Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Data Validation Reports
LDC# 21257

Volatiles

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 16 through June 23, 2008

LDC Report Date: August 24, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844538

Sample Identification

PB061608B
PC-40B
H-48B
TRIP BLANK 06/19/08
MC-66BD
MC-65B
MC-66B
PC-37B
TRIP BLANK 06/20/08 0935-1
TRIP BLANK 06/20/08 0935-2
PC-72B
M-94BX
MC-62B
MC-62BDL
TRIP BLANK 06/23/08 1200
TRIP BLANK 06/23/08 1335

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/3/08	tert-Butyl alcohol	0.028 (≥0.05)	All samples in SDG R2844538	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
6/24/08	tert-Butyl alcohol 2-Butanone	35.7 26.9	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 VBLK1	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/24/08 (Z2547)	tert-Butyl alcohol	0.018 (≥0.05)	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 VBLK1	J (all detects) UJ (all non-detects)	A
6/25/08 (Z2576)	tert-Butyl alcohol	0.023 (≥0.05)	PC-72B M-94BX MC-62B TRIP BLANK 06/23/08 1200 TRIP BLANK 06/23/08 1335 VBLK2	J (all detects) UJ (all non-detects)	A
6/26/08 (Z2607)	tert-Butyl alcohol	0.027 (≥0.05)	MC-62BDL VBLK3	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 TRIP BLANK 06/19/08, TRIP BLANK 06/20/08 0935-1, TRIP BLANK 06/20/08 0935-2, TRIP BLANK 06/23/08 1200, and sample TRIP BLANK 06/23/08 1335 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
TRIP BLANK 06/19/08	6/19/08	Chloroform	0.33 ug/L	H-48B
TRIP BLANK 06/20/08 0935-1	6/20/08	Chloroform	0.26 ug/L	MC-66BD MC-65B MC-66B PC-37B
TRIP BLANK 06/20/08 0935-2	6/20/08	Chloroform Toluene	0.31 ug/L 0.32 ug/L	MC-66BD MC-65B MC-66B PC-37B
TRIP BLANK 06/23/08 1200	6/23/08	Chlorobenzene	0.28 ug/L	PC-72B M-94BX MC-62B MC-62BDL

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Acetone 2-Butanone tert-Butyl alcohol Ethyl-tert-butyl ether 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene m,p-Xylenes	16 ug/L 2.5 ug/L 4.1 ug/L 0.29 ug/L 2.2 ug/L 0.35 ug/L 0.25 ug/L 1.8 ug/L 0.26 ug/L	PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B MC-62BDL

Sample PB061608B was identified as a pump blank. No volatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	1,2-Dichloroethane Ethylbenzene Styrene Toluene m,p-Xylenes o-Xylene	0.24 ug/L 0.22 ug/L 0.25 ug/L 5.4 ug/L 0.49 ug/L 0.24 ug/L	PC-40B H-48B MC-66BD MC-65B MC-66B PC-37B PC-72B M-94BX MC-62B MC-62BDL

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
PC-40B	1,2-Dichloroethane Toluene	0.48 ug/L 1.1 ug/L	0.48U ug/L 1.1U ug/L
MC-65B	1,4-Dichlorobenzene Methylene chloride Toluene	1.5 ug/L 0.32 ug/L 0.22 ug/L	1.5U ug/L 0.32U ug/L 0.22U ug/L
PC-37B	1,4-Dichlorobenzene 1,2-Dichloroethane	0.29 ug/L 0.22 ug/L	0.29U ug/L 0.22U ug/L
H-48B	Acetone 2-Butanone 1,4-Dichlorobenzene Toluene	21 ug/L 4.2 ug/L 1.0 ug/L 0.29 ug/L	21U ug/L 4.2U ug/L 1.0U ug/L 0.29U ug/L
MC-66B	1,4-Dichlorobenzene	1.6 ug/L	1.6U ug/L
M-94BX	1,4-Dichlorobenzene	0.35 ug/L	0.35U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS1	Acetone	66 (75-125)	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 VBLK1	J- (all detects) UJ (all non-detects)	P
LCS3	Dichlorodifluoromethane	128 (75-125)	MC-62BDL VBLK3	J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
MC-62B	Benzene	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 R2844538	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
MC-62B	Benzene	X	A
MC-62BDL	All TCL compounds except Benzene	X	A

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

XVI. Field Duplicates

Samples MC-66BD and MC-66B were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	MC-66BD	MC-66B				
Carbon tetrachloride	0.70	0.82	-	0.12 (≤1.0)	-	-
Chloroform	5.3	5.2	2 (≤30)	-	-	-
Chloromethane	1.0	2.0U	-	1 (≤2.0)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	MC-66BD	MC-66B				
1,2-Dichlorobenzene	0.56	0.68	-	0.12 (≤2.0)	-	-
1,4-Dichlorobenzene	1.6	1.6	-	0 (≤2.0)	-	-
1,3-Dichlorobenzene	0.61	0.64	-	0.03 (≤2.0)	-	-
1,1-Dichloroethane	1.4	1.6	-	0.2 (≤1.0)	-	-
Methylene chloride	0.73	0.64	-	0.09 (≤2.0)	-	-
Tetrachloroethene	0.36	0.53	-	0.17 (≤1.0)	-	-
Trichloroethene	0.54	0.58	-	0.04 (≤1.0)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844538

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844538	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 PC-72B M-94BX MC-62B MC-62BDL TRIP BLANK 06/23/08 1200 TRIP BLANK 06/23/08 1335	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844538	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2	tert-Butyl alcohol 2-Butanone	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R2844538	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 PC-72B M-94BX MC-62B TRIP BLANK 06/23/08 1200 TRIP BLANK 06/23/08 1335 MC-62BDL	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844538	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2	Acetone	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844538	MC-62BDL	Dichlorodifluoromethane	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844538	MC-62B	Benzene	J (all detects)	A	Project Quantitation Limit (e)
R2844538	PB061608B PC-40B H-48B TRIP BLANK 06/19/08 MC-66BD MC-65B MC-66B PC-37B TRIP BLANK 06/20/08 0935-1 TRIP BLANK 06/20/08 0935-2 PC-72B M-94BX MC-62B MC-62BDL TRIP BLANK 06/23/08 1200 TRIP BLANK 06/23/08 1335	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844538	MC-62B	Benzene	X	A	Overall assessment of data (o)
R2844538	MC-62BDL	All TCL compounds except Benzene	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844538

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844538

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844538	PC-40B	1,2-Dichloroethane Toluene	0.48U ug/L 1.1U ug/L	A	bp,bf
R2844538	H-48B	Toluene	0.29U ug/L	A	bp,bf
R2844538	H-48B	Acetone 2-Butanone 1,4-Dichlorobenzene	21U ug/L 4.2U ug/L 1.0U ug/L	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844538	MC-65B	Toluene	0.22U ug/L	A	bp,bt,bf
R2844538	MC-65B	1,4-Dichlorobenzene Methylene chloride	1.5U ug/L 0.32U ug/L	A	bf
R2844538	PC-37B	1,2-Dichloroethane	0.22U ug/L	A	bp,bf
R2844538	PC-37B	1,4-Dichlorobenzene	0.29U ug/L	A	bf
R2844538	MC-66BD	1,4-Dichlorobenzene	1.6U ug/L	A	bf
R2844538	MC-66B	1,4-Dichlorobenzene	1.6U ug/L	A	bf
R2844538	M-94BX	1,4-Dichlorobenzene	0.35U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257A1
SDG #: R2844538
Laboratory: Columbia Analytical Services

Date: 8/11/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/16 - 23/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2nd RSD r²
IV.	Continuing calibration ~~ver~~	SW	CCV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	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 = 5,7
XVII.	Field blanks	SW	PB = 1 TB = 4 9 10 15 16 FB = FB062408GWAREA1 (from R2844650) PB = Pump Blk

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

Validated Samples: Water

1 1	PB061608B	11 1	PC-72B	21 1	VBLK1 (6/24)	31	
2 1	PC-40B	12 2	M-94B	22 2	VBLK2 (6/25)	32	
3 1	H-48B	13 2	MC-62B	23 3	VBLK3 (6/26)	33	
4 1	TRIP BLANK 06/19/08	14 3	MC-62BDL	24		34	
5 1	MC-66BD D	15 2	TRIP BLANK 06/23/08 1200	25		35	
6 1	MC-65B	16 2	TRIP BLANK 06/23/08 1335	26		36	
7 1	MC-66B D	17		27		37	
8 1	PC-37B	18		28		38	
9 1	TRIP BLANK 06/20/08 0935-1	19		29		39	
10 1	TRIP BLANK 06/20/08 0935-2	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	lll. 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 #: 21257A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/03/08	ICAL	ZZZ		0.028	All + BKs	J/NJ/A (C)

INICAL.1SB

LDC #: 21257A1
SDG #: Cu Corr ✓

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	6/24/08	Z2547	ZZZ (-)	35.7		1-10, VBLK1	J-/UJ/A (c)
			ZZZ		0.018		J/UJ/A
			M (-)	26.9			J-/UJ/A
	6/25/09	Z2576	ZZZ		0.023	11-13, 15, 16, VBLK2	J/UJ/A
	6/26/09	Z2607	ZZZ		0.027	14, VBLK3	J/UJ/A

LDC #: 21257A1
SDG #: Sep Cov

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 2,3 5-8 11-14 (bp)

Compound	Blank ID 1	Blank ID	Sample Identification							
Sampling Date	6/16/08	2	3	6	8					
(2X) 0.48 Methylene chloride L	0.24	0.48/U			0.22/U					
0.44 Acetone EE	0.22									
0.50 Chloroform FF	0.25									
10.8 CC	5.4	1.1/U	0.29/U	0.22/U						
RRR	0.49									
SSS	0.24									
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 3 (NP)

Compound	Blank ID 4	Blank ID	Sample Identification							
Sampling Date	6/19/08									
Methylene chloride K	0.33									
Acetone										
Chloroform										
CRQL										

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

LDC #: 21257A1
SDG #: Cu Cove

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/L

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 5 - 8 (6t)

Compound	Blank ID 9	Blank ID 10	Sample Identification							
Sampling Date	6/20/08		5	6	7	8				
(2x) 0.6x Methylene chloride K	0.26	0.31	(5.3)	(8.3)	(5.2)	(2.0)				
0.6t Acetone CC		0.32		0.22/U						
Chloroform										
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 11 - 14

Compound	Blank ID 15	Blank ID ~~16~~	Sample Identification							
Sampling Date	6/23/08		13	14						
0.56 Methylene chloride DD	0.28		(1100)	(1200)						
Acetone										
Chloroform										
CRQL										

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

LDC #: 21257A1
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?

6 of

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 2, 3, 5-8, 11-14

Compound	FB062408SW AREA1 Blank ID	Blank ID	Sample Identification								
Sampling Date	6/24/08		2	3	5	6	7	8	12	13	14
F	16			21/U							
M	2.5			4.2/U							
ZZZ	4.1										
AAAA	0.29										
HHH	2.2		7.6	1.0/U	1.6/U	1.5/U	1.6/U	0.29/U	0.35/U	35	38
L	0.35		0.48/U					0.22/U			
E	0.25				0.73	0.32/U	0.64		0.83		
CC	1.8		1.1/U	0.29/U		0.22/U					
RRR	0.26										

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 #: 21257A1
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
		LCS1 ~~(6/24)~~	F	66 (75-125)	( )	( )	1-10, VBLK1	J-/UJ/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		LCS3 ~~(6/26)~~	JJ	128 (75-125)	( )	( )	14, VBLK3	J+ dets/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257A1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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
		13	V > cal range		J dets / A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257A1
SDG #: Fu Cmv

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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
		13	V > cal range		X /A (Q)
					↓
		14	All except V dil		(Q)

Comments: _____

LDC#: 21257A1
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JK
2nd Reviewer:

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

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/L)		RPD (≤30%)	Diff	Quals (Parent Only)
	5	7			
Carbon Tetrachloride	0.70	0.82		0.12 (≤ 1.0)	
Chloroform	5.3	5.2	2		
Chloromethane	1.0	2.0U		1 (≤ 2.0)	
1,2-Dichlorobenzene	0.56	0.68		0.12	
1,4-Dichlorobenzene	1.6	1.6		0	
1,3-Dichlorobenzene	0.61	0.64		0.03	
1,1-Dichloroethane	1.4	1.6		0.2 (≤ 1.0)	
Methylene chloride	0.73	0.64		0.09 (≤ 2.0)	
Tetrachloroethene	0.36	0.53		0.17 (≤ 1.0)	
Trichloroethene	0.54	0.58		0.04	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 24 through June 27, 2008

LDC Report Date: August 20, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844650

Sample Identification

M-44B
H-49AB
FB062408GWAREA1
TRIP BLANK 06/24/08 1335-1
TRIP BLANK 06/24/08 1335-2
MC-45B
MC-53B
M-23B
MC-97B
TRIP BLANK 06/25/08
TRIP BLANK 06/25/08 1400
MC-94B
MW-16B
MW-16BDL
M-5AB
EB062608GW3
TRIP BLANK 06/25/08
M-61B
M-61BDL
M-88BB
M-88BBDL
M-7BB
TRIP BLANK 06/26/08 1400-1
TRIP BLANK 06/26/08 1400-2
M-67B
M-67BDL
M-6AB
M-57AB
M-95B
M-95BDL
M-68B
M-68BDL
TRIP BLANK 06/27/08 1400-1
TB062708GW3
TRIP BLANK 06/27/08 1400-2
M-7BBMS
M-7BBMSD

