent differences (RPD) were not within QC limits for several compounds, the MSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
172495-LCS	Bromomethane	70 (75-125)	SA161-25BDL SA161009-25B SA161-37B 172495-MB	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA161-25B	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 R0905348	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
SA161-25B	Chloroform	X	A

Sample	Compound	Flag	A or P
SA161-25BDL	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 SA161-25B and SA161009-25B and samples SA161-25BDL and SA161009-25B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA161-25B	SA161009-25B				
2-Butanone	2.8	220	-	217.2 (≤1600)	-	-
Acetone	10	3200U	-	3190 (≤3200)	-	-
Bromoform	5.8	790U	-	784.2 (≤790)	-	-
Chloroform	470	830	-	360 (≤790)	-	-
Dibromochloromethane	2.0	790U	-	788 (≤790)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA161-25BDL	SA161009-25B				
2-Butanone	230	220	-	10 (≤1800)	-	-
Chloroform	630	830	-	200 (≤900)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905348

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905348	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905348	SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905348	SA161-25B	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905348	SA161-25BDL SA161009-25B SA161-37B	Bromomethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905348	SA161-25B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R0905348	EB091809-SO1 SA117-0.5B SA117-9B SA117-25B SA117-41B SA161-0.5B SA161-10B SA161-25B SA161-25BDL SA161009-25B SA161-37B TB091809-SO1 TB091809-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905348	SA161-25B	Chloroform	X	A	Overall assessment of data (o)
R0905348	SA161-25BDL	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 R0905348

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905348	SA161-25BDL (135.5X)	2-Butanone	230U ug/Kg	A	bl
R0905348	SA161009-25B (119.5X)	2-Butanone	220U ug/Kg	A	bl
R0905348	SA161-37B (105.5X)	2-Butanone	240U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905348

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905348

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905348	SA117-0.5B	Acetone	4.5U ug/Kg	A	be
R0905348	SA117-25B	Acetone	1.9U ug/Kg	A	be
R0905348	SA117-41B	Acetone	13U ug/Kg	A	be
R0905348	SA161-0.5B	Acetone	7.8U ug/Kg	A	be
R0905348	SA161-10B	Acetone	11U ug/Kg	A	be
R0905348	SA161-25B	Acetone	10U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905348

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905348	SA117-0.5B	Acetone	4.5U ug/Kg	A	bf
R0905348	SA117-25B	Acetone	1.9U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905348	SA117-41B	Toluene	0.33U ug/Kg	A	bf
R0905348	SA161-0.5B	Toluene	0.71U ug/Kg	A	bf
R0905348	SA161-10B	Toluene	0.78U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991K1
SDG #: R0905348
Laboratory: Columbia Analytical Services

Date: 12/02/09
Page: 1 of 1
Reviewer: JVG
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: 9/18/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r
IV.	Continuing calibration ~~ICV~~	SW	CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	~~SW~~	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 8, 10 D_2 = 9, 10
XVII.	Field blanks	SW	EB = 1 *TB = 12, 13 FB = FB072909-SO (from R0904226)

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	1	EB091809-SO1	W	11	4	SA161-37B	S	21	+ 1	172043-MB	31 (9155)
2	✓	SA117-0.5B	S	12	1	TB091809-SO1	W	22	✓	172392-	32 (9236)
3	✓	SA117-9B		13	1	TB091809-SO3	↓	23	✓	172787-	33 (9254)
4	✓	SA117-25B		14	✓	SA117-9BMS	S	24	4	172495-	34 (9248)
5	✓	SA117-41B		15	✓	SA117-9BMSD	↓	25			35
6	✓	SA161-0.5B		16				26			36
7	✓	SA161-10B		17				27			37
8	3	SA161-25B	D_1	18				28			38
9	4	SA161-25BDL	D_2	19				29			39
10	4	SA161009-25B	D_1, D_2 ✓	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 #: 21991k1
SDG #: Sy Cmer

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".

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	9/29/09	H1190	F (+)	27.5		2-7, 172392-MB	J+ Aets/A (c)
			LLL (-)	28.4			J-/NJ/A
	9/30/09	H1211	LLL (-)	29.7		14, 15	J-/NJ/A
	10/01/09	H1236	CCC (-)	28.1		8, 172787-MB	J-/NJ/A
			EEE (-)	25.2			
			GGG (-)	25.5			
			MM (-)	25.6			
			LLL (-)	45.9			

LDC #: 21991k1
SDG #: Cu Cmat

VALIDATION FINDINGS WORKSHEET
Blanks

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: 9/29/09
Conc. units: ug/L Associated Samples: 9-11 (6L)

Compound	Blank ID	Sample Identification								
	172495_MB (50x)	(135.5x) 9	(119.5x) 10	(105.5x) 11						
M	110	230/4	220/4	240/4						

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 21991 k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JV6
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: EB Associated Samples: All soils (be)

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	9/18/09	2	4	5	6	7	8			
F	6.6	4.5/4	1.9/4	13/4	7.8/4	11/4	10/4			
E	0.27									
			(All others either ND or > EB)							

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

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

Compound	Blank ID FB072909-SO	Blank ID	Sample Identification							
Sampling Date	7/29/09		2	4	5	6	7			
F	3.5		4.5/4	1.9/4						
E	0.30									
CC	0.44				0.33/4	0.71/4	0.78/4			
			(All others either ND or > FB)							

LDC #: 21991k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		14/15	several compounds	have %R in the MS			3	No qual (MSD
			outside limits	and %RPD outside limits				
				( )	( )	( )		
				(See attached summary)				
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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%

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905348
Date Collected: 9/18/09
Date Received: 9/19/09
Date Analyzed: 9/30/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA117-9B
Lab Code: R0905348-003