Introduction

This data review covers 37 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
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	All samples in SDG R2844650	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/1/08 (B0833)	Acetone	27.4	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 METBLK1	J+ (all detects)	A
7/9/08 (B0996)	Di-isopropyl ether	26.0	M-67BDL M-95BDL METBLK4	J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/1/08 (B0833)	tert-Butyl alcohol	0.024 (≥0.05)	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 METBLK1	J (all detects) UJ (all non-detects)	A
7/2/08 (B0877)	tert-Butyl alcohol	0.020 (≥0.05)	MC-94B MW-16B M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-88BB METBLK2	J (all detects) UJ (all non-detects)	A

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/3/08 (B0900)	tert-Butyl alcohol	0.021 (≥0.05)	MW-16BDL M-61BDL M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-6AB M-57AB M-95B M-68B TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2 M-7BBMS M-7BBMSD METBLK3	J (all detects) UJ (all non-detects)	A
7/9/08 (B0996)	tert-Butyl alcohol	0.022 (≥0.05)	M-67BDL M-95BDL METBLK4	J (all detects) UJ (all non-detects)	A
7/10/08 (B1023)	tert-Butyl alcohol	0.020 (≥0.05)	M-68BDL METBLK5	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
METBLK1	7/1/08	Acetone	1.1 ug/L	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400
METBLK2	7/2/08	Acetone tert-Butyl alcohol	1.4 ug/L 1.8 ug/L	MC-94B MW-16B M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-88BB

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
METBLK3	7/3/08	tert-Butyl alcohol	1.9 ug/L	MW-16BDL M-61BDL M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-6AB M-57AB M-95B M-68B TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2
METBLK4	7/9/08	tert-Butyl alcohol	2.0 ug/L	M-67BDL M-95BDL

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
M-44B	Acetone	1.2 ug/L	1.2U ug/L
H-49AB	Acetone	1.1 ug/L	1.1U ug/L
TRIP BLANK 06/24/08 1335-1	Acetone	1.9 ug/L	1.9U ug/L
TRIP BLANK 06/24/08 1335-2	Acetone	1.9 ug/L	1.9U ug/L
MC-45B	Acetone	1.1 ug/L	1.1U ug/L
MC-53B	Acetone	1.6 ug/L	1.6U ug/L
M-23B	Acetone	2.0 ug/L	2.0U ug/L
MC-97B	Acetone	1.1 ug/L	1.1U ug/L
MC-94B	Acetone tert-Butyl alcohol	1.2 ug/L 3.4 ug/L	1.2U ug/L 3.4U ug/L
MW-16B	Acetone tert-Butyl alcohol	1.4 ug/L 2.7 ug/L	1.4U ug/L 2.7U ug/L
EB062608GW3	tert-Butyl alcohol	3.1 ug/L	3.1U ug/L

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
TRIP BLANK 06/25/08	Acetone	1.8 ug/L	1.8U ug/L
M-61B	Acetone tert-Butyl alcohol	1.2 ug/L 1.8 ug/L	1.2U ug/L 1.8U ug/L
M-88BB	Acetone tert-Butyl alcohol	1.5 ug/L 3.4 ug/L	1.5U ug/L 3.4U ug/L
M-61BDL (2X)	tert-Butyl alcohol	5.2 ug/L	5.2U ug/L
M-88BBDL (5X)	tert-Butyl alcohol	13 ug/L	13U ug/L
TRIP BLANK 06/26/08 1400-1	tert-Butyl alcohol	1.9 ug/L	1.9U ug/L
TRIP BLANK 06/26/08 1400-2	tert-Butyl alcohol	1.9 ug/L	1.9U ug/L
M-67B	tert-Butyl alcohol	2.3 ug/L	2.3U ug/L
M-6AB	tert-Butyl alcohol	3.4 ug/L	3.4U ug/L
M-57AB	tert-Butyl alcohol	1.8 ug/L	1.8U ug/L
M-95B	tert-Butyl alcohol	2.7 ug/L	2.7U ug/L
M-68B	tert-Butyl alcohol	1.7 ug/L	1.7U ug/L
TRIP BLANK 06/27/08 1400-1	tert-Butyl alcohol	2.3 ug/L	2.3U ug/L
TB062708GW3	tert-Butyl alcohol	2.3 ug/L	2.3U ug/L
TRIP BLANK 06/27/08 1400-2	tert-Butyl alcohol	2.0 ug/L	2.0U ug/L
M-67BDL (5X)	tert-Butyl alcohol	11 ug/L	11U ug/L
M-95BDL (2.5X)	tert-Butyl alcohol	9.0 ug/L	9.0U ug/L

Samples TRIP BLANK 06/24/08 1335-1, TRIP BLANK 06/24/08 1335-2, TRIP BLANK 06/25/08, TRIP BLANK 06/25/08 1400, TRIP BLANK 06/25/08, TRIP BLANK 06/26/08 1400-1, TRIP BLANK 06/26/08 1400-2, TRIP BLANK 06/27/08 1400-1, TB062708GW3, and TRIP BLANK 06/27/08 1400-2 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
TRIP BLANK 06/24/08 1335-1	6/24/08	Acetone tert-Butyl alcohol	1.9 ug/L 5.2 ug/L	M-44B H-49AB
TRIP BLANK 06/24/08 1335-2	6/24/08	Acetone tert-Butyl alcohol	1.9 ug/L 5.0 ug/L	M-44B H-49AB
TRIP BLANK 06/25/08	6/25/08	Acetone 2-Butanone tert-Butyl alcohol 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene	2.8 ug/L 1.4 ug/L 2.0 ug/L 11 ug/L 0.31 ug/L 0.26 ug/L 0.68 ug/L	MC-45B MC-53B M-23B MC-97B
TRIP BLANK 06/25/08 1400	6/25/08	Acetone 2-Butanone tert-Butyl alcohol 1,2-Dichloroethane Methylene chloride	3.6 ug/L 0.92 ug/L 3.1 ug/L 0.26 ug/L 0.29 ug/L	MC-45B MC-53B M-23B MC-97B
TRIP BLANK 06/25/08	6/25/08	Acetone tert-Butyl alcohol	1.8 ug/L 4.9 ug/L	MC-94B MW-16B MW-16BDL M-5AB
TRIP BLANK 06/26/08 1400-1	6/26/08	Acetone tert-Butyl alcohol	1.4 ug/L 1.9 ug/L	M-61B M-61BDL M-88BB M-88BBDL M-7BB
TRIP BLANK 06/26/08 1400-2	6/26/08	Acetone tert-Butyl alcohol	2.5 ug/L 1.9 ug/L	M-61B M-61BDL M-88BB M-88BBDL M-7BB
TB062708GW3	6/27/08	Acetone tert-Butyl alcohol	3.4 ug/L 2.3 ug/L	M-6AB
TRIP BLANK 06/27/08 1400-1	6/27/08	Acetone tert-Butyl alcohol Chloroform	3.2 ug/L 2.3 ug/L 0.24 ug/L	M-67B M-67BDL M-57AB M-95B M-95BDL M-68B M-68BDL

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TRIP BLANK 06/27/08 1400-2	6/27/08	Acetone tert-Butyl alcohol	2.8 ug/L 2.0 ug/L	M-67B M-67BDL M-57AB M-95B M-95BDL M-68B M-68BDL

Sample EB062608GW3 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB062608GW3	6/26/08	Acetone 2-Butanone tert-Butyl alcohol Chlorobenzene 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene	3.3 ug/L 1.2 ug/L 3.1 ug/L 0.29 ug/L 11 ug/L 0.24 ug/L 0.25 ug/L 0.48 ug/L	MW-16B MW-16BDL M-5AB

Sample FB062408GWAREA1 was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Acetone 2-Butanone tert-Butyl alcohol Ethyl-tert-butyl ether 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene m,p-Xylenes	16 ug/L 2.5 ug/L 4.1 ug/L 0.29 ug/L 2.2 ug/L 0.35 ug/L 0.25 ug/L 1.8 ug/L 0.26 ug/L	M-44B H-49AB MC-45B MC-53B M-23B MC-97B MC-94B MW-16B MW-16BDL M-5AB M-61B M-61BDL M-88BB M-67B M-67BDL M-6AB M-57AB M-95B M-95BDL M-68B M-68BDL

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No volatile contaminants were found in this blank with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	1,2-Dichloroethane Ethylbenzene Styrene Toluene m,p-Xylenes o-Xylene	0.24 ug/L 0.22 ug/L 0.25 ug/L 5.4 ug/L 0.49 ug/L 0.24 ug/L	M-44B H-49AB MC-45B MC-53B M-23B MC-97B MC-94B MW-16B MW-16BDL M-5AB M-61B M-61BDL M-88BB M-67B M-67BDL M-6AB M-57AB M-95B M-95BDL M-68B M-68BDL

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-44B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	1.2 ug/L 3.6 ug/L 0.67 ug/L	1.2U ug/L 3.6U ug/L 0.67U ug/L
H-49AB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride	1.1 ug/L 3.5 ug/L 2.6 ug/L 0.33 ug/L 0.35 ug/L	1.1U ug/L 3.5U ug/L 2.6U ug/L 0.33U ug/L 0.35U ug/L
MC-45B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene 1,2-Dichloroethane	1.1 ug/L 3.9 ug/L 5.6 ug/L 0.29 ug/L	1.1U ug/L 3.9U ug/L 5.6U ug/L 0.29U ug/L
MC-53B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	1.6 ug/L 2.8 ug/L 1.5 ug/L	1.6U ug/L 2.8U ug/L 1.5U ug/L
M-23B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	2.0 ug/L 2.5 ug/L 1.7 ug/L 0.23 ug/L	2.0U ug/L 2.5U ug/L 1.7U ug/L 0.23U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
MC-97B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride	1.1 ug/L 3.5 ug/L 0.20 ug/L 0.45 ug/L 0.35 ug/L	1.1U ug/L 3.5U ug/L 0.20U ug/L 0.45U ug/L 0.35U ug/L
MC-94B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene 1,2-Dichloroethane	1.2 ug/L 3.4 ug/L 2.4 ug/L 0.64 ug/L	1.2U ug/L 3.4U ug/L 2.4U ug/L 0.64U ug/L
MW-16B	Acetone tert-Butyl alcohol Methylene chloride	1.4 ug/L 2.7 ug/L 0.36 ug/L	1.4U ug/L 2.7U ug/L 0.36U ug/L
MW-16BDL	Acetone	5.0 ug/L	5.0U ug/L
M-61B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.2 ug/L 1.8 ug/L 1.0 ug/L 0.23 ug/L	1.2U ug/L 1.8U ug/L 1.0U ug/L 0.23U ug/L
M-61BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	6.4 ug/L 5.2 ug/L 1.1 ug/L 0.42 ug/L	6.4U ug/L 5.2U ug/L 1.1U ug/L 0.42U ug/L
M-88BB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.5 ug/L 3.4 ug/L 1.1 ug/L 0.37 ug/L	1.5U ug/L 3.4U ug/L 1.1U ug/L 0.37U ug/L
M-88BBDL	Acetone 1,4-Dichlorobenzene	13 ug/L 1.3 ug/L	13U ug/L 1.3U ug/L
M-7BB	Acetone tert-Butyl alcohol Methylene chloride	1.4 ug/L 4.6 ug/L 0.25 ug/L	1.4U ug/L 4.6U ug/L 0.25U ug/L
M-67B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	6.4 ug/L 2.3 ug/L 0.33 ug/L 0.29 ug/L	6.4U ug/L 2.3U ug/L 0.33U ug/L 0.29U ug/L
M-67BDL	Acetone	9.3 ug/L	9.3U ug/L
M-6AB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	2.6 ug/L 3.4 ug/L 1.2 ug/L	2.6U ug/L 3.4U ug/L 1.2U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
M-57AB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	0.91 ug/L 1.8 ug/L 1.6 ug/L	0.91U ug/L 1.8U ug/L 1.6U ug/L
M-95B	Acetone tert-Butyl alcohol 1,2-Dichloroethane Methylene chloride	1.1 ug/L 2.7 ug/L 0.29 ug/L 0.23 ug/L	1.1U ug/L 2.7U ug/L 0.29U ug/L 0.23U ug/L
M-95BDL	Acetone	7.1 ug/L	7.1U ug/L
M-68B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.5 ug/L 1.7 ug/L 0.42 ug/L 0.26 ug/L	1.5U ug/L 1.7U ug/L 0.42U ug/L 0.26U ug/L
M-68BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	4.5 ug/L 4.0 ug/L 0.46 ug/L	4.5U ug/L 4.0U ug/L 0.46U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. 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
M-7BBMS/MSD (M-7BB)	Dichlorodifluoromethane	150 (70-130)	144 (70-130)	-	J+ (all 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
LCS1	Dichlorodifluoromethane	128 (75-125)	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 METBLK1	J+ (all detects)	P
LCS2	Dichlorodifluoromethane	127 (75-125)	MC-94B MW-16B M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-88BB METBLK2	J+ (all detects)	P
LCS3	Dichlorodifluoromethane	127 (75-125)	MW-16BDL M-61BDL M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-6AB M-57AB M-95B M-68B TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2 METBLK3	J+ (all detects)	P
LCS4	Acetone Di-isopropyl ether	134 (75-125) 128 (75-125)	M-67BDL M-95BDL METBLK4	J+ (all detects) J+ (all detects)	P
LCS5	2-Hexanone	71 (75-125)	M-68BDL METBLK5	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
MW-16B	Chlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
M-61B M-88BB M-67B M-95B M-68B	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 R2844650	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
MW-16B	Chlorobenzene	X	A
MW-16BDL	All TCL compounds except Chlorobenzene	X	A

Sample	Compound	Flag	A or P
M-61B M-88BB M-67B M-95B M-68B	Chloroform	X	A
M-61BDL M-88BBDL M-67BDL M-95BDL M-68BDL	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, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844650

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 MC-94B MW-16B MW-16BDL M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-61BDL M-88BB M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-67BDL M-6AB M-57AB M-95B M-95BDL M-68B M-68BDL TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844650	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R2844650	M-67BDL M-95BDL	Di-isopropyl ether	J+ (all detects)	A	Continuing calibration (%D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 MC-94B MW-16B MW-16BDL M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-61BDL M-88BB M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-67BDL M-6AB M-57AB M-95B M-95BDL M-68B M-68BDL TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844650	M-7BB	Dichlorodifluoromethane	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 MC-94B MW-16B M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-88BB MW-16BDL M-61BDL M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-6AB M-57AB M-95B M-68B TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2	Dichlorodifluoromethane	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844650	M-67BDL M-95BDL	Acetone Di-isopropyl ether	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844650	M-68BDL	2-Hexanone	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844650	MW-16B	Chlorobenzene	J (all detects)	A	Project Quantitation Limit (e)
R2844650	M-61B M-88BB M-67B M-95B M-68B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 TRIP BLANK 06/24/08 1335-1 TRIP BLANK 06/24/08 1335-2 MC-45B MC-53B M-23B MC-97B TRIP BLANK 06/25/08 TRIP BLANK 06/25/08 1400 MC-94B MW-16B MW-16BDL M-5AB EB062608GW3 TRIP BLANK 06/25/08 M-61B M-61BDL M-88BB M-88BBDL M-7BB TRIP BLANK 06/26/08 1400-1 TRIP BLANK 06/26/08 1400-2 M-67B M-67BDL M-6AB M-57AB M-95B M-95BDL M-68B M-68BDL TRIP BLANK 06/27/08 1400-1 TB062708GW3 TRIP BLANK 06/27/08 1400-2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844650	MW-16B	Chlorobenzene	X	A	Overall assessment of data (o)
R2844650	MW-16BDL	All TCL compounds except Chlorobenzene	X	A	Overall assessment of data (o)
R2844650	M-61B M-88BB M-67B M-95B M-68B	Chloroform	X	A	Overall assessment of data (o)
R2844650	M-61BDL M-88BBDL M-67BDL M-95BDL M-68BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844650

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844650	M-44B	Acetone	1.2U ug/L	A	bl
R2844650	H-49AB	Acetone	1.1U ug/L	A	bl
R2844650	TRIP BLANK 06/24/08 1335-1	Acetone	1.9U ug/L	A	bl
R2844650	TRIP BLANK 06/24/08 1335-2	Acetone	1.9U ug/L	A	bl
R2844650	MC-45B	Acetone	1.1U ug/L	A	bl
R2844650	MC-53B	Acetone	1.6U ug/L	A	bl
R2844650	M-23B	Acetone	2.0U ug/L	A	bl
R2844650	MC-97B	Acetone	1.1U ug/L	A	bl
R2844650	MC-94B	Acetone tert-Butyl alcohol	1.2U ug/L 3.4U ug/L	A	bl
R2844650	MW-16B	Acetone tert-Butyl alcohol	1.4U ug/L 2.7U ug/L	A	bl
R2844650	EB062608GW3	tert-Butyl alcohol	3.1U ug/L	A	bl
R2844650	TRIP BLANK 06/25/08	Acetone	1.8U ug/L	A	bl
R2844650	M-61B	Acetone tert-Butyl alcohol	1.2U ug/L 1.8U ug/L	A	bl
R2844650	M-88BB	Acetone tert-Butyl alcohol	1.5U ug/L 3.4U ug/L	A	bl
R2844650	M-61BDL (2X)	tert-Butyl alcohol	5.2U ug/L	A	bl
R2844650	M-88BBDL (5X)	tert-Butyl alcohol	13U ug/L	A	bl
R2844650	TRIP BLANK 06/26/08 1400-1	tert-Butyl alcohol	1.9U ug/L	A	bl
R2844650	TRIP BLANK 06/26/08 1400-2	tert-Butyl alcohol	1.9U ug/L	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844650	M-67B	tert-Butyl alcohol	2.3U ug/L	A	bl
R2844650	M-6AB	tert-Butyl alcohol	3.4U ug/L	A	bl
R2844650	M-57AB	tert-Butyl alcohol	1.8U ug/L	A	bl
R2844650	M-95B	tert-Butyl alcohol	2.7U ug/L	A	bl
R2844650	M-68B	tert-Butyl alcohol	1.7U ug/L	A	bl
R2844650	TRIP BLANK 06/27/08 1400-1	tert-Butyl alcohol	2.3U ug/L	A	bl
R2844650	TB062708GW3	tert-Butyl alcohol	2.3U ug/L	A	bl
R2844650	TRIP BLANK 06/27/08 1400-2	tert-Butyl alcohol	2.0U ug/L	A	bl
R2844650	M-67BDL (5X)	tert-Butyl alcohol	11U ug/L	A	bl
R2844650	M-95BDL (2.5X)	tert-Butyl alcohol	9.0U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844650

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	M-44B	Acetone tert-Butyl alcohol	1.2U ug/L 3.6U ug/L	A	bt,bf
R2844650	M-44B	1,4-Dichlorobenzene	0.67U ug/L	A	bf
R2844650	H-49AB	Acetone tert-Butyl alcohol	1.1U ug/L 3.5U ug/L	A	bt,bf
R2844650	H-49AB	1,2-Dichloroethane	0.33U ug/L	A	bf,bp
R2844650	H-49AB	1,4-Dichlorobenzene Methylene chloride	2.6U ug/L 0.35U ug/L	A	bf
R2844650	MC-45B	Acetone tert-Butyl alcohol	1.1U ug/L 3.9U ug/L	A	bt,bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	MC-45B	1,4-Dichlorobenzene	5.6U ug/L	A	bt
R2844650	MC-45B	1,2-Dichloroethane	0.29U ug/L	A	bt,bf,bp
R2844650	MC-53B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	1.6U ug/L 2.8U ug/L 1.5U ug/L	A	bt,bf
R2844650	M-23B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	2.0U ug/L 2.5U ug/L 1.7U ug/L 0.23U ug/L	A	bt,bf
R2844650	MC-97B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.1U ug/L 3.5U ug/L 0.20U ug/L 0.35U ug/L	A	bt,bf
R2844650	MC-97B	1,2-Dichloroethane	0.45U ug/L	A	bt,bf,bp
R2844650	MC-94B	Acetone tert-Butyl alcohol	1.2U ug/L 3.4U ug/L	A	bt,bf
R2844650	MC-94B	1,4-Dichlorobenzene 1,2-Dichloroethane	2.4U ug/L 0.64U ug/L	A	bf
R2844650	MW-16B	Acetone tert-Butyl alcohol	1.4U ug/L 2.7U ug/L	A	bt,bf
R2844650	MW-16B	Methylene chloride	0.36U ug/L	A	be,bf
R2844650	MW-16BDL	Acetone	5.0U ug/L	A	be,bf
R2844650	M-61B	Acetone tert-Butyl alcohol	1.2U ug/L 1.8U ug/L	A	bt,bf
R2844650	M-61B	1,4-Dichlorobenzene Methylene chloride	1.0U ug/L 0.23U ug/L	A	bf
R2844650	M-61BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	6.4U ug/L 5.2U ug/L 1.1U ug/L 0.42U ug/L	A	bf
R2844650	M-88BB	Acetone tert-Butyl alcohol	1.5U ug/L 3.4U ug/L	A	bt,bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	M-88BB	1,4-Dichlorobenzene Methylene chloride	1.1U ug/L 0.37U ug/L	A	bf
R2844650	M-88BBDL	Acetone 1,4-Dichlorobenzene	13U ug/L 1.3U ug/L	A	bf
R2844650	M-7BB	Acetone	1.4U ug/L	A	bt,bf
R2844650	M-7BB	tert-Butyl alcohol Methylene chloride	4.6U ug/L 0.25U ug/L	A	bf
R2844650	M-67B	Acetone tert-Butyl alcohol	6.4U ug/L 2.3U ug/L	A	bt,bf
R2844650	M-67B	1,4-Dichlorobenzene Methylene chloride	0.33U ug/L 0.29U ug/L	A	bf
R2844650	M-67BDL	Acetone	9.3U ug/L	A	bf
R2844650	M-6AB	Acetone tert-Butyl alcohol	2.6U ug/L 3.4U ug/L	A	bt,bf
R2844650	M-6AB	1,4-Dichlorobenzene	1.2U ug/L	A	bf
R2844650	M-57AB	Acetone tert-Butyl alcohol	0.91U ug/L 1.8U ug/L	A	bt,bf
R2844650	M-57AB	1,4-Dichlorobenzene	1.6U ug/L	A	bf
R2844650	M-95B	Acetone tert-Butyl alcohol	1.1U ug/L 2.7U ug/L	A	bt,bf
R2844650	M-95B	1,2-Dichloroethane	0.29U ug/L	A	bf,bp
R2844650	M-95B	Methylene chloride	0.23U ug/L	A	bf
R2844650	M-95BDL	Acetone	7.1U ug/L	A	bf
R2844650	M-68B	Acetone tert-Butyl alcohol	1.5U ug/L 1.7U ug/L	A	bt,bf
R2844650	M-68B	1,4-Dichlorobenzene Methylene chloride	0.42U ug/L 0.726U ug/L	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	M-68BDL	Acetone tert-Butyl alcohol	4.5U ug/L 4.0U ug/L	A	bt,bf
R2844650	M-68BDL	1,4-Dichlorobenzene	0.46U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257B1
SDG #: R2844650
Laboratory: Columbia Analytical Services

Date: 8/18/09
Page: 1 of 1
Reviewer: JW
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24-27/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD rr
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	A	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = 3 TB = 4,5,10,11,17,23,24,33,34,35 EB = 16 PB = PB061608B from R2844538

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

Validated Samples: Water

1 1	M-44B	11 1	TRIP BLANK 06/25/08 1400	21 3	M-88BBDL	31 3	M-68B
2 1	H-49AB	12 2	MC-94B	22 3	M-7BB	32 5	M-68BDL
3 1	FB062408GWAREA1	13 2	MW-16B	23 3	TRIP BLANK 06/26/08 1400-1	33 3	TRIP BLANK 06/27/08 1400-1
4 1	TRIP BLANK 06/24/08 1335-1	14 3	MW-16BDL	24 3	TRIP BLANK 06/26/08 1400-2	34 3	TB062708GW3
5 1	TRIP BLANK 06/24/08 1335-2	15 2	M-5AB	25 3	M-67B	35 3	TRIP BLANK 06/27/08 1400-2
6 1	MC-45B	16 2	EB062608GW3	26 4	M-67BDL	36 3	M-7BBMS
7 1	MC-53B	17 2	TRIP BLANK 06/25/08	27 3	M-6AB	37 3	M-7BBMSD
8 1	M-23B	18 2	M-61B	28 3	M-57AB	38 1	METBLK1 7/01
9 1	MC-97B	19 3	M-61BDL	29 3	M-95B	39 2	2 7/02
10 1	TRIP BLANK 06/25/08 ~~ND~~	20 2	M-88BB	30 4	M-95BDL	40 3	3 7/03
						4 - 5	4 5 7/04 7/05

LDC #: 21257 b1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JW
2nd Reviewer: [signature]

Method: Volatiles (EPA SW 846 Method 8260B)

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

LDC #: 21259 #1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: [signature]

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 #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: JVL
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? $r^2 \geq 0.99$
(Y) N N/A Did the initial calibration meet the acceptance criteria?
Y (N) N/A Were all %RSDs and RRFs within the validation criteria of ≤30 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/26/08	ICAL	ZZZ		0.021	All + BLKS	J/UJ/A (C)

LDC #: 21254B7
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	7/01/08	B0833	F (+)	27.4		1-11, METBLK1	J+ dets/A (c)
			ZZZ		0.024	↓	J/UJ/A
	7/02/08	B0877	ZZZ		0.020	12, 13, 15-18, 20, METBLK2	J/UJ/A
	7/03/08	B0900	ZZZ		0.021	14, 19, 21-25, 27-29, 31, 33-37, METBLK3	J/UJ/A
	7/09/08	B0996	ZZZ		0.022	26, 30, METBLK4	J/UJ/A
			XXX (+)	26.0			J+ dets/A
	7/10/08	B1023	ZZZ		0.020	32, METBLK5	J/UJ/A

CONCAL.1SB

LDC #: 21257B1
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.