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909236-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909236-04 Result	Amount	% Rec	% Rec Limits	RPD		RPD Limit
1,1,1,2-Tetrachloroethane	ND	35.7	52.9	68	*	47.5	58.3	81	70 - 130	28		30
1,1,1-Trichloroethane (TCA)	ND	44.6	52.9	84		57.0	58.3	98	70 - 130	24		30
1,1,2,2-Tetrachloroethane	ND	37.4	52.9	71		51.7	58.3	89	70 - 130	32	*	30
1,1,2-Trichloroethane	ND	35.9	52.9	68	*	47.7	58.3	82	70 - 130	28		30
1,1-Dichloroethane (1,1-DCA)	ND	42.6	52.9	80		53.1	58.3	91	70 - 130	22		30
1,1-Dichloroethene (1,1-DCE)	ND	42.2	52.9	80		55.7	58.3	96	70 - 130	28		30
1,1-Dichloropropene	ND	43.3	52.9	82		52.7	58.3	90	70 - 130	19		30
1,2,3-Trichlorobenzene	ND	33.6	52.9	63	*	49.9	58.3	86	70 - 130	39	*	30
1,2,3-Trichloropropane	ND	35.0	52.9	66	*	47.3	58.3	81	70 - 130	30		30
1,2,4-Trichlorobenzene	ND	37.3	52.9	71		53.2	58.3	91	70 - 130	35	*	30
1,2,4-Trimethylbenzene	ND	40.2	52.9	76		53.0	58.3	91	70 - 130	28		30
1,2-Dibromo-3-chloropropane (DBC	ND	34.3	52.9	65		48.9	58.3	84	50 - 150	35	*	30
1,2-Dibromoethane	ND	36.9	52.9	70		47.7	58.3	82	70 - 130	26		30
1,2-Dichlorobenzene	ND	37.0	52.9	70		50.4	58.3	86	70 - 130	31	*	30
1,2-Dichloroethane	ND	39.1	52.9	74		50.0	58.3	86	70 - 130	25		30
1,2-Dichloropropane	ND	39.1	52.9	74		49.8	58.3	85	70 - 130	24		30
1,3,5-Trimethylbenzene	ND	40.8	52.9	77		53.9	58.3	92	70 - 130	28		30
1,3-Dichlorobenzene	ND	39.9	52.9	75		52.8	58.3	90	70 - 130	28		30
1,3-Dichloropropane	ND	36.1	52.9	68	*	47.8	58.3	82	70 - 130	28		30
1,4-Dichlorobenzene	ND	40.6	52.9	77		53.5	58.3	92	70 - 130	27		30
2,2-Dichloropropane	ND	45.0	52.9	85		56.9	58.3	98	70 - 130	23		30
2-Butanone (MEK)	0.79	40.3	52.9	75		55.5	58.3	94	50 - 150	32	*	30
2-Chlorotoluene	ND	39.6	52.9	75		57.7	58.3	99	70 - 130	37	*	30
2-Hexanone	ND	36.3	52.9	69	*	48.3	58.3	83	70 - 130	28		30
2-Methyl-2-propanol	ND	809	1060	76		1050	1170	90	50 - 150	26		30
4-Chlorotoluene	ND	42.2	52.9	80		54.9	58.3	94	70 - 130	26		30
4-Isopropyltoluene	ND	41.8	52.9	79		55.5	58.3	95	70 - 130	28		30
4-Methyl-2-pentanone	ND	36.7	52.9	69	*	48.6	58.3	83	70 - 130	28		30
Acetone	ND	54.1	52.9	102		81.3	58.3	139	50 - 150	40	*	30
Benzene	ND	38.7	52.9	73		49.6	58.3	85	70 - 130	25		30
Bromobenzene	ND	37.3	52.9	70		50.3	58.3	86	70 - 130	30		30
Bromochloromethane	ND	38.1	52.9	72		49.1	58.3	84	70 - 130	25		30
Bromodichloromethane	ND	39.4	52.9	75		49.3	58.3	85	70 - 130	22		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905348
Date Collected: 9/18/09
Date Received: 9/19/09
Date Analyzed: 9/30/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA117-9B
Lab Code: R0905348-003

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909236-03 Result	Matrix Spike Amount	Matrix Spike % Rec		Duplicate Matrix Spike RQ0909236-04 Result	Duplicate Matrix Spike Amount	Duplicate Matrix Spike % Rec		% Rec Limits	RPD		RPD Limit
Bromoform	ND	36.8	52.9	70		49.1	58.3	84		70 - 130	29		30
Bromomethane	ND	37.1	52.9	70		45.9	58.3	79		50 - 150	21		30
Carbon Tetrachloride	ND	46.8	52.9	89		57.9	58.3	99		70 - 130	21		30
Chlorobenzene	ND	37.8	52.9	71		49.4	58.3	85		70 - 130	27		30
Chloroethane	ND	40.0	52.9	76		48.8	58.3	84		70 - 130	20		30
Chloroform	ND	41.6	52.9	79		55.1	58.3	94		70 - 130	28		30
Chloromethane	ND	39.2	52.9	74		49.1	58.3	84		70 - 130	22		30
Dibromochloromethane	ND	37.5	52.9	71		48.8	58.3	84		70 - 130	26		30
Dibromomethane	ND	38.4	52.9	73		48.7	58.3	84		70 - 130	24		30
Dichlorodifluoromethane (CFC 12)	ND	33.9	52.9	64	*	42.7	58.3	73		70 - 130	23		30
Dichloromethane	ND	39.3	52.9	74		51.3	58.3	88		70 - 130	26		30
Diisopropyl Ether	ND	43.6	52.9	82		56.1	58.3	96		70 - 130	25		30
Ethyl tert-Butyl Ether	ND	44.4	52.9	84		58.2	58.3	100		70 - 130	27		30
Ethylbenzene	ND	41.1	52.9	78		53.0	58.3	91		70 - 130	25		30
Hexachlorobutadiene	ND	36.0	52.9	68	*	49.3	58.3	85		70 - 130	31	*	30
Isopropylbenzene (Cumene)	ND	43.1	52.9	81		54.4	58.3	93		70 - 130	23		30
Methyl tert-Butyl Ether	ND	38.7	52.9	73		51.9	58.3	89		70 - 130	29		30
Naphthalene	ND	35.6	52.9	67		51.0	58.3	87		50 - 150	36	*	30
Styrene	ND	40.4	52.9	76		53.2	58.3	91		70 - 130	27		30
Tetrachloroethene (PCE)	ND	43.1	52.9	81		55.2	58.3	95		70 - 130	25		30
Toluene	ND	39.3	52.9	74		50.8	58.3	87		70 - 130	26		30
Trichloroethene (TCE)	ND	42.7	52.9	81		52.5	58.3	90		70 - 130	20		30
Trichlorofluoromethane (CFC 11)	ND	45.2	52.9	85		56.7	58.3	97		70 - 130	23		30
Vinyl Chloride	ND	41.2	52.9	78		50.6	58.3	87		70 - 130	20		30
cis-1,2-Dichloroethene	ND	38.9	52.9	74		54.2	58.3	93		70 - 130	33	*	30
cis-1,3-Dichloropropene	ND	40.0	52.9	76		51.8	58.3	89		70 - 130	26		30
m,p-Xylenes	ND	81.8	106	77		105	117	90		70 - 130	25		30
n-Butylbenzene	ND	43.2	52.9	82		58.2	58.3	100		70 - 130	30		30
n-Propylbenzene	ND	42.3	52.9	80		54.5	58.3	93		70 - 130	25		30
o-Xylene	ND	39.8	52.9	75		49.3	58.3	84		70 - 130	21		30
sec-Butylbenzene	ND	42.6	52.9	81		56.4	58.3	97		70 - 130	28		30
tert-Amyl Methyl Ether	ND	41.1	52.9	78		56.7	58.3	97		70 - 130	32	*	30
tert-Butylbenzene	ND	40.9	52.9	77		52.3	58.3	90		70 - 130	25		30
trans-1,2-Dichloroethene	ND	41.7	52.9	79		53.0	58.3	91		70 - 130	24		30

Comments:

SDG #: 21991K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		172495-LCS	B	70 (75-125)	( )	( )	9-11, 172495-MB	J-/UJ/P (L)
				( )	( )	( )		
				( )	( )	( )		
		172392-LCS	LLL	74 (75-125)	( )	( )	2-7, 172392-MB	No qual (MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21991 K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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
		8	K > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21991k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		8	K > cal range		X (A (o)
		9	All except K dil		

Comments: _____

LDC #: 21991 k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: [signature]

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

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

Compound	Concentration (ug/kg)		RPD	Parent only
	8	10		
M	2.8	220	217.2 (≤1600 D)	–
F	10	3200 U	3190 (≤3200 D)	–
X	5.8	790 U	784.2 (≤790 D)	–
K	470	830	360	–
T	2.0	790 U	788	–

Compound	Concentration (ug/kg)		RPD	Parent only
	9	10		
M	230	220	10 (≤1800 D)	–
K	630	830	200 (≤900 D)	–

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 21, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905387

Sample Identification

SA32-0.5B
SA32-9B
SA32-25B
SA32009-25B
SA32-37B
SA66-0.5B
SA66-0.5BDL
SA66009-0.5B
SA66009-0.5BDL
SA66-10B
SA66-10BRE
SA66-28B
SA129-10B
SA129-29B
RSAT4-0.5B
RSAT4-10B
RSAT4-25B
RSAT4-10B
RSAT4-53B
TB092109-SO1
TB092109-SO2

Introduction

This data review covers 19 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2 172107-WMB 172107-SMB 173080-MB	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
9/30/09	Hexachlorobutadiene	29.7	SA32-0.5B SA32-9B SA32-25B SA32-37B 172602-MB	J- (all detects) UJ (all non-detects)	A
10/1/09	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	28.1 25.2 25.5 25.6 45.9	SA32009-25B SA66-0.5B SA66009-0.5B SA66-10B 172787-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
9/28/09	2-Methyl-2-propanol	0.029 (≥0.05)	SA66-10BRE TB092109-SO1 TB092109-SO2 172107-WMB 172107-SMB	J (all detects) UJ (all non-detects)	A
10/2/09	2-Methyl-2-propanol	0.027 (≥0.05)	SA66-0.5BDL SA66009-0.5BDL 173080-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
172107-SMB	9/28/09	2-Butanone	53 ug/Kg	SA66-28B
173080-MB	10/2/09	2-Butanone	79 ug/Kg	SA66009-0.5BDL

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
SA66009-0.5BDL	2-Butanone	590 ug/Kg	590U ug/Kg

Samples TB092109-SO1 and TB092109-SO2 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
TB092109-SO1	9/21/09	Acetone	5.3 ug/L	SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B

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

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66-0.5BDL SA66009-0.5B SA66009-0.5BDL SA66-10B SA66-10BRE SA66-28B SA129-10B SA129-29B
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-53B

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
SA32-0.5B	Toluene	0.50 ug/Kg	0.50U ug/Kg
SA32-9B	Toluene	0.69 ug/Kg	0.69U ug/Kg
SA66009-0.5B	Acetone	6.7 ug/Kg	6.7U ug/Kg
SA129-29B	Acetone	3.7 ug/Kg	3.7U ug/Kg
RSAT4-0.5B	Toluene	0.57 ug/Kg	0.57U ug/Kg

VI. Surrogate Spikes

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

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SA66-10BRE	Dibromofluoromethane	67 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

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. Although the LCSD percent recoveries (%R) were not within QC limits for some compounds, the LCS percent recoveries (%R) were within QC limits and no data were qualified.

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
SA66-0.5B SA66009-0.5B	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905387	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
SA66-0.5B SA66009-0.5B	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	X X	A
SA66-0.5BDL SA66009-0.5BDL	All TCL compounds except 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	X	A

Sample	Compound	Flag	A or P
SA66-10BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA32-25B and SA32009-25B, samples SA66-0.5B and SA66009-0.5B, and samples SA66-0.5BDL and SA66009-0.5BDL 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
	SA32-25B	SA32009-25B				
2-Butanone	3.5	2.4	-	1.1 (≤14)	-	-
Chloroform	38	18	-	20 (≤7.2)	J (all detects)	A
Toluene	1.2	1	-	0.2 (≤7.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA66-0.5B	SA66009-0.5B				
1,2,3-Trichlorobenzene	490	650	28 (≤50)	-	-	-
1,2,4-Trichlorobenzene	920	1500	48 (≤50)	-	-	-
1,2-Dichlorobenzene	10	33	-	23 (≤6.2)	J (all detects)	A
1,3-Dichlorobenzene	4.9	17	-	12.1 (≤6.2)	J (all detects)	A
1,4-Dichlorobenzene	12	38	-	26 (≤6.2)	J (all detects)	A
2-Butanone	11U	1.7	-	9.3 (≤11)	-	-
2-Chlorotoluene	5.3U	1.9	-	3.4 (≤5.3)	-	-
2-Hexanone	1.8	12U	-	10.2 (≤12)	-	-
Acetone	21U	6.7	-	14.3 (≤21)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA66-0.5B	SA66009-0.5B				
Chlorobenzene	5.6	10	-	4.4 (≤6.2)	-	-
Chloroform	4.8	3.7	-	1.1 (≤6.2)	-	-
Hexachlorobutadiene	30	90	100 (≤50)	-	J (all detects)	A
Toluene	5.3U	5.6	-	0.3 (≤5.3)	-	-
Trichloroethene	0.44	6.2U	-	5.76 (≤6.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA66-0.5BDL	SA66009-0.5BDL				
1,2,3-Trichlorobenzene	6900	22000	104 (≤50)	-	J (all detects)	A
1,2,4-Trichlorobenzene	12000	39000	106 (≤50)	-	J (all detects)	A
1,2-Dichlorobenzene	88	260	-	172 (≤6.2)	J (all detects)	A
1,4-Dichlorobenzene	130	400	-	270 (≤1300)	-	-
2-Butanone	200	590	-	390 (≤2600)	-	-
Chloroform	290	2000	-	1710 (≤1300)	J (all detects)	A
Hexachlorobutadiene	930	3000	-	2070 (≤1300)	J (all detects)	A
Tetrachloroethene	550U	220	-	330 (≤550)	-	-
Toluene	550U	150	-	400 (≤550)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R0905387

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905387	SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905387	SA32-0.5B SA32-9B SA32-25B SA32-37B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905387	SA32009-25B SA66-0.5B SA66009-0.5B SA66-10B	tert-Butylbenzene sec-Butylbenzene p-Isopropyltoluene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905387	SA66-0.5BDL SA66009-0.5BDL SA66-10BRE TB092109-SO1 TB092109-SO2	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905387	SA66-10BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905387	SA66-0.5B SA66009-0.5B	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R0905387	SA32-0.5B SA32-9B SA32-25B SA32009-25B SA32-37B SA66-0.5B SA66-0.5BDL SA66009-0.5B SA66009-0.5BDL SA66-10B SA66-10BRE SA66-28B SA129-10B SA129-29B RSAT4-0.5B RSAT4-10B RSAT4-25B RSAT4-10B RSAT4-53B TB092109-SO1 TB092109-SO2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905387	SA66-0.5B SA66009-0.5B	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	X X	A	Overall assessment of data (o)
R0905387	SA66-0.5BDL SA66009-0.5BDL	All TCL compounds except 1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	X	A	Overall assessment of data (o)
R0905387	SA66-10BRE	All TCL compounds	X	A	Overall assessment of data (o)
R0905387	SA32-25B SA32009-25B	Chloroform	J (all detects)	A	Field duplicates (Difference) (fd)
R0905387	SA66-0.5B SA66009-0.5B	1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene	J (all detects)	A	Field duplicates (Difference) (fd)
R0905387	SA66-0.5B SA66009-0.5B	Hexachlorobutadiene	J (all detects)	A	Field duplicates (RPD) (fd)
R0905387	SA66-0.5BDL SA66009-0.5BDL	1,2,3-Trichlorobenzene 1,2,4-Trichlorobenzene	J (all detects) J (all detects)	A	Field duplicates (RPD) (fd)
R0905387	SA66-0.5BDL SA66009-0.5BDL	1,2-Dichlorobenzene Chloroform Hexachlorobutadiene	J (all detects) J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R0905387

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905387	SA66009-0.5BDL	2-Butanone	590U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905387

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905387

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905387	SA32-0.5B	Toluene	0.50U ug/Kg	A	bf
R0905387	SA32-9B	Toluene	0.69U ug/Kg	A	bf
R0905387	SA66009-0.5B	Acetone	6.7U ug/Kg	A	bf
R0905387	SA129-29B	Acetone	3.7U ug/Kg	A	bf
R0905387	RSAT4-0.5B	Toluene	0.57U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991L1
SDG #: R0905387
Laboratory: Columbia Analytical Services

Date: 11/25/09
Page: 1 of 1
Reviewer: JVG
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: 9/21/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD r²
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25?
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
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_1 = 3,4 D_2 = 6,8 D_3 = 7,9
XVII.	Field blanks	SW	TB = 20, 21 FB = FB 072909-SO (from R09 ↓ = FB080309-SO (from R090427

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	SA32-0.5B	S	11	SA66-10BDL RE	S	21	TB092109-SO2	W	31	172602-MB	
+ 2	SA32-9B		12	SA66-28B		22			32	172787-MB	
+ 3	SA32-25B	D_1	13	SA129-10B		23			+ 33	173080-MB	
+ 4	SA32009-25B	D_1	14	SA129-29B		24			34	172989- ↓	
+ 5	SA32-37B		15	RSAT4-0.5B		25			35	172107-WMB	
6	SA66-0.5B	D_2	16	RSAT4-10B		26			+ 36	172107-SMB	
7	SA66-0.5BDL	D_2	17	RSAT4-25B		27			37		
8	SA66009-0.5B	D_1	18	RSAT4-~~10~~4B		28			38		
9	SA66009-0.5BDL	D_3	19	RSAT4-53B		29			39		
10	SA66-10B		+ 20	TB092109-SO1	W	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.

.DC #: 21911L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JV6
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
	9/18/09	ICAL	NNNN		0.028	7, 9, 11, 20, 21, 172107-WMB, 172107-SMB, 173080-MB	J/UJ/A (C)

LDC #: 21991L1
SDG #: Fu Cmv

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
	9/30/09	H1211	LLL (-)	29.7		1-3, 5, 172602-MB	J-/NJ/A (c)
	10/01/09	H1236	CCC (-)	28.1		4, 6, 8, 10, 172787-MB	
			EEE (-)	25.2			
			GGG (-)	25.5			
			MM (-)	25.6			
			LLL (-)	45.9			
	9/28/09	C1047	NNNN		0.029	11, 20, 21, 172107-WMB, 172107-SMB	J/NJ/A
	10/02/09	C1190	NNNN		0.027	7, 9, 173080-MB	

CONCAL 1SB

LDC #: 21991L1
SDG #: Lu Cmw

VALIDATION FINDINGS WORKSHEET
Blanks

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 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: 9/28/09
Conc. units: ug/kg
Associated Samples: 12 (ND)

Compound	Blank ID	Sample Identification								
	172107-SMB									
M	53									

Blank analysis date: 10/02/09
Conc. units: ug/kg
Associated Samples: 9 (6L)

Compound	Blank ID	Sample Identification								
	173080-MB	9 (244X)								
M	79	590/4								

LDC #: 21991L1
SDG #: Cu Conv

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: 1-5 (ND)

Compound	Blank ID 20	Blank ID	Sample Identification								
Sampling Date	9/21/09										
F	5.3										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-14 (6f)

Compound	Blank ID FB072909-SO	Blank ID	Sample Identification								
Sampling Date	7/29/09	1	2	8	14						
F	3.5			6.7/U	3.7/U						
E	0.30										
CC	0.44	0.50/U	0.69/U								
			(All others either ND or > FB)								

88

LDC #: 21991L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV6
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: 15 - 19 (bf)

Compound	FB080309-50 Blank ID	Blank ID	Sample Identification							
Sampling Date	8/03/09		15							
F	2.1									
CC	0.30		0.57/U							
			(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 #: 21991L1
SDG #: Sex Gmw

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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
		11	DFM	67 (70-130)	J- /NJ/A (5)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	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 #: 21991L1
SDG #: Su Cmx

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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".

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
		172989-LCS/D	UU	( )	74 (75-125)	( )	11, 13-19, 172989-MB	No qual (LCS
			I	( )	71 ( )	( )		
			XX	( )	72 ( )	( )		
			MM	( )	68 ( )	( )		
			ZZ	( )	74 ( )	( )		
			LL	( )	65 ( )	( )		
			MMM	( )	74 ( )	( )		
			CCC	( )	70 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

DC #: 21491L1
DG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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
		6, 8	NNN, KKK > cal range		J dets /A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21991L1
SDG #: Sq Grav

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		6, 8	NNN, kkk > cal range		X/A (o)
		7, 9	All except NNN, kkk all		
		11	four outside limits		

Comments: _____

OVR.1SB

LDC#: 21991L1a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JV6
2nd Reviewer:

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	3	4				
2-Butanone	3.5	2.4		1.1	≤14	-
Chloroform	38	18		20	≤7.2	Jdets/A (fd)
Toluene	1.2	1.0		0.2	≤7.2	-

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	6	8				
1,2,3-Trichlorobenzene	490	650	28			-
1,2,4-Trichlorobenzene	920	1500	48			-
1,2-Dichlorobenzene	10	33		23	≤6.2	Jdets/A (fd)
1,3-Dichlorobenzene	4.9	17		12.1	≤6.2	Jdets/A (fd)
1,4-Dichlorobenzene	12	38		26	≤6.2	Jdets/A (fd)
2-Butanone	11U	1.7		9.3	≤11	-
2-Chlorotoluene	5.3U	1.9		3.4	≤5.3	-
2-Hexanone	1.8	12U		10.2	≤12	-
Acetone	21U	6.7		14.3	≤21	-
Chlorobenzene	5.6	10		4.4	≤6.2	-
Chloroform	4.8	3.7		1.1	≤6.2	-
Hexachlorobutadiene	30	90	100			Jdets/A (fd)
Toluene	5.3U	5.6		0.3	≤5.3	-
Trichloroethene	0.44	6.2U		5.76	≤6.2	-