(b 1)

Blank analysis date: 7/01/08
Conc. units: ug/L
Associated Samples: 1 - 11

Compound	Blank ID	Sample Identification										
	MET BLK1	1	2	3	4	5	6	7	8	9	10	11
2.7 ~~Methylene chloride~~ F	1.1	1.2/U	1.1/U	(16)	1.9/U	1.9/U	1.1/U	1.6/U	2.0/U	1.1/U	(2.8)	(3.6)
Acetone												
CRQL												

(b 1)

Blank analysis date: 7/02/08
Conc. units: ug/L
Associated Samples: 12, 13, 15-18, 20

Compound	Blank ID	Sample Identification								
	MET BLK1	12	13	15 (25X)	16	17	18	20		
2.8 ~~Methylene chloride~~ F	1.4	1.2/U	1.4/U	(80)	(3.3)	1.8/U	1.2/U	1.5/U		
3.6 ~~Acetone~~ ZZZ	1.8	3.4/U	2.7/U	(58)	3.1/U	(4.9)	1.8/U	3.4/U		
CRQL										

LDC #: 21257 B1
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: 7/03/08 (bl)

Conc. units: ug/L Associated Samples: 14, 19, 21-25, 27-29, 31, 33-35

Compound	Blank ID	Sample Identification								
	MET BLK 3	14 (2x)	19 (2x)	21 (5x)	22	23	24	25	27	28
3.8 Methylene chloride ~~222~~	1.9	(17)	5.2 /U	13 /U	(4.6)	1.9 /U	1.9 /U	2.3 /U	3.6 /U	1.8 /U
Acetone										
CRQL										

Blank analysis date: Same as above (bl)

Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
	MET BLK 3	29	31	33	34	35				
Methylene chloride ~~222~~	1.9	2.7 /U	1.7 /U	2.3 /U	2.3 /U	2.0 /U				
Acetone										
CRQL										

LDC #: 21257 (b)
SDG #: Eu Cov

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.

(bl)

Blank analysis date: 7/09/08
Conc. units: ug/L Associated Samples: 26, 30

Compound	Blank ID	Sample Identification								
	METBLK4	26 (5x)	30 (2.5x)							
4.0 ~~Methylene chloride~~ ZZZ	2.0	11/U	9.0/U							
Acetone										
CROL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CROL										

LDC #: 21257 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 6
Reviewer: DVG
2nd Reviewer: 9

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

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

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

Compound	Blank ID 4	Blank ID 5	Sample Identification							
Sampling Date	6/24/08		1	2						
F	1.9	1.9	1.2/U	1.1/U						
ZZZ	5.2	5.0	3.6/U	3.5/U						
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 6-9 (bt)

Compound	Blank ID 10	Blank ID 11	~~Blank ID 17~~	Sample Identification						
Sampling Date	6/25/08			6	7	8	9			
F	2.8	3.6	~~1.8~~	1.1/U	1.6/U	2.0/U	1.1/U			
M	1.4	0.92								
ZZZ	2.0	3.1	~~4.9~~	3.9/U	2.8/U	2.5/U	3.5/U			
HHH	11			5.6/U	1.5/U	1.7/U	0.20/U			
L	0.31	0.26		0.29/U	(1.0)		0.45/U			
E	0.26	0.29			(0.73)	0.23/U	0.35/U			
CC	0.68									
CRQL										

LDC #: 21257 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JKG
2nd Reviewer: [signature]

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 12-15 (bt)

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	6/25/08		12	13	14	15				
F	1.8		1.2/U	1.4/U	(5.0)	(80)				
ZZZ	4.9		3.4/U	2.7/U	(17)	(58)				
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: 13-15 (be)

Compound	Blank ID 16	Blank ID	Sample Identification							
Sampling Date	6/26/08		13	14	15					
F	3.3		1.4/U	5.0/U	(80)					
M	1.2									
ZZZ	3.1		2.7/U	(17)	(58)					
DD	0.29		(230)	(190)	(3900)					
HHH	11		(36)	(29)	(36)					
L	0.24			(2.2)	(32)					
E	0.25		0.36/U	(0.62)						
CRQL CC	0.48									

LDC #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 18 – 22 (bt)

Compound	Blank ID 23	Blank ID 24	Sample Identification							
Sampling Date	6/26/08		18	19	20	21	22			
F	1.4	2.5	1.2/U	(6.4)	1.5/U	(13)	1.4/U			
ZZZ	1.9	1.9	1.8/U	(5.2)	3.4/U	(13)	(4.6)			
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: Associated Samples: 27 (bt)

Compound	Blank ID 34	Blank ID	Sample Identification							
Sampling Date	6/27/08		27							
F	3.4		2.6/U							
ZZZ	2.3		3.4/U							
CRQL										

(23,24 → COC sampling date = 6/25)

LDC #: 21257 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

(b f)

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 1, 2 6-9 12-15 18-22 25-32

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	6/24/08	1	2	6	7	8	9	12	13	14
F	16	1.2 /U	1.1 /U	1.1 /U	1.6 /U	2.0 /U	1.1 /U	1.2 /U	1.4 /U	5.0 /U
M	2.5									(12)
ZZZ	4.1	3.6 /U	3.5 /U	3.9 /U	2.8 /U	2.5 /U	3.5 /U	3.4 /U	2.7 /U	(17)
AAAA	0.29									
HHH	2.2	0.67 /U	2.6 /U	(5.6)	1.5 /U	1.7 /U	0.20 /U	2.4 /U	(36)	(29)
L	0.35		0.33 /U	0.29 /U	(1.0)		0.45 /U	0.64 /U		(2.2)
E	0.25	(1.0)	0.35 /U		(0.73)	0.23 /U	0.35 /U	(0.58)	0.36 /U	(0.62)
CRQL CC	1.8									
RRR	0.26									

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

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

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	6/24/08	15	18	19	20	21	22	25	26	27
F	16	(80)	1.2 /U	6.4 /U	1.5 /U	13 /U	1.4 /U	6.4 /U	9.3 /U	2.6 /U
M	2.5									
ZZZ	4.1	(58)	1.8 /U	5.2 /U	3.4 /U	(13)	4.6 /U	2.3 /U	(11)	3.4 /U
AAAA	0.29									
HHH	2.2	(36)	1.0 /U	1.1 /U	1.1 /U	1.3 /U		0.33 /U		1.2 /U
L	0.35	(32)					(1.8)			(1.5)
E	0.25		0.23 /U	0.42 /U	0.37 /U		0.25 /U	0.29 /U	(1.2)	
CRQL CC	1.8									
RRR	0.26									

LDC #: 21757B1
SDG #: Surface

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 25, 26, 28 – 32

Compound	Blank ID 33	Blank ID 35	Sample Identification							
Sampling Date	6/27/08		25	26	28	29	30	31	32	
±	3.2	2.8	6.4/U	(9.3)	0.91/U	1.1/U	(7.1)	1.5/U	4.5/U	
222	2.3	2.0	2.3/U	(11)	1.8/U	2.7/U	(9.0)	1.7/U	4.0/U	
K	0.24		(840)	(790)	(98)	(410)	(390)	(280)	(190)	
CRQL										

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

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										
CRQL										

LDC #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: N

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

(6f)

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: FB Associated Samples: 1,2,6-9,12-15,18-22,25-32

Compound	Blank ID 3	Blank ID	Sample Identification							
Sampling Date	6/24/08		28	29	30	31	32			
F	16		0.91/U	1.1/U	7.1/U	1.5/U	4.5/U			
M	2.5									
ZZZ	4.1		1.8/U	2.7/U	(9.0)	1.7/U	4.0/U			
AAAA	0.29									
HHH	2.2		1.6/U			0.42/U	0.46/U			
L	0.35			0.29/U						
E	0.25		(3.9)	0.23/U	(0.58)	0.26/U				
CRQL CC	1.8									
RRR	0.26									

Blank units: **Associated sample units:**

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1,2 6-9, 12, 18-22, 25-32

code 6Q

Compound	PBOG1608B Blank ID	Blank ID	Sample Identification							
Sampling Date	6/16/08	2	6	7	9	12	~~28~~ 22	27	29	
0.48 L	0.29	0.33/U	0.29/U	(1.0)	0.45/U	(0.64)	(1.8)	(1.5)	0.29/U	
EE	0.22									
FF	0.25									
CC	5.4									
RRR	0.49									
SSS	0.24									
CRQL										

LDC #: 21257 b1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		36/37	A	146 (70-130)	142 (70-130)	( )	22	No qual (LCSin)
			JJ	150 ( )	144 ( )	( )		J+ dets/A (mb)
			C	140 ( )	134 ( )	( )		No qual (LCSin)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS 1	JJ	128 (75-125)	( )	( )	1-11, METBLK1	J+ (all pos)/P (l)
				( )	( )	( )		
				( )	( )	( )		
		LCS 2	JJ	127 ( )	( )	( )	12, 13, 15-18, 26, METBLK2	
				( )	( )	( )		
				( )	( )	( )		
		LCS 3	JJ	127 ( )	( )	( )	14, 19, 21-25, 27-29, 31,	
				( )	( )	( )	33-35, METBLK3	
				( )	( )	( )		
				( )	( )	( )		
		LCS 4	F	134 ( )	( )	( )	26, 30, METBLK4	
			XXX	128 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		LCS 5	Z	71 ( )	( )	( )	32, METBLK5	J-/UJ/P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 71257B1
SDG #: Cu Lower

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: JVB
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
		13	DD > cal range		J dets/A (e)
		18, 20, 25, 29, 31	K > cal range		↓ ↓

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257 B7
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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
		13	DD > cal range		X (A Co)
		14	All except DD dil		
		18, 20, 25, 29, 31	K > cal range		
		19, 21, 26, 30, 32	All except K dil		

Comments: _____

OVR.1SB

LDC #: 21257B)
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SVG
2nd Reviewer: CV

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	6/26/08	C (1st internal standard)	0.405	0.405	0.383	0.383	4.5	4.6
			S (2nd internal standard)	0.277	0.277	0.277	0.277	4.1	4.1
			EE (3rd internal standard)	0.447	0.447	0.429	0.420	5.0	5.0
2			BB (1st internal standard)	0.487	0.487	0.467	0.467	3.0	3.0
			(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 #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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

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

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

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

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	BB833	7/01/08	C (1st internal standard)	0.383	0.416	0.416	8.6	8.6
			S (2nd internal standard)	0.277	0.281	0.281	1.4	1.4
			EE (3rd internal standard)	0.420	0.446	0.446	6.2	6.2
			BB (4th internal standard)	0.467	0.486	0.486	5.2	5.2
2	BB877	7/02/08	C (1st internal standard)		0.393	0.393	2.6	2.6
			S (2nd internal standard)		0.277	0.277	0	0
			EE (3rd internal standard)		0.448	0.448	6.7	6.7
			BB (4th internal standard)		0.468	0.468	1.3	1.4
3	BB900	7/03/08	C (1st internal standard)		0.416	0.416	8.6	8.6
			S (2nd internal standard)		0.259	0.259	6.5	6.5
			EE (3rd internal standard)		0.418	0.418	0.5	0.5
			BB (4th internal standard)		0.458	0.458	0.9	0.9
4	BB996	7/09/08	C (1st internal standard)		0.410	0.410	7.0	7.0
			S (2nd internal standard)		0.271	0.271	2.2	2.2
			EE (3rd internal standard)		0.425	0.425	1.2	1.2
			BB (4th internal standard)		0.433	0.433	4.1	4.1

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

LDC #: 21254 B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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	B1023	7/10/08	C (1st internal standard)	0.383	0.393	0.393	2.6	2.6
			S (2nd internal standard)	0.277	0.281	0.281	1.4	1.6
			EE (3rd internal standard)	0.420	0.431	0.431	2.6	2.6
			BB (4th internal standard)	0.462	0.452	0.452	2.2	2.2
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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

LDC #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer:
2nd reviewer:

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Toluene-d8	50	54.50	109	109	0
Bromofluorobenzene		52.94	106	106	
1,2-Dichloroethane-d4					
Dibromofluoromethane	↓	48.71	97	97	↓

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 #: 21257 B7
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JV6
2nd Reviewer:

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 = | MSC - MSDC | * 2/(MSC + MSDC)

MSC = Matrix spike percent recovery; MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 36/37

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		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	50	50		63.0	61.0	126	126	122	122	3	3
Trichloroethene				52.0	52.0	104	104	104	104	0	0
Benzene				57.0	56.0	114	114	112	112	2	2
Toluene				55.0	54.0	110	110	108	108	2	2
Chlorobenzene				52.0	51.0	104	104	102	102	2	2

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

LDC #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

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

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: LCS1

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	NA	22.1	NA	111	111				
Trichloroethene			20.27		101	101				
Benzene			21.08		105	105				
Toluene			20.68		103	103				
Chlorobenzene			20.28		101	101				

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 #: 21257B1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVL
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. 14, DD:

Conc. = $\frac{(328153)(50)(\quad)}{(2655511)(0.83)(\quad)(\quad)}$

= 188.2

≈ 190 ng/L

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 25 through June 26, 2008

LDC Report Date: August 31, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844666

Sample Identification

SA87-0.5B
SA87-10B
SA87-20B
SA87-30B
SA87-25B
TB062508SB2
SA180-0.5B
SA180-0.5BD
SA180-10B
SA180-20B
SA180-30B
SA180-30BDL
SA57-0.5B
SA57-10B
SA57-20B
SA57-20BDL
SA57-30B
SA57-30BDL
TB062608SB2
SA57-10BD
SA87-10BMS
SA87-10BMSD
SA180-10BMS
SA180-10BMSD

Introduction

This data review covers 22 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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
3/17/08	tert-Butyl alcohol	0.044 (≥0.05)	TB062508SB2 SA180-30BDL SA57-20BDL SA57-30BDL TB062608SB2 METBLK4 MEDBLK4	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/1/08 (K8199)	Acetone	36.1	SA180-10B SA57-0.5B SA57-10B SA57-10BD SA180-10BMS SA180-10BMSD METBLK3	J+ (all detects)	A
7/8/08 (K8302)	Acetone tert-Butyl alcohol	25.9 28.9	SA87-20B METBLK5	J+ (all detects) J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/2/08 (K8232)	tert-Butyl alcohol	0.038 (≥0.05)	TB062508SB2 SA180-30BDL SA57-20BDL SA57-30BDL TB062608SB2 METBLK4 MEDBLK4	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
METBLK1	6/26/08	Acetone Chloroform	2.7 ug/Kg 0.41 ug/Kg	SA87-0.5B SA87-30B SA87-25B

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
METBLK2	6/30/08	Acetone	1.3 ug/Kg	SA87-10B SA180-0.5B SA180-0.5BD SA180-20B SA180-30B SA57-20B SA57-30B
METBLK3	7/1/08	Acetone	3.3 ug/Kg	SA180-10B SA57-0.5B SA57-10B SA57-10BD
METBLK4	7/2/08	Acetone	3.2 ug/L	TB062508SB2 TB062608SB2
METBLK5	7/8/08	Acetone	2.3 ug/Kg	SA87-20B

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
SA57-0.5B	Acetone	6.2 ug/Kg	6.2U ug/Kg
TB062508SB2	Acetone	1.6 ug/L	1.6U ug/L
TB062608SB2	Acetone	2.1 ug/L	2.1U ug/L

Samples TB062508SB2 and TB062608SB2 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
TB062508SB2	6/25/08	Acetone	1.6 ug/L	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB062608SB2	6/26/08	Acetone	2.1 ug/L	SA180-0.5B SA180-0.5BD SA180-10B SA180-20B SA180-30B SA180-30BDL SA57-0.5B SA57-10B SA57-20B SA57-20BDL SA57-30B SA57-30BDL SA57-10BD

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS1	Acetone	130 (75-125)	SA87-0.5B SA87-30B SA87-25B METBLK1	J+ (all detects)	P
LCS5	Acetone	134 (75-125)	SA87-20B METBLK5	J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA180-30B SA57-20B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
SA57-30B	Chlorobenzene Chloroform	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 R2844666	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
SA180-30B SA57-20B	Chloroform	X	A
SA180-30BDL SA57-20BDL	All TCL compounds except Chloroform	X	A
SA57-30B	Chlorobenzene Chloroform	X X	A
SA57-30BDL	All TCL compounds except Chlorobenzene Chloroform	X	A

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

XVI. Field Duplicates

Samples SA180-0.5B and SA180-0.5BD and samples SA57-10B and SA57-10BD were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA180-0.5B	SA180-0.5BD				
Acetone	11	9.2	-	1.8 (≤23.2)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA57-10B	SA57-10BD				
Acetone	17	40	-	23 (≤22.4)	J (all detects)	A
Chloroform	0.62	0.63	-	0.01 (≤5.6)	-	-
2-Butanone	11U	2.1	-	8.9 (≤11)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844666

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844666	TB062508SB2 SA180-30BDL SA57-20BDL SA57-30BDL TB062608SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844666	SA180-10B SA57-0.5B SA57-10B SA57-10BD	Acetone	J+ (all detects)	A	Continuing calibration (%D) (c)
R2844666	SA87-20B	Acetone tert-Butyl alcohol	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R2844666	TB062508SB2 SA180-30BDL SA57-20BDL SA57-30BDL TB062608SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844666	SA87-0.5B SA87-30B SA87-25B SA87-20B	Acetone	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844666	SA180-30B SA57-20B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R2844666	SA57-30B	Chlorobenzene Chloroform	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R2844666	SA87-0.5B SA87-10B SA87-20B SA87-30B SA87-25B TB062508SB2 SA180-0.5B SA180-0.5BD SA180-10B SA180-20B SA180-30B SA180-30BDL SA57-0.5B SA57-10B SA57-20B SA57-20BDL SA57-30B SA57-30BDL TB062608SB2 SA57-10BD	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844666	SA180-30B SA57-20B	Chloroform	X	A	Overall assessment of data (o)
R2844666	SA180-30BDL SA57-20BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R2844666	SA57-30B	Chlorobenzene Chloroform	X X	A	Overall assessment of data (o)
R2844666	SA57-30BDL	All TCL compounds except Chlorobenzene Chloroform	X	A	Overall assessment of data (o)
R2844666	SA57-10B SA57-10BD	Acetone	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844666

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844666	SA57-0.5B	Acetone	6.2U ug/Kg	A	bl
R2844666	TB062508SB2	Acetone	1.6U ug/L	A	bl
R2844666	TB062608SB2	Acetone	2.1U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844666

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257C1
SDG #: R2844666
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/25-26/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r²
IV.	Continuing calibration ~~ICV~~	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	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 = 7, 8 D_2 = 14, 20
XVII.	Field blanks	SW	TB = 6, 19

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	SA87-05B	S	11	2	SA180-30B	S	21	2	SA87-10BMS	S	31	1	MET BLK1	(6/26)
2	2	SA87-10B		12	5	SA180-30BDL		22	2	SA87-10BMSD		32	2	MET BLK2	(6/30)
3	6	SA87-20B		13	3	SA57-0.5B		23	3	SA180-10BMS		33	3	MET BLK3	(7/01)
4	1	SA87-30B		14	3	SA57-10B	D_2	24	3	SA180-10BMSD		34	4	MET BLK4	(7/02)
5	1	SA87-25B		15	2	SA57-20B		25				35	5	MEDBLK4	(7/02)
6	4	TB062508SB2	W	16	5	SA57-20BDL		26				36	6	MET BLK5	
7	2	SA180-0.5B	D_1 S	17	2	SA57-30B		27				37			
8	2	SA180-0.5BD	D_1	18	5	SA57-30BDL		28				38			
9	3	SA180-10B		19	4	TB062608SB2	W	29				39			
10	2	SA180-20B		20	3	SA57-10BD	D_2 S	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	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 #: 21257C1
SDG #: Sa Cmv

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/17/08	ICAL-MS5	222		0.044	6, 12, 16, 18, 19, METBLK4, MEDBLK4	J/NJ/A (cc)

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer:

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/01/08	K8199	F (+)	36.1		9, 13, 14, 20, METBLK 3, 23+24	J+ dets/A (C)
	7/02/08	K8232	ZZ		0.038	6, 12, 16, 18, 19, METBLK 4, MEDBLK 4	J/UJ/A (C)
	7/08/08	K8302	F (+)	25.9		3, METBLK 5	J+ dets/A (C)
			ZZ (+)	28.9			

LDC #: 21257 C1
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: 6/26/08
Conc. units: ug/kg
Associated Samples: 1, 4, 5

Compound	Blank ID	Sample Identification								
	METBLK1	1	4	5						
Methylene chloride F	2.7	(6.5)	(7.6)	(14)						
Acetone K	0.41		(50)	(15)						
CRQL										

5.4
0.82

Blank analysis date: 6/30/08
Conc. units: ug/kg
Associated Samples: 2, 7, 8, 10, 11, 15, 17

Compound	Blank ID	Sample Identification								
	METBLK2	2	7	8	10	11	15	17		
Methylene chloride F	1.3	(26)	(11)	(9.2)	(8.4)	(24)	(27)	(28)		
Acetone										
CRQL										

2.6

LDC #: 21257 C1
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: 7/01/08
Conc. units: ug/Kg
Associated Samples: 9 13,14, 20 (bl)

Compound	Blank ID	Sample Identification								
	MET Blk 3	9	13	14	20					
6.6 ~~Methylene chloride~~ F	3.3	(16)	6.2/U	(17)	(40)					
Acetone										
CRQL										

Blank analysis date: 7/02/08
Conc. units: ~~ug/Kg~~ ug/L
Associated Samples: 6, 19 (CAN water) (bl)

Compound	Blank ID	Sample Identification								
	MET Blk 4	6	19							
~~Methylene chloride~~ F	3.2	1.6/U	2.1/U							
Acetone										
CRQL										

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

Blank analysis date: 7/08/08
Conc. units: ug/kg Associated Samples: 3

Compound	Blank ID	Sample Identification								
	MET BLK 5	3								
~~Methylene chloride~~ F	2.3	(13)								
Acetone										
CRQL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-5

Compound	Blank ID 6	Blank ID	Sample Identification							
	6/25/08		1	2	3	4	5			
3.2 Methylene chloride F	1.6		6.5	26	13	7.6	14			
Acetone										
Chloroform										
CRQL										

Blank units: ug/L **Associated sample units:** ug/kg
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 7 – 18, 20

Compound	Blank ID 19	Blank ID	Sample Identification									
	6/26/08	7	8	9	10	11	13	14	15	17	20	
4.2 Methylene chloride F	2.1	11	9.2	16	8.4	24	6.2	17	27	28	40	
Acetone												
Chloroform												
CRQL												

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

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JV6
2nd Reviewer: CV

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		21/22	CCC	( )	69 (70-130)	( )	2	No qual (MS in)
			~~EEE~~	( )	( )	32 (30)		(MS/MSD in)
			III	( )	61 ( )	38 ( )		(MS in)
			ZZ	( )	( )	31 ( )		(MS/MSD in)
			BBB	( )	69 ( )	32 ( )		(MS in)
			T	( )	69 ( )	( )		
			JJJ	( )	66 ( )	32 ( )		
			HHH	( )	64 ( )	32 ( )		
			~~FFF~~	( )	64 ( )	( )		
			W	( )	69 ( )	( )		
			LL	67 (70-130)	44 ( )	41 ( )		(LCS in)
			GGG	( )	64 ( )	33 ( )		(MS in)
			YY	( )	69 ( )	( )		
			CC	( )	69 ( )	( )		
			KKK	( )	60 ( )	( )		
			NNN	( )	58 ( )	( )		
				( )	( )	( )		
		23/24	F	( )	151 (50-15)	( )	9	No qual (MS in)

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

LDC #: 21257C1
SDG #: See Cov

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
		LCS 1	F	130 (75-125)	( )	( )	1, 4, 5, METBLK1	J+ dets/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		LCS 3	F	130 ( )	( )	( )	9, 13, 14, 20, METBLK3	N. qual (MS in)
			MM	70 ( )	( )	( )		(MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
		LCS 5	F	134 ( )	( )	( )	3, METBLK5	J+ dets/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Page: 1 of 1
Reviewer: 9V6
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
		11, 15	K > cal range		J dets /A (e)
		17	DD, K > cal range		

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JG
2nd Reviewer: [signature]

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		11, 15	K > cal range		X / A (c)
		12, 16	All except K dil		
		17	DD, K > cal range		
		18	All except above dil		✓ ✓

Comments: _____

LDC #: 21257C1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		RPD
	7	8	
F	11	9.2	1.8 (≤ 23.2 Diff) -

Compound	Concentration (ug/kg)		Diff ~~RPD~~
	14	20	
F	17	40	23 (≤ 22.4) J det, A (all)
K	0.62	0.63	0.01 (≤ 5.6) -
~~B~~ M	11 U	2.1	8.9 (≤ 11) -

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 29 through June 30, 2008

LDC Report Date: September 1, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844768

Sample Identification

M-79B
M-126B
M-84B
M-14ADBF
M-14ABF
TB062908GW4
TB062908GW1
TB062803
TB063008GW3

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/8/08	tert-Butyl alcohol	0.012 (≥0.05)	All samples in SDG R2844768	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/10/08 (Z2763)	tert-Butyl alcohol	0.014 (≥0.05)	All samples in SDG R2844768	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 TB062908GW4, TB062908GW1, TB062803, and TB063008GW3 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
TB062908GW1	6/29/08	Acetone	2.2 ug/L	M-126B
TB063008GW3	6/30/08	Acetone Methylene chloride	1.4 ug/L 0.23 ug/L	M-14ADBF M-14ABF

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Acetone 2-Butanone tert-Butyl alcohol Ethyl-tert-butyl ether 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene m,p-Xylenes	16 ug/L 2.5 ug/L 4.1 ug/L 0.29 ug/L 2.2 ug/L 0.35 ug/L 0.25 ug/L 1.8 ug/L 0.26 ug/L	M-79B M-126B M-84B M-14ADBF M-14ABF