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	7	9				
1,2,3-Trichlorobenzene	6900	22000	104			Jdets/A (fd)
1,2,4-Trichlorobenzene	12000	39000	106			Jdets/A (fd)
1,2-Dichlorobenzene	88	260		172	≤6.2	Jdets/A (fd)

LDC#: 21991L1a
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound Name	Conc (ug/Kg)		RPD (≤ 50%)	Diff	Diff Limits	Quals (Parent Only)
	7	9				
1,4-Dichlorobenzene	130	400		270	≤1300	-
2-Butanone	200	590		390	≤2600	-
Chloroform	290	2000		1710	≤1300	Jdets/A (fd)
Hexachlorobutadiene	930	3000		2070	≤1300	Jdets/A (fd)
Tetrachloroethene	550U	220		330	≤550	-
Toluene	550U	150		400	≤550	-

V:\FIELD DUPLICATES\21991L1a.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: September 24 through September 25, 2009

LDC Report Date: December 6, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0905464

Sample Identification

SA205-0.5B
SA205-10B
SA205-25B
SA205-41B
SA84-0.5B
SA84-10B
SA84009-10B
SA84-25B
SA84-43B
TB092409-SO1
EB092509-SO1A2
EB092509-SO2A4
SA101-0.5B
SA101-10B
SA101-25B
SA101-42B
SA121-0.5B
SA121009-0.5B
SA121-10B
SA121-25B
SA121-25BRE
SA121-44B
SA208-0.5B
SA208-7B
TB092509-SO1
TB092509-SO2
TB092509-SO3
SA101-0.5BMS
SA101-0.5BMSD

Introduction

This data review covers 23 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
9/18/09	2-Methyl-2-propanol	0.028 (≤0.05)	All water samples in SDG R0905464	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
10/5/09 (C1217)	Acetone 2-Butanone	25.3 26.9	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A
10/4/09	Acetone	28.7	SA205-0.5B SA205-10B SA205-25B 173191-MB	J- (all detects) UJ (all non-detects)	A
10/5/09 (H1369)	Acetone	35.5	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA101-0.5BMS SA101-0.5BMSD 173307-MB	J+ (all detects)	A
10/5/09 (H1369)	1,2,3-Trichloropropane tert-Butylbenzene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene Naphthalene	25.6 27.3 28.7 33.8 27.1	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA101-0.5BMS SA101-0.5BMSD 173307-MB	J- (all detects) UJ (all non-detects)	A
10/6/09	Hexachlorobutadiene	35.2	SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B 173430-MB	J- (all detects) UJ (all non-detects)	A
10/9/09	Hexachlorobutadiene	31.6	SA121-25BRE 174051-MB	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
10/2/09	2-Methyl-2-propanol	0.027 (≥0.05)	TB092509-SO2 TB092509-SO3 173080-MB	J (all detects) UJ (all non-detects)	A
10/5/09 (C1217)	2-Methyl-2-propanol	0.024 (≥0.05)	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB	J (all detects) UJ (all non-detects)	A

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
174051-MB	10/9/09	Dichloromethane	1.6 ug/Kg	SA121-25BRE

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

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA121-25BRE	Dichloromethane	1.8 ug/Kg	1.8U ug/Kg

Samples TB092409-SO1, TB092509-SO1, TB092509-SO2, and TB092509-SO3 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
TB092409-SO1	9/24/09	Acetone	1.7 ug/L	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB092509-SO1	9/25/09	Bromoform Dibromochloromethane	3.4 ug/L 1.6 ug/L	EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-25BRE SA121-44B
TB092509-SO3	9/25/09	Bromoform	0.32 ug/L	EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-25BRE SA121-44B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA205-25B	Acetone	3.2 ug/Kg	3.2U ug/Kg

Samples EB092509-SO1A2 and EB092509-SO2A4 were identified as equipment blanks. No volatile contaminants were found in these blanks with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092509-SO1A2	9/25/09	Acetone Chloroform	3.7 ug/L 0.26 ug/L	SA208-0.5B SA208-7B

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB092509-SO2A4	9/25/09	Acetone Chloroform	4.3 ug/L 0.23 ug/L	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-25BRE SA121-44B

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

Sample	Compound	Reported Concentration	Modified Final Concentration
SA208-7B	Acetone	6.6 ug/Kg	6.6U ug/Kg
SA205-0.5B	Acetone	5.1 ug/Kg	5.1U ug/Kg
SA205-25B	Acetone	3.2 ug/Kg	3.2U ug/Kg
SA205-41B	Acetone	7.3 ug/Kg	7.3U ug/Kg
SA84-0.5B	Acetone	6.8 ug/Kg	6.8U ug/Kg
SA84-25B	Acetone	4.4 ug/Kg	4.4U ug/Kg
SA101-0.5B	Acetone	4.7 ug/Kg	4.7U ug/Kg
SA101-42B	Acetone	3.3 ug/Kg	3.3U ug/Kg
SA121009-0.5B	Acetone	8.3 ug/Kg	8.3U ug/Kg

Samples FB072909-SO (from SDG R0904226) and FB080309-SO (from SDG R0904279) were identified as field blanks. No volatile contaminants were found in these blanks with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072909-SO	7/29/09	Acetone Dichloromethane Toluene	3.5 ug/L 0.30 ug/L 0.44 ug/L	SA208-0.5B SA208-7B
FB080309-SO	8/3/09	Acetone Toluene	2.1 ug/L 0.30 ug/L	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-25BRE SA121-44B

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
SA208-7B	Acetone Toluene	6.6 ug/Kg 0.40 ug/Kg	6.6U ug/Kg 0.40U ug/Kg
SA205-0.5B	Toluene	0.38 ug/Kg	0.38U ug/Kg
SA205-25B	Acetone	3.2 ug/Kg	3.2U ug/Kg
SA84-25B	Acetone	4.4 ug/Kg	4.4U ug/Kg
SA101-0.5B	Acetone	4.7 ug/Kg	4.7U ug/Kg
SA101-42B	Acetone	3.3 ug/Kg	3.3U ug/Kg
SA121-0.5B	Toluene	0.57 ug/Kg	0.57U ug/Kg
SA121-44B	Toluene	0.56 ug/Kg	0.56U 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
SA121-25B	Bromofluorobenzene	63 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
SA121-25BRE	Bromofluorobenzene	65 (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. 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
SA101-0.5BMS/MSD (SA101-0.5B)	Hexachlorobutadiene	38 (70-130)	40 (70-130)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
173191-LCS	1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene	70 (75-125) 62 (75-125) 65 (75-125) 74 (75-125)	SA205-0.5B SA205-10B SA205-25B 173191-MB	J- (all detects) UJ (all non-detects)	P
173360-LCS	Isopropylbenzene	126 (75-125)	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 173360-MB	J+ (all detects)	P