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No volatile contaminants were found in these blanks with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	1,2-Dichloroethane Ethylbenzene Styrene Toluene m,p-Xylenes o-Xylene	0.24 ug/L 0.22 ug/L 0.25 ug/L 5.4 ug/L 0.49 ug/L 0.24 ug/L	M-79B M-126B M-84B M-14ADBF M-14ABF

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-79B	1,4-Dichlorobenzene Methylene chloride	1.0 ug/L 0.31 ug/L	1.0U ug/L 0.31U ug/L
M-84B	1,4-Dichlorobenzene Methylene chloride	0.28 ug/L 0.25 ug/L	0.28U ug/L 0.25U ug/L
M-14ADBF	1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride	0.64 ug/L 0.20 ug/L 0.24 ug/L	0.64U ug/L 0.20U ug/L 0.24U ug/L
M-14ABF	1,4-Dichlorobenzene Methylene chloride	0.58 ug/L 0.25 ug/L	0.58U ug/L 0.25U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS1	Acetone Chloroethane 1,2-Dibromoethane 1,1-Dichloroethene Methylene chloride Trichlorofluoromethane	66 (75-125) 71 (75-125) 74 (75-125) 72 (75-125) 74 (75-125) 61 (75-125)	All samples in SDG R2844768	J- (all detects) UJ (all non-detects)	P
LCS1	Dichlorodifluoromethane	131 (75-125)	All samples in SDG R2844768	J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All 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 R2844768	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

Samples M-14ADBF and M-14ABF were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ADBF	M-14ABF				
Bromodichloromethane	0.32	0.39	-	0.07 (≤1.0)	-	-
Carbon tetrachloride	1.2	1.4	-	0.2 (≤1.0)	-	-
Chloroform	150	150	0 (≤30)	-	-	-
Chloromethane	0.58	2.0U	-	1.42 (≤1.0)	-	-
1,4-Dichlorobenzene	0.64	0.58	-	0.06 (≤2.0)	-	-
1,2-Dichloroethane	0.20	1.0U	-	0.8 (≤1.0)	-	-
Methylene chloride	0.24	0.25	-	0.01 (≤2.0)	-	-
Tetrachloroethene	0.24	0.29	-	0.05 (≤1.0)	-	-
Trichloroethene	0.90	0.92	-	0.02 (≤1.0)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844768

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF TB062908GW4 TB062908GW1 TB062803 TB063008GW3	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF TB062908GW4 TB062908GW1 TB062803 TB063008GW3	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF TB062908GW4 TB062908GW1 TB062803 TB063008GW3	Acetone Chloroethane 1,2-Dibromoethane 1,1-Dichloroethene Methylene chloride Trichlorofluoromethane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF TB062908GW4 TB062908GW1 TB062803 TB063008GW3	Dichlorodifluoromethane	J+ (all detects)	A	Laboratory control samples (%R) (l)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF TB062908GW4 TB062908GW1 TB062803 TB063008GW3	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844768

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844768

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844768	M-79B	1,4-Dichlorobenzene Methylene chloride	1.0U ug/L 0.31U ug/L	A	bf
R2844768	M-84B	1,4-Dichlorobenzene Methylene chloride	0.28U ug/L 0.25U ug/L	A	bf
R2844768	M-14ADBF	1,4-Dichlorobenzene Methylene chloride	0.64U ug/L 0.24U ug/L	A	bf
R2844768	M-14ADBF	1,2-Dichloroethane	0.20U ug/L	A	bf,bp
R2844768	M-14ABF	1,4-Dichlorobenzene Methylene chloride	0.58U ug/L 0.25U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257D1
SDG #: R2844768
Laboratory: Columbia Analytical Services

Date: 8/12/09
Page: 1 of 1
Reviewer: JDG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/29 - 30/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	%RSD
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	SW	TB = *6, 7, 8* 9 PB = PB061608B FB = FB062408GWAREA1 (from R2844538)

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

Validated Samples: Water

1	M-79B	11	VBlk1	21		31	
2	M-126B	12		22		32	
3	M84B	13		23		33	
4	M14ADBF D	14		24		34	
5	M-14ABF D	15		25		35	
6	TB062908GW4	16		26		36	
7	TB062908GW1	17		27		37	
8	TB062803	18		28		38	
9	TB063008GW3	19		29		39	
10		20		30		40	

(no ICV ; no R)

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 #: 21257D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial 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 — 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
	7/08/08	ICAL	ZZZ		0.012	All + Blk	J/UJ/A (C)

LDC #: 21259D1
SDG #: Sa 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
	7/10/08	Z2763	ZZZ		0.014	All + Blk	J/NJ/A (c)

CONCAL.1SB

LDC #: 21257D1
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/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 2 (ND)

Compound	Blank ID 7	Blank ID	Sample Identification							
Sampling Date	6/29/08									
F	2.2									
CRQL										

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

Compound	Blank ID 9	Blank ID	Sample Identification							
Sampling Date	6/30/08									
F	1.4									
E	0.23									
CRQL										

LDC #: 21257D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer: [signature]

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

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

Blank units: ug/L **Associated ~~sample~~ units:** ug/L (64)

Field blank type: (circle one) (Field Blank) / Rinsate / Trip Blank / Other: Associated Samples: 1-5

Compound	FB062408GW AREA1 Blank ID	Blank ID	Sample Identification							
Sampling Date	6/24/08		1	2	3	4	5			
F	16									
M	2.5									
ZZZ	4.1									
AAAA	0.29									
HHH	2.2		1.0/U	(680)	0.28/U	0.64/U	0.58/U			
L	0.35					0.20/U	~~0.2~~			
E	0.25		0.31/U	(19)	0.25/U	0.24/U	0.25/U			
CC	1.8									
RRR	0.26									

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 #: 21257 D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1-5 (bp)

Compound	PB061608B Blank ID	Blank ID	Sample Identification							
Sampling Date	6/16/08		4							
~~Methylene chloride~~ L	0.24		0.20/U							
~~Acetone~~ EE	0.22									
~~Chloroform~~ FF	0.25									
CC	5.4									
RRR	0.49									
SSS	0.24									
CRQL										

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

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

Compound	Blank ID	Blank ID	Sample Identification							
Sampling Date										
Methylene chloride										
Acetone										
Chloroform										
CRQL										

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

LDC #: 21257D1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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
		LCS1	F	66 (75-125)	( )	( )	All + Blk	J-/UJ/P (L)
			D	71 ( )	( )	( )		
			II	74 ( )	( )	( )		
			JJ	131 ( )	( )	( )		J+ dets/P
			H	72 ( )	( )	( )		J-/UJ/P
			E	74 ( )	( )	( )		
			KK	61 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC#: 21257D1
SDG#: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: SVG
2nd Reviewer: V

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

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/L)		RPD (≤30%)	Diff	Quals (Parent Only)
	4	5			
Bromodichloromethane	0.32	0.39		0.07 (≤1.0)	
Carbon Tetrachloride	1.2	1.4		0.2 ↓	
Chloroform	150	150	0	—	
Chloromethane	0.58	2.0U		1.42 (≤2.0)	
1,4-Dichlorobenzene	0.64	0.58		0.06 ↓	
1,2-Dichloroethane	0.20	1.0U		0.8 (≤1.0)	
Methylene chloride	0.24	0.25		0.01 (≤2.0)	
Tetrachloroethene	0.24	0.29		0.05 (≤1.0)	
Trichloroethene	0.90	0.92		0.02 ↓	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: June 30 through July 2, 2008

LDC Report Date: September 18, 2009

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844797

Sample Identification

SA207-0.5B
SA207-0.5BDL
SA207-10B
SA207-10BDL
SA207-20B
SA207-30B
SA207-40B
SA181-0.5B
SA181-10B
SA181-20B
SA181-30B
SA181-30BDL
SA181-35B
SA207-30BMS
SA207-30BMSD

Introduction

This data review covers 15 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
3/17/08	tert-Butyl alcohol	0.044 (≥0.05)	SA207-0.5BDL SA207-10BDL SA181-30BDL MB7/09/08	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/7/08 (K8281)	Acetone tert-Butyl alcohol	29.3 26.0	SA207-0.5B SA207-10B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B SA207-30BMS SA207-30BMSD MB7/07/08	J+ (all detects) J+ (all detects)	A
7/8/08 (K8302)	Acetone tert-Butyl alcohol	25.9 28.5	SA207-20B MB7/08/08	J+ (all detects) J+ (all detects)	A
7/9/08 (K8312)	1,2,4-Trichlorobenzene	26.88	SA207-0.5BDL SA207-10BDL SA181-30BDL MB7/09/08	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
MB7/07/08	7/7/08	Acetone	2.2 ug/Kg	SA207-0.5B SA207-10B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B
MB7/08/08	7/8/08	Acetone	2.3 ug/Kg	SA207-20B

Sample concentrations were compared to concentrations detected in the method blanks as required by the QAPP. No sample data was qualified.
*Removed Method blank finding for sample SA181-35B.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
SA207-0.5B	Bromofluorobenzene	50 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
SA207-10B	Bromofluorobenzene	56 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS 7/08/08	Acetone	134 (75-125)	SA207-20B MB7/08/08	J+ (all detects)	P
LCS 7/09/08	1,2,3-Trichlorobenzene	74 (75-125)	SA207-0.5BDL SA207-10BDL SA181-30BDL MB7/09/09	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
SA207-0.5B	1,4-Dichlorobenzene-d4	88884 (122434-489736)	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
SA207-10B	1,4-Dichlorobenzene-d4	103240 (122434-489736)	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

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA207-0.5B	Acetone 2-Butanone	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
SA207-10B	Acetone	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
SA181-30B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844797	All compounds reported below the PQL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
SA207-0.5B SA207-10B	Acetone	X	A
SA207-0.5BDL SA207-10BDL	All TCL compounds except Acetone	X	A
SA181-30B	Chloroform	X	A

Sample	Compound	Flag	A or P
SA181-30BDL	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, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844797

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844797	SA207-0.5BDL SA207-10BDL SA181-30BDL	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844797	SA207-0.5B SA207-10B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B SA207-20B	Acetone tert-Butyl alcohol	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R2844797	SA207-0.5BDL SA207-10BDL SA181-30BDL	1,2,4-Trichlorobenzene	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R2844797	SA207-0.5B SA207-10B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
R2844797	SA207-20B	Acetone	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844797	SA207-0.5BDL SA207-10BDL SA181-30BDL	1,2,3-Trichlorobenzene	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844797	SA207-0.5B SA207-10B	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)
R2844797	SA207-0.5B	Acetone 2-Butanone	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R2844797	SA207-10B	Acetone	J (all detects)	A	Project Quantitation Limit (e)
R2844797	SA181-30B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R2844797	SA207-0.5B SA207-0.5BDL SA207-10B SA207-10BDL SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-30BDL SA181-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844797	SA207-0.5B SA207-10B	Acetone	X	A	Overall assessment of data (o)
R2844797	SA207-0.5BDL SA207-10BDL	All TCL compounds except Acetone	X	A	Overall assessment of data (o)
R2844797	SA181-30B	Chloroform	X	A	Overall assessment of data (o)
R2844797	SA181-30BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

***Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada**
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844797

*No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844797

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257E1
SDG #: R2844797
Laboratory: Columbia Analytical Services

Date: 8/11/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/30- 7/02/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r^2
IV.	Continuing calibration ~~rev~~	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	A	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	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	1	SA207-0.5B	11	1	SA181-30B	+ 21 1	MB 7/07/08	31	
2	3	SA207-0.5BDL	12	3	SA181-30BDL	+ 22 2	7/08/08	32	
3	1	SA207-10B	13	1	SA181-35B	− 23 3	7/09/08	33	
4	3	SA207-10BDL	14	1	SA207-30BMS	24		34	
5	2	SA207-20B	15	1	SA207-30BMSD	25		35	
6	1	SA207-30B	16			26		36	
7	1	SA207-40B	17			27		37	
8	1	SA181-0.5B	18			28		38	
9	1	SA181-10B	19			29		39	
10	1	SA181-20B	20			30		40	

(no ICV)

LDC #: 21257 E1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: [illegible]

Method: Volatiles (EPA SW 846 Method 8260B)

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

LDC #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: 9

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 #: 21231 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	3/17/08	ICAL	ZZZ		0.044	2, 4, 12, MB7/09/08	J/UJ/A (C)

LDC #: 21257E1
SDG #: See Cover

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/07/08	K8281	F (+)	29.3		1, 3, 6-11, 13-15,	J+ (all TCL) /A (C)
			ZZZ (+)	26.0		MB 7/07/08	
	7/08/08	K8302	F (+)	25.9		5, MB 7/08/08	
			ZZZ (+)	28.5		↓	✓
	7/09/08	K8312	KKK (-)	26.88		2, 4, 12, MB 7/09/08	J-/UJ/A

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 7/07/08
Conc. units: ug/kg

Associated Samples: 1, 3, 6-11, 13 (61)

Compound	Blank ID	Sample Identification								
	MB 7/07/08	1	3	6 (1.57%)	7	8	9	10	11	13
(2X) 4.4 Methylene chloride F	2.2	(3700)	(1500)	(7.4)	(16)	(15)	(5.6)	(11)	(14)	(99) EJ
Acetone										
CROI										