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
173307-LCS	Hexachlorobutadiene	62 (75-125)	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B 173307-MB	J- (all detects) UJ (all non-detects)	P
174051-LCS	Acetone	139 (75-125)	SA121-25BRE 174051-MB	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
SA121-25B	Pentafluorobenzene	103752 (258285-1033140)	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) R (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA121-25B	1,4-Dichlorobenzene-d4	125113 (205219-820874)	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA121-25BRE	Pentafluorobenzene 1,4-Dichlorobenzene-d4	147116 (236617-946466) 144505 (188329-753316)	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0905464	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
SA121-25B	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples SA84-10B and SA84009-10B and samples SA121-0.5B and SA121009-0.5B 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
	SA84-10B	SA84009-10B				
2-Butanone	12U	1.5	-	10.5 (≤12)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA101-42B	SA121-0.5B				
2-Butanone	0.91	1.6	-	0.69 (≤11)	-	-
Dichloromethane	0.34	5.6U	-	5.26 (≤5.6)	-	-
Toluene	0.57	0.66	-	0.09 (≤5.6)	-	-
Acetone	18U	8.3	-	9.7 (≤18)	-	-

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Volatiles - Data Qualification Summary - SDG R0905464

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 TB092509-SO2 TB092509-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R0905464	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1	Acetone 2-Butanone	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905464	SA205-0.5B SA205-10B SA205-25B	Acetone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905464	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R0905464	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B	1,2,3-Trichloropropane tert-Butylbenzene 1,2-Dibromo-3-chloropropane Hexachlorobutadiene Naphthalene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R0905464	SA121009-0.5B SA121-10B SA121-25B SA121-44B SA208-0.5B SA208-7B SA121-25BRE	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1 TB092509-SO2 TB092509-SO3	2-Methyl-2-propanol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R0905464	SA121-25B SA121-25BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0905464	SA101-0.5B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0905464	SA205-0.5B SA205-10B SA205-25B	1,2,3-Trichloropropane 1,2-Dibromo-3-chloropropane Hexachlorobutadiene tert-Butylbenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905464	TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 TB092509-SO1	Isopropylbenzene	J+ (all detects)	P	Laboratory control samples (%R) (l)
R0905464	SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B	Hexachlorobutadiene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R0905464	SA121-25BRE	Acetone	J+ (all detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	SA121-25B	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) R (all non-detects)	A	Internal standards (area) (i)
R0905464	SA121-25B	1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	SA121-25BRE	Chloromethane Bromomethane Vinyl chloride Chloroethane Dichloromethane Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether Ethyl-tert-butyl ether tert-Amyl-methyl ether 2-Methyl-2-propanol 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0905464	SA205-0.5B SA205-10B SA205-25B SA205-41B SA84-0.5B SA84-10B SA84009-10B SA84-25B SA84-43B TB092409-SO1 EB092509-SO1A2 EB092509-SO2A4 SA101-0.5B SA101-10B SA101-25B SA101-42B SA121-0.5B SA121009-0.5B SA121-10B SA121-25B SA121-25BRE SA121-44B SA208-0.5B SA208-7B TB092509-SO1 TB092509-SO2 TB092509-SO3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0905464	SA121-25B	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 R0905464

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R0905464	SA121-25BRE	Dichloromethane	1.8U ug/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Trip Blank Data Qualification Summary - SDG R0905464

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905464	SA205-25B	Acetone	3.2U ug/Kg	A	bt

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Equipment Blank Data Qualification Summary - SDG R0905464

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905464	SA208-7B	Acetone	6.6U ug/Kg	A	be
R0905464	SA205-0.5B	Acetone	5.1U ug/Kg	A	be
R0905464	SA205-25B	Acetone	3.2U ug/Kg	A	be
R0905464	SA205-41B	Acetone	7.3U ug/Kg	A	be
R0905464	SA84-0.5B	Acetone	6.8U ug/Kg	A	be
R0905464	SA84-25B	Acetone	4.4U ug/Kg	A	be
R0905464	SA101-0.5B	Acetone	4.7U ug/Kg	A	be
R0905464	SA101-42B	Acetone	3.3U ug/Kg	A	be
R0905464	SA121009-0.5B	Acetone	8.3U ug/Kg	A	be

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R0905464

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905464	SA208-7B	Acetone Toluene	6.6U ug/Kg 0.40U ug/Kg	A	bf
R0905464	SA205-0.5B	Toluene	0.38U ug/Kg	A	bf
R0905464	SA205-25B	Acetone	3.2U ug/Kg	A	bf
R0905464	SA84-25B	Acetone	4.4U ug/Kg	A	bf
R0905464	SA101-0.5B	Acetone	4.7U ug/Kg	A	bf
R0905464	SA101-42B	Acetone	3.3U ug/Kg	A	bf
R0905464	SA121-0.5B	Toluene	0.57U ug/Kg	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0905464	SA121-44B	Toluene	0.56U ug/Kg	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21991N1
SDG #: R0905464
Laboratory: Columbia Analytical Services

Date: 12/02/09
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: 9/24 - 25/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD mr
IV.	Continuing calibration ~~ICV~~	SW	CCV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 6, 7 D_2 = 17, 18
XVII.	Field blanks	SW	TB = 10, 25, 26, 27 EB = 11, 12 FB = FB072909-SO (from R090 ↓ = FB 080309-SO (from R090

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	SA205-0.5B	S	11	EB092509-SO1A2	W	21	SA121-25B~~DL~~ RE	S	31	173080-MB	(9910)
2	SA205-10B		12	EB092509-SO2A4		22	SA121-44B		32	173191-	(9453)
3	SA205-25B		13	SA101-0.5B	S	23	SA208-0.5B		33	173360-	(0041)
4	SA205-41B		14	SA101-10B		24	SA208-7B		34	173307-	(9500)
5	SA84-0.5B		15	SA101-25B		25	TB092509-SO1	W	35	173430-	(4534)
6	SA84-10B	D_1	16	SA101-42B		26	TB092509-SO2		36	174051-	(9728)
7	SA84009-10B	D_1	17	SA121-0.5B	D_2	27	TB092509-SO3		37		
8	SA84-25B		18	SA121009-0.5B	D_2	28	SA101-0.5BMS	S	38		
9	SA84-43B		19	SA121-10B		29	SA101-0.5BMSD		39		
10	TB092409-SO1	W	20	SA121-25B		30			40		

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

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

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

PFB 4DCB

SDC #: 21991 N1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: NG
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
	9/18/09	ICAL	NNNN		0.028	All water + 173080-MB, 173360-MB	J/UJ/A (C)