Blank analysis date: 7/08/08
Conc. units: ug/kg

Associated Samples: 5

Compound	Blank ID	Sample Identification								
	MB 7/08/08	5								
(2X) 4.6 Methylene chloride F	2.3	(6.7)								
Acetone										
CROI										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JV6
2nd Reviewer: Q

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

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

Y (N) N/A Were 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
		1	BFB	50 (70-130)	J-/UJ/A (S)
				( )	
		3	↓	56 (↓)	↓ ↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	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

SDG #: Su Cerro

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JV6
2nd Reviewer: 9

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

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

(Y) N N/A Were 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	M	( )	( )	31 (30)	6	No final (MS, MSD NC
			K	145 (70-130)	139 (70-130)	( )		~~No final J dets/A~~ (m) (v)
			I	( )	131 ( )	( )		J + dets/A (m)
			Z	18 ( )	20 ( )	( )		No final (MS) (m)
			KKK	59 ( )	66 ( )	( )		J-/UJ/A
			NNN	61 ( )	64 ( )	( )		
			N	133 (✓)	132 (✓)	( )	✓	J + dets/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 21200 / E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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	No Qual (MS/MSD) Qualifications
		LCS 7/07/08	F	139 (75-125)	( )	( )	1, 3, 6-11, 13-15,	~~J+ (all sds) (p)~~
			JJ	130 ( )	( )	( )	MB 7/07/08	
				( )	( )	( )		
				( )	( )	( )		
		LCS 7/08/08	F	134 ( )	( )	( )	5, MB 7/08/08	J+ (all sds) (p, l)
				( )	( )	( )		
				( )	( )	( )		
		LCS 7/09/08	NNN	74 (✓)	( )	( )	2, 4, 12, MB 7/09/08	J- (all sds) (p)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

SDG #: Cu Cont'v

Internal Standards

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 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
		1	4 DCB	88884 (122 434 - 489 736)		J/UJ/A (i)
		3		103 240		
						EPI case see highlighted (cpds in target compound WS

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

LDC #: 21237E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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	F, M > Cal	range	J (all detects) (e)
		3	F		
		11	K		

Comments: See sample calculation verification worksheet for recalculations

LDC #: [illegible]
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 3	F > cal range		X /A (0)
		2, 4	All except ≠ dil		(0)
		11	k > cal range		(0)
		12	All except k dil		(0)

Comments: (Min # 2 = ND, reported from 1)

OVR.1SB

LDC #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [illegible]

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	3/14/08	C (1st internal standard)	0646	0.646	0.662	0.662	8.3	8.3
			CC (2nd internal standard)	1.519	1.519	1.609	1.609	5.2	5.2
	MJ134		EE (3rd internal standard)	1.888	1.888	1.925	1.924	7.2	7.2
2			BB (1st internal standard)	1.199	1.199	1.199	1.199	9.1	9.1
			(2nd internal standard)						
			(3rd internal standard)						
3	ICAL	3/17/08	C (1st internal standard)	0.615	0.615	0.543	0.543	12.5	12.5
			CC (2nd internal standard)	1.423	1.423	1.381	1.381	3.4	3.4
	MJ118		EE (3rd internal standard)	1.659	1.659	1.558	1.558	8.9	8.9
4			BB (1st internal standard)	1.256	1.256	1.259	1.259	8.3	8.3
			(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 #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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	K8281	7/07/08	C (1st internal standard)	0.662	0.733	0.733	10.6	10.7
			CC (2nd internal standard)	1.609	1.599	1.599	0.7	0.6
			EE (3rd internal standard)	1.925	2.031	2.031	5.5	5.5
			BB (4th internal standard)	1.199	1.247	1.247	4.0	4.0
2	K8302	7/08/08	C (1st internal standard)	0.662	0.731	0.731	10.4	10.4
			CC (2nd internal standard)	1.609	1.599	1.599	0.6	0.6
			EE (3rd internal standard)	1.925	1.899	1.899	1.3	1.3
			BB (4th internal standard)	1.199	1.261	1.261	5.1	5.2
3	K8312	7/09/08	C (1st internal standard)	0.543	0.583	0.583	7.3	7.3
			CC (2nd internal standard)	1.381	1.286	1.286	6.9	6.9
			EE (3rd internal standard)	1.558	1.356	1.356	12.9	12.9
			BB (4th internal standard)	1.259	1.105	1.105	12.3	12.3
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

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

LDC #: 21257 E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer:
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	42.33	85	85	0
Bromofluorobenzene		25.05	50	50	
1,2-Dichloroethane-d4					
Dibromofluoromethane		45.15	90	90	

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 #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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 = | MSC - MSDC | * 2/(MSC + MSDC) MSC = Matrix spike percent recovery; MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 14/15

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	73.8	85.0	0	85.0	96.7	115	115	113	113	12	12
Trichloroethene				~~72.7~~	82.8	98	98	97	97	13	13
Benzene				69.4	78.3	94	94	92	92	12	12
Toluene				69.4	80.5	94	94	95	95	15	15
Chlorobenzene	↓	↓	↓	69.4	81.7	94	94	96	96	16	16

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 #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

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

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: LCS 7/07/08

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		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	21.11	NA	106	106				
Trichloroethene			19.60		98	98				
Benzene			19.54		98	98				
Toluene			19.14		96	96				
Chlorobenzene			20.96		105	105				

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 #: 21257E1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JM
2nd reviewer: V

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, CC:

Conc. = $\frac{(1308740)(50)(1.61)}{(686194)(1.609)(0.784)(\quad)}$

= 121.7

≥ 120 ug/kg

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

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 1 through July 2, 2008

LDC Report Date: September 1, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844803

Sample Identification

M-55B
M-55DB
M-78B
M-78BDL
TB070108GW2
M-65B
EB070208GW1
TB070208GW1
M-78BMS
M-78BMSD

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	All samples in SDG R2844803	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/15/08 (B1111)	2-Hexanone	26.4	M-78BDL METBLK2	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/14/08 (B1085)	tert-Butyl alcohol	0.019 (≥0.05)	M-55B M-55DB M-78B TB070108GW2 M-65B EB070208GW1 TB070208GW1 M-78BMS M-78BMSD METBLK1	J (all detects) UJ (all non-detects)	A
7/15/08 (B1111)	tert-Butyl alcohol	0.019 (≥0.05)	M-78BDL METBLK2	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
METBLK1	7/14/08	tert-Butyl alcohol	2.0 ug/L	M-55B M-55DB M-78B TB070108GW2 M-65B EB070208GW1 TB070208GW1

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
M-55B (5X)	tert-Butyl alcohol	15 ug/L	15U ug/L
M-55DB (5X)	tert-Butyl alcohol	9.3 ug/L	9.3U ug/L
M-78B (2.5X)	tert-Butyl alcohol	6.8 ug/L	6.8U ug/L
TB070108GW2	tert-Butyl alcohol	2.5 ug/L	2.5U ug/L
M-65B (10X)	tert-Butyl alcohol	27 ug/L	27U ug/L
TB070208GW1	tert-Butyl alcohol	1.7 ug/L	1.7U ug/L

Samples TB070108GW2 and TB070208GW1 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
TB070108GW2	7/1/08	Acetone tert-Butyl alcohol	2.3 ug/L 2.5 ug/L	M-55B M-55DB M-78B M-78BDL
TB070208GW1	7/2/08	Acetone tert-Butyl alcohol	1.5 ug/L 1.7 ug/L	M-65B

Sample EB070208GW1 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
EB070208GW1	7/2/08	Acetone 2-Butanone tert-Butyl alcohol Chloromethane 1,4-Dichlorobenzene	14 ug/L 1.9 ug/L 4.7 ug/L 1.4 ug/L 12 ug/L	M-65B

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Acetone 2-Butanone tert-Butyl alcohol Ethyl-tert-butyl ether 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene m,p-Xylenes	16 ug/L 2.5 ug/L 4.1 ug/L 0.29 ug/L 2.2 ug/L 0.35 ug/L 0.25 ug/L 1.8 ug/L 0.26 ug/L	M-55B M-55DB M-78B M-78BDL M-65B

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No volatile contaminants were found in these blanks with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	1,2-Dichloroethane Ethylbenzene Styrene Toluene m,p-Xylenes o-Xylene	0.24 ug/L 0.22 ug/L 0.25 ug/L 5.4 ug/L 0.49 ug/L 0.24 ug/L	M-55B M-55DB M-78B M-78BDL

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-55B	Acetone 1,4-Dichlorobenzene	8.8 ug/L 1.2 ug/L	8.8U ug/L 1.2U ug/L
M-55DB	Acetone 1,4-Dichlorobenzene	7.4 ug/L 1.2 ug/L	7.4U ug/L 1.2U ug/L
M-78B	Acetone 1,4-Dichlorobenzene	3.8 ug/L 1.1 ug/L	3.8U ug/L 1.1U ug/L
M-78BDL	Acetone 1,4-Dichlorobenzene	6.6 ug/L 1.3 ug/L	6.6U ug/L 1.3U ug/L
M-65B	Acetone	19 ug/L	19U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
M-78B	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 R2844803	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
M-78B	Chloroform	X	A
M-78BDL	All TCL compounds except Chloroform	X	A

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

XVI. Field Duplicates

Samples M-55B and M-55DB were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55B	M-55DB				
Acetone	8.8	7.4	-	1.4 (≤100)	-	-
Bromoform	8.8	10	13 (≤30)	-	-	-
tert-Butyl alcohol	15	9.3	-	5.7 (≤500)	-	-
Carbon Tetrachloride	1.7	1.9	-	0.2 (≤5.0)	-	-
Chloroform	670	650	3 (≤30)	-	-	-
1,4-Dichlorobenzene	1.2	1.2	-	0 (≤10)	-	-
Trichloroethene	8.8	8.6	2 (≤30)	-	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844803

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844803	M-55B M-55DB M-78B M-78BDL TB070108GW2 M-65B EB070208GW1 TB070208GW1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844803	M-78BDL	2-Hexanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)
R2844803	M-55B M-55DB M-78B M-78BDL TB070108GW2 M-65B EB070208GW1 TB070208GW1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844803	M-78B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R2844803	M-55B M-55DB M-78B M-78BDL TB070108GW2 M-65B EB070208GW1 TB070208GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844803	M-78B	Chloroform	X	A	Overall assessment of data (o)
R2844803	M-78BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844803

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844803	M-55B (5X)	tert-Butyl alcohol	15U ug/L	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844803	M-55DB (5X)	tert-Butyl alcohol	9.3U ug/L	A	bl
R2844803	M-78B (2.5X)	tert-Butyl alcohol	6.8U ug/L	A	bl
R2844803	TB070108GW2	tert-Butyl alcohol	2.5U ug/L	A	bl
R2844803	M-65B (10X)	tert-Butyl alcohol	27U ug/L	A	bl
R2844803	TB070208GW1	tert-Butyl alcohol	1.7U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844803

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844803	M-55B	Acetone 1,4-Dichlorobenzene	8.8U ug/L 1.2U ug/L	A	bf
R2844803	M-55DB	Acetone 1,4-Dichlorobenzene	7.4U ug/L 1.2U ug/L	A	bf
R2844803	M-78B	Acetone	3.8U ug/L	A	bt,bf
R2844803	M-78B	1,4-Dichlorobenzene	1.1U ug/L	A	bt
R2844803	M-78BDL	Acetone 1,4-Dichlorobenzene	6.6U ug/L 1.3U ug/L	A	bf
R2844803	M-65B	Acetone	19U ug/L	A	bt,be,bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257F1
SDG #: R2844803
Laboratory: Columbia Analytical Services

Date: 8/18/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/01-02/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD r²
IV.	Continuing calibration/~~ver~~	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, 2
XVII.	Field blanks	SW	TB = 5 8 EB = 7 PB = PBQ61608B FB = FBQ62408GWAREA1 (from R2844650) (from R2844538)

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-55B D	+ 11	METBLK1	21		31	
2	M-55DB D	- 12	METBLK2	22		32	
3	M-78B	13		23		33	
4	M-78BDL	14		24		34	
5	TB070108GW2	15		25		35	
6	M65B	16		26		36	
7	EB070208GW1	17		27		37	
8	TB070208GW1	18		28		38	
9	M-78BMS	19		29		39	
10	M-78BMSD	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	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 #: 21257 #1
SDG #: Sa Coral

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: d

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/26/08	ICAL	ZZZ		0.021	All + Blks	J/UJ/A (C)

LDC #: 31257 #1
SDG #: Su Coor

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/14/08	B1085	ZZZ		0.019	1-3, 5-10, METBLK1	J/NJ/A (C)
	7/15/08	B111	ZZZ		0.019	4, METBLK2	J/NJ/A (C)
			2 (-)	26.4		↓	J/NJ/A ↓

CONCAL.1SB

LDC #: 21257F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 7/14/08
Conc. units: ug/L
Associated Samples: 1-3, 5-8 (bl)

Compound	Blank ID	Sample Identification								
	MET BLK1	1 (5x)	2 (5x)	3 (2.5x)	5	6 (10x)	7	8		
4.0 ~~Methylene chloride~~ ZZZ	2.0	15/U	9.3/U	6.8/U	2.5/U	27/U	(4.7)	1.7/U		
Acetone										
CRQL										

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

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21257 F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1-4 (NO PB hits in samples)

Compound	PB061608B Blank ID	TB Blank ID 5	Sample Identification							
Sampling Date	6/16/08	7/01/08	1	2	3	4				
~~Methylene chloride~~ L	0.24									
~~Acetone~~ EE	0.22									
~~Chloroform~~ FF	0.25									
CC	5.4									
RRR	0.49									
SSS	0.24									
F		2.3	(8.8)	(7.4)	3.8/U	(6.6)				
5.0 CRQL ZZZ		2.5	(15)	(9.3)	(6.8)	(13)				

4.6

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

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

Compound	EB Blank ID 7	TB Blank ID 8	Sample Identification							
Sampling Date	7/07/08		6							
~~Methylene chloride~~ F	14	1.5	19/U							
~~Acetone~~ M	1.9									
~~Chloroform~~ ZZZ	4.7	1.7	(27)							
A	1.4									
HHH	12									
CRQL										

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

LDC #: 21257 F1
SDG #: Sq Cmrv

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?