LDC #: 21991N1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	10/02/09	C1190	NNNN		0.027	26, 27, 173080-MB	J/NJ/A (c)
	10/05/09	C1217	F (-)	25.3		10-12, 25, 173360-MB	J-/NJ/A
			M (-)	26.9			
			NNNN		0.024		J/NJ/A
	10/04/09	H1330	F (-)	28.7		1-3, 173191-MB	J-/NJ/A
	10/05/09	H1369	F (+)	35.5		4-9, 13-17, 28, 29,	J+ (all cts)/A
			XX (-)	25.6		173307-MB	J-/NJ/A
			CCC (-)	27.3			
			MM (-)	28.7			
			LLL (-)	33.8			
			MMM (-)	27.1			
	10/06/09	H1403	LLL (-)	35.2		18-20, 22-24, 173430-MB	J-/NJ/A
	10/09/09	H1504	LLL (-)	31.6		21, 174051-MB	J-/NJ/A

LDC #: 21991 N1
SDG #: Sulfur

VALIDATION FINDINGS WORKSHEET
Blanks

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

Blank analysis date: 10/09/09
Conc. units: ug/kg
Associated Samples: 21 (b l)

Compound	Blank ID	Sample Identification								
	174051-MB	21								
E	1.6	1.8/4								

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 21991 N1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer: d

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: 1-9 (6t)

Compound	Blank ID 10	Blank ID	Sample Identification							
Sampling Date	9/24/09		3							
F	1.7		3.2/U							
			(All others either ND or > TB)							

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

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 12-22 (ND)

Compound	Blank ID 25	Blank ID 27	Sample Identification							
Sampling Date	9/25/09	→	12							
X	3.4	0.32								
T	1.6									

LDC #: 21991 N1
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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 23, 24 (be)

Compound	Blank ID 11	Blank ID	Sample Identification							
Sampling Date	9/25/09		24							
F	3.7		6.6/U							
K	0.26									
		(All others either ND or > EB)								

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 1-9, 13-22 (be)

Compound	Blank ID 12	Blank ID	Sample Identification							
Sampling Date	9/25/09	1	3	4	5	8	13	16	18	
F	4.3	5.1/U	3.2/U	7.3/U	6.8/U	4.4/U	4.7/U	3.3/U	8.3/U	
K	0.23									
		(All others either ND or > EB)								

LDC #: 21991N1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 2 of 3
Reviewer: JVG
2nd Reviewer: ✓

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

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

Blank units: ng/L **Associated sample units:** ng/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 23, 24 (bf)

Compound	Blank ID FB072909-SO	Blank ID	Sample Identification							
Sampling Date	7/29/09		24							
F	3.5		6.6/4							
E	0.30									
CC	0.44		0.40/4							
		(All others either ND or > FB)								

Blank units: ng/L **Associated sample units:** ng/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-9, 13-22 (bf)

Compound	Blank ID FB080309-SO	Blank ID	Sample Identification							
Sampling Date	8/03/09	1	3	8	13	16	17	22		
F	2.1		3.2/4	9.4/4	4.7/4	3.3/4				
CC	0.30	0.38/4					0.57/4	0.56/4		

LDC #: 21991N1
SDG #: San Gray

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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

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

Y (N) N/A 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
		20	BFB	63 (70-130)	J-/UJ/A (5)
		21		65 ( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	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 #: 21991 N1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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 associatec MS/MSD. Soil / Water.

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		28/29	Several compounds have 2 R and 3 RPD outside limits but either MS/MSD or LCS in (see attached summary)			( )	13	No qual
			LLL	38 (70-130)	40 (70-130)	( )		J- /UJ /A (m)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905464
Date Collected: 9/25/09
Date Received: 9/26/09
Date Analyzed: 10/ 5/09 - 10/ 6/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA101-0.5B
Lab Code: R0905464-013

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909500-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909500-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
1,1,1,2-Tetrachloroethane	ND	39.3	55.9	70		38.7	55.9	69	*	70 - 130	1	30
1,1,1-Trichloroethane (TCA)	ND	52.2	55.9	94		50.6	55.9	91		70 - 130	3	30
1,1,2,2-Tetrachloroethane	ND	40.2	55.9	72		39.6	55.9	71		70 - 130	1	30
1,1,2-Trichloroethane	ND	43.4	55.9	78		44.0	55.9	79		70 - 130	1	30
1,1-Dichloroethane (1,1-DCA)	ND	49.4	55.9	88		48.9	55.9	88		70 - 130	1	30
1,1-Dichloroethene (1,1-DCE)	ND	47.0	55.9	84		44.6	55.9	80		70 - 130	5	30
1,1-Dichloropropene	ND	46.0	55.9	82		47.1	55.9	84		70 - 130	2	30
1,2,3-Trichlorobenzene	ND	28.5	55.9	51	*	30.4	55.9	54	*	70 - 130	7	30
1,2,3-Trichloropropane	ND	38.5	55.9	69	*	40.4	55.9	72		70 - 130	5	30
1,2,4-Trichlorobenzene	ND	27.9	55.9	50	*	30.0	55.9	54	*	70 - 130	7	30
1,2,4-Trimethylbenzene	ND	30.2	55.9	54	*	31.1	55.9	56	*	70 - 130	3	30
1,2-Dibromo-3-chloropropane (DBC	ND	38.2	55.9	68		38.9	55.9	70		50 - 150	2	30
1,2-Dibromoethane	ND	43.6	55.9	78		43.0	55.9	77		70 - 130	1	30
1,2-Dichlorobenzene	ND	32.1	55.9	58	*	34.4	55.9	62	*	70 - 130	7	30
1,2-Dichloroethane	ND	47.7	55.9	85		48.0	55.9	86		70 - 130	1	30
1,2-Dichloropropane	ND	46.9	55.9	84		48.1	55.9	86		70 - 130	2	30
1,3,5-Trimethylbenzene	ND	30.3	55.9	54	*	31.3	55.9	56	*	70 - 130	3	30
1,3-Dichlorobenzene	ND	30.5	55.9	55	*	31.8	55.9	57	*	70 - 130	4	30
1,3-Dichloropropane	ND	42.9	55.9	77		43.9	55.9	79		70 - 130	2	30
1,4-Dichlorobenzene	ND	31.4	55.9	56	*	32.3	55.9	58	*	70 - 130	3	30
2,2-Dichloropropane	ND	51.6	55.9	92		46.5	55.9	83		70 - 130	10	30
2-Butanone (MEK)	1.0	57.5	55.9	101		51.7	55.9	91		50 - 150	11	30
2-Chlorotoluene	ND	31.8	55.9	57	*	35.4	55.9	63	*	70 - 130	11	30
2-Hexanone	ND	42.9	55.9	77		44.8	55.9	80		70 - 130	4	30
2-Methyl-2-propanol	ND	1110	1120	99		988	1120	88		50 - 150	11	30
4-Chlorotoluene	ND	31.9	55.9	57	*	33.4	55.9	60	*	70 - 130	5	30
4-Isopropyltoluene	ND	28.3	55.9	51	*	29.2	55.9	52	*	70 - 130	3	30
4-Methyl-2-pentanone	ND	44.4	55.9	80		46.4	55.9	83		70 - 130	4	30
Acetone	4.7	74.6	55.9	125		88.3	55.9	150		50 - 150	17	30
Benzene	ND	42.4	55.9	76		44.0	55.9	79		70 - 130	4	30
Bromobenzene	ND	34.0	55.9	61	*	35.6	55.9	64	*	70 - 130	5	30
Bromochloromethane	ND	42.5	55.9	76		45.0	55.9	81		70 - 130	6	30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905464
Date Collected: 9/25/09
Date Received: 9/26/09
Date Analyzed: 10/ 5/09 - 10/ 6/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA101-0.5B
Lab Code: R0905464-013