(bf)

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

Field blank type: (circle one) (Field Blank) / Rinsate / Trip Blank / Other:_____ Associated Samples: 1-4, 6

Compound	FB062408GW AREA1 Blank ID	Blank ID	Sample Identification							
Sampling Date	6/24/08		1	2	3	4	6			
32 F	16		8.8/U	7.4/U	3.8/U	6.6/U	19/U			
M	2.5									
8.Y ZZZ	4.1		(15)	(9.3)	~~6.8~~ 6.8/U	(13)	(27)			
AAAA	0.29									
HHH	2.2		1.2/U	1.2/U	1.1/U	1.3/U				
L	0.35									
E	0.25									
CC	1.8									
RRR	0.26									

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 #: 21257F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		9/10	JJ	136 (70-130)	( )	( )	3, 4	No qual (MSD in)
			FF	17 (↓)	14 (70-130)	( )	↓	↓ (LCS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

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

LDC #: 21257F1
SDG #: Sa 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
		LCS 1	JJ	135 (75-135)	( )	( )	All + Blk	No qual (MSD in)
			Z	65 ( )	( )	( )		(MS/MSD in)
			Y	74 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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

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

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

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257F1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		3	K > cal range		X / A (o)
		4	All except K dil		

Comments: _____

LDC#: 21257F1
SDG#: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JW
2nd Reviewer:

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

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/L)		RPD (≤30%)	Diff	Quals (Parent Only)
	1	2			
Acetone	8.8	7.4		1.4 (≤100)	
Bromoform	8.8	10	13	—	
tert-Butyl alcohol	15	9.3		5.7 (≤500)	
Carbon Tetrachloride	1.7	1.9		0.2 (≤5.0)	
Chloroform	670	650	3	—	
1,4-Dichlorobenzene	1.2	1.2		0 (≤10)	
Trichloroethene	8.8	8.6	2	—	

V:\FIELD DUPLICATES\21257F1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 7 through July 8, 2008

LDC Report Date: August 24, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844862

Sample Identification

SA47-0.5B
SA47-10B
SA47-20B
SA47-30B
SA47-35B
SA183-0.5B
SA67-0.5B
SA67-10B
SA67-20B
SA67-30B
SA67-35B
RSAN2-0.5B
RSAN2-10B
RSAN2-20B
TB070808SB1
TB070808SB2

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
7/16/08	tert-Butyl alcohol	0.043 (≥0.05)	SA67-35B TB070808SB1 TB070808SB2 MEDBLK2 METBLK3	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/08 (K8439)	tert-Butyl alcohol	0.043 (≥0.05)	SA67-35B MEDBLK2	J (all detects) UJ (all non-detects)	A
7/18/08 (K8452)	tert-Butyl alcohol	0.043 (≥0.05)	TB070808SB1 TB070808SB2 METBLK2	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
METBLK3	7/18/08	Methyl-tert-butyl ether	1.8 ug/L	TB070808SB1 TB070808SB2

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

Samples TB070808SB1 and TB070808SB2 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
TB070808SB1	7/8/08	Acetone	1.5 ug/L	SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB070808SB2	7/8/08	Acetone	1.2 ug/L	SA67-0.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
MEDLCS2	Dichlorodifluoromethane Methyl-tert-butyl ether	139 (75-125) 130 (75-125)	SA67-35B MEDBLK2	J+ (all detects) J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844862	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844862

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844862	SA67-35B TB070808SB1 TB070808SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844862	SA67-35B TB070808SB1 TB070808SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844862	SA67-35B	Dichlorodifluoromethane Methyl-tert-butyl ether	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844862	SA47-0.5B SA47-10B SA47-20B SA47-30B SA47-35B SA183-0.5B SA67-0.5B SA67-10B SA67-20B SA67-30B SA67-35B RSAN2-0.5B RSAN2-10B RSAN2-20B TB070808SB1 TB070808SB2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844862

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844862

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257G1
SDG #: R2844862
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: TVG
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: 7/07-08/08
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	N	Client Spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 15, 16

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	SA47-0.5B S	11	SA67-35B S	21	METBLK1	(7/10) 31	
2	SA47-10B	12	RSAN2-0.5B	22	MEDBLK2	(7/17) 32	
3	SA47-20B	13	RSAN2-10B	23	METBLK3	(7/18) 33	
4	SA47-30B	14	RSAN2-20B	24		34	
5	SA47-35B	15	TB070808SB1 W	25		35	
6	SA183-0.5B	16	TB070808SB2	26		36	
7	SA67-0.5B	17		27		37	
8	SA67-10B	18		28		38	
9	SA67-20B	19		29		39	
10	SA67-30B	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	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 #: 21257 G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial 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 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
	7/16/08	ICAL - MS5	ZZZ		0.043	11, 15, 16, MEDBLK2, METBLK3	J/UJ/A (C)

INICAL.1SB

LDC #: 21257G1
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
	7/17/08	K8439	ZZZ		0.043	11, MEDBLK2	J/NJ/A (c)
	7/18/08	K8452	ZZZ		0.043	15, 16, MET BLK2	

CONCAL.1SB

LDC #: 21257 G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: JV2
2nd Reviewer: A

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

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

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

Blank analysis date: 7/18/08
Conc. units: ug/L
Associated Samples: 15, 16 (ND)

Compound	Blank ID	Sample Identification								
	MET Blk3									
~~Methylene chloride~~ LL	1.8									
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21257G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of ___
Reviewer: JVL
2nd Reviewer: AL

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

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

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

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

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

Compound	Blank ID 15	Blank ID	Sample Identification							
Sampling Date	7/08/08		1	2	5	6				
F	1.5		(27)	(8.3)	(27)	(8.9)				
CRQL										

3.0

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 7 - 14

Compound	Blank ID 16	Blank ID	Sample Identification							
Sampling Date	7/08/08		7	8	9	10	13	14		
F	1.2		(11)	(12)	(14)	(12)	(6.8)	(29)		
CRQL										

2.4

LDC #: 21257G1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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
		MED LCS2	JJ	139 (75-125)	( )	( )	11, MED BLK2	J+ dets/P (A)
			LL	130 (↓)	( )	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 8 through July 11, 2008

LDC Report Date: August 24, 2009

Matrix: Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844866

Sample Identification

M-39B
M-39BDL
TR-2B
M-69B
I-BB
TB070808GW2
M-96BF
M-48B
TR-4B
TB070908GW2
TB070908-W1
CLD3-RB
CLD3-RBDL
CLD1-RB
CLD1-RBDL
TB071008-W1
TB071008GW2
M-124B
M-124BDL
M-123B
TB071108-W1
M-96BFMS
M-96BFMSD

Introduction

This data review covers 23 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 with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-124B M-124BDL M-123B TB071108-W1	All TCL compounds	Cooler temperature was reported at 8°C upon receipt by the laboratory.	Cooler temperature must be 4±2°C .	J- (all detects) UJ (all non-detects)	A

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	All samples in SDG R2844866	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/16/08 (B1135)	2-Hexanone	27.3	M-39B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD1-RB M-96BFMS M-96BFMSD METBLK1	J- (all detects) UJ (all non-detects)	A
7/17/08 (B1157)	2-Hexanone	28.2	M-39BDL TR-2B CLD3-RBDL CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1 METBLK2	J- (all detects) UJ (all non-detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/16/08 (B1135)	tert-Butyl alcohol	0.020 (≥0.05)	M-39B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD1-RB M-96BFMS M-96BFMSD METBLK1	J (all detects) UJ (all non-detects)	A
7/17/08 (B1157)	tert-Butyl alcohol	0.016 (≥0.05)	M-39BDL TR-2B CLD3-RBDL CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1 METBLK2	J (all detects) UJ (all non-detects)	A
7/18/08 (B1180)	tert-Butyl alcohol Acetone	0.019 (≥0.05) 0.049 (≥0.05)	M-124BDL M-123B METBLK3	J (all detects) UJ (all non-detects) 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 TB070808GW2, TB070908GW2, TB070908-W1, TB071008-W1, TB071008GW2, and TB071108-W1 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
TB070808GW2	7/8/08	Acetone tert-Butyl alcohol	1.8 ug/L 1.7 ug/L	M-39B M-39BDL TR-2B M-69B I-BB
TB070908GW2	7/9/08	Acetone tert-Butyl alcohol	5.1 ug/L 4.0 ug/L	M-96BF

Trip Blank ID	Sampling Date	Compound	Concentration	Associated Samples
TB070908-W1	7/9/08	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	2.7 ug/L 2.6 ug/L 0.29 ug/L	M-48B TR-4B
TB071008-W1	7/10/08	Acetone	1.5 ug/L	CLD3-RB CLD3-RBDL
TB071008GW2	7/10/08	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	1.4 ug/L 1.7 ug/L 0.25 ug/L	CLD1-RB CLD1-RBDL
TB071108-W1	7/11/08	Acetone tert-Butyl alcohol	2.9 ug/L 4.1 ug/L	M-124B M-124BDL M-123B

Sample FB062408GWAREA1 (from SDG R2844650) was identified as a field blank. No volatile contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Acetone 2-Butanone tert-Butyl alcohol Ethyl-tert-butyl ether 1,4-Dichlorobenzene 1,2-Dichloroethane Methylene chloride Toluene m,p-Xylenes	16 ug/L 2.5 ug/L 4.1 ug/L 0.29 ug/L 2.2 ug/L 0.35 ug/L 0.25 ug/L 1.8 ug/L 0.26 ug/L	M-39B M-39BDL TR-2B M-69B I-BB M-96BF M-48B TR-4B CLD3-RB CLD3-RBDL CLD1-RB CLD1-RBDL M-124B M-124BDL M-123B

Sample PB061608B (from SDG R2844538) was identified as a pump blank. No volatile contaminants were found in these blanks with the following exceptions:

Pump Blank ID	Sampling Date	Analyte	Concentration	Associated Samples
PB061608B	6/16/08	1,2-Dichloroethane Ethylbenzene Styrene Toluene m,p-Xylenes o-Xylene	0.24 ug/L 0.22 ug/L 0.25 ug/L 5.4 ug/L 0.49 ug/L 0.24 ug/L	M-39B M-39BDL TR-2B M-69B I-BB M-96BF M-48B CLD3-RB CLD3-RBDL CLD1-RB CLD1-RBDL M-124B M-124BDL M-123B

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-39B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.0 ug/L 2.8 ug/L 1.5 ug/L 0.26 ug/L	1.0U ug/L 2.8U ug/L 1.5U ug/L 0.26U ug/L
M-39BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	9.1 ug/L 10 ug/L 1.6 ug/L	9.1U ug/L 10U ug/L 1.6U ug/L
TR-2B	tert-Butyl alcohol 1,4-Dichlorobenzene	2.9 ug/L 0.37 ug/L	2.9U ug/L 0.37U ug/L
M-69B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.1 ug/L 2.4 ug/L 2.7 ug/L 0.23 ug/L	1.1U ug/L 2.4U ug/L 2.7U ug/L 0.23U ug/L
I-BB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.2 ug/L 3.8 ug/L 1.3 ug/L 0.21 ug/L	1.2U ug/L 3.8U ug/L 1.3U ug/L 0.21U ug/L
M-96BF	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.7 ug/L 3.3 ug/L 1.5 ug/L 0.47 ug/L	1.7U ug/L 3.3U ug/L 1.5U ug/L 0.47U ug/L
M-48B	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	1.1 ug/L 1.9 ug/L 0.85 ug/L	1.1U ug/L 1.9U ug/L 0.85U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
TR-4B	tert-Butyl alcohol	2.2 ug/L	2.2U ug/L
CLD3-RB	tert-Butyl alcohol	2.3 ug/L	2.3U ug/L
CLD3-RBDL	Acetone	10 ug/L	10U ug/L
CLD1-RB	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	1.6 ug/L 2.6 ug/L 0.88 ug/L 0.43 ug/L	1.6U ug/L 2.6U ug/L 0.88U ug/L 0.43U ug/L
CLD1-RBDL	Acetone	12 ug/L	12U ug/L
M-124B	Acetone 2-Butanone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	3.6 ug/L 0.24 ug/L 2.4 ug/L 3.4 ug/L 0.22 ug/L	3.6U ug/L 0.24U ug/L 