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909500-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909500-04 Result	Amount	% Rec		% Rec Limits	RPD		RPD Limit
Bromodichloromethane	ND	45.8	55.9	82		47.2	55.9	84		70 - 130	3		30
Bromoform	ND	43.0	55.9	77		44.6	55.9	80		70 - 130	4		30
Bromomethane	ND	8.75	55.9	16	*	36.3	55.9	65		50 - 150	122	*	30
Carbon Tetrachloride	ND	51.4	55.9	92		50.6	55.9	91		70 - 130	2		30
Chlorobenzene	ND	37.0	55.9	66	*	38.6	55.9	69	*	70 - 130	4		30
Chloroethane	ND	40.5	55.9	73		40.5	55.9	72		70 - 130	0		30
Chloroform	ND	50.5	55.9	90		50.4	55.9	90		70 - 130	0		30
Chloromethane	ND	56.8	55.9	102		44.9	55.9	80		70 - 130	23		30
Dibromochloromethane	ND	42.1	55.9	75		44.5	55.9	80		70 - 130	6		30
Dibromomethane	ND	43.6	55.9	78		45.2	55.9	81		70 - 130	3		30
Dichlorodifluoromethane (CFC 12)	ND	37.3	55.9	67	*	35.3	55.9	63	*	70 - 130	5		30
Dichloromethane	0.48	46.6	55.9	83		45.4	55.9	80		70 - 130	3		30
Diisopropyl Ether	ND	55.3	55.9	99		53.7	55.9	96		70 - 130	3		30
Ethyl tert-Butyl Ether	ND	56.3	55.9	101		56.5	55.9	101		70 - 130	0		30
Ethylbenzene	ND	38.5	55.9	69	*	37.1	55.9	66	*	70 - 130	4		30
Hexachlorobutadiene	ND	21.3	55.9	38	*	22.3	55.9	40	*	70 - 130	5		30
Isopropylbenzene (Cumene)	ND	38.6	55.9	69	*	38.3	55.9	69	*	70 - 130	1		30
Methyl tert-Butyl Ether	ND	49.8	55.9	89		47.6	55.9	85		70 - 130	5		30
Naphthalene	ND	33.9	55.9	61		36.4	55.9	65		50 - 150	7		30
Styrene	ND	40.2	55.9	72		40.1	55.9	72		70 - 130	0		30
Tetrachloroethene (PCE)	ND	40.4	55.9	72		39.2	55.9	70		70 - 130	3		30
Toluene	0.51	40.1	55.9	71		40.2	55.9	71		70 - 130	0		30
Trichloroethene (TCE)	ND	45.9	55.9	82		46.7	55.9	84		70 - 130	2		30
Trichlorofluoromethane (CFC 11)	ND	49.4	55.9	88		48.5	55.9	87		70 - 130	2		30
Vinyl Chloride	ND	46.8	55.9	84		39.4	55.9	71		70 - 130	17		30
cis-1,2-Dichloroethene	ND	46.1	55.9	82		45.4	55.9	81		70 - 130	1		30
cis-1,3-Dichloropropene	ND	46.4	55.9	83		46.7	55.9	84		70 - 130	1		30
m,p-Xylenes	ND	73.5	112	66	*	71.5	112	64	*	70 - 130	3		30
n-Butylbenzene	ND	25.6	55.9	46	*	26.7	55.9	48	*	70 - 130	4		30
n-Propylbenzene	ND	31.1	55.9	56	*	32.3	55.9	58	*	70 - 130	4		30
o-Xylene	ND	36.7	55.9	66	*	38.1	55.9	68	*	70 - 130	4		30
sec-Butylbenzene	ND	30.6	55.9	55	*	31.8	55.9	57	*	70 - 130	4		30
tert-Amyl Methyl Ether	ND	53.0	55.9	95		50.1	55.9	90		70 - 130	6		30

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Service Request: R0905464
Date Collected: 9/25/09
Date Received: 9/26/09
Date Analyzed: 10/ 5/09 - 10/ 6/09

Matrix Spike Summary
Volatile Organic Compounds by GC/MS

Sample Name: SA101-0.5B
Lab Code: R0905464-013

Units: µg/Kg
Basis: Dry

Analytical Method: 8260B

Analyte Name	Sample Result	Matrix Spike RQ0909500-03 Result	Amount	% Rec		Duplicate Matrix Spike RQ0909500-04 Result	Amount	% Rec		% Rec Limits	RPD	RPD Limit
tert-Butylbenzene	ND	30.1	55.9	54	*	30.5	55.9	55	*	70 - 130	1	30
trans-1,2-Dichloroethene	ND	45.0	55.9	81		42.6	55.9	76		70 - 130	6	30
trans-1,3-Dichloropropene	ND	41.9	55.9	75		43.4	55.9	78		70 - 130	3	30

Comments:

LDC #: 21991 N1
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
		173191-LCS	XX	70 (75-125)	( )	( )	1-3, 173191-MB	J-/UJ/P (L)
			MM	62 ( )	( )	( )		
			LLL	65 ( )	( )	( )		
			CCC	74 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		173360-LCS	VV	126 ( )	( )	( )	10-12, 25, 173360-MB	J+ dets/P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		173307-LCS	F	132 ( )	( )	( )	4-9, 13-17, 173307-MB	No qual (MS/MSD in
			LLL	67 ( )	( )	( )		J-/UJ/P (L)
				( )	( )	( )		
				( )	( )	( )		
		174051-LCS	F	139 (✓)	( )	( )	21, 174051-MB	J+ dets/P (L)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #:_____
SDG #: Sulfur

VALIDATION FINDINGS WORKSHEET
Internal Standards

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 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
		20	PFB	103752 (258285 - 1033140)		J/R/A (i)
			4DCB	125113 (205219 - 820874)		J/UJ/A
		21	PFB	147116 (236617 - 946466)		J/UJ/A
			4DCB	144505 (188329 - 753316)		
						(Please see TCL for association)

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

LDC #: 21991 NJ
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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
		20	IS & Surr outside limits		X /A (o)

Comments: _____

LDC #: 21991 N1
SDG #: See Cover

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 (Parent only)
	6	7	
M	12 U	1.5	10.5 (≤ 12 D) -

Compound	Concentration (ug/kg)		RPD (Parent only)
	17	18	
M	0.91	1.6	0.69 (≤ 11 D) -
E	0.34	5.6 U	5.26 (≤ 5.6 D) -
CC	0.57	0.66	0.09 ↓ -
F	18 U	8.3	9.7 (≤ 18 D) -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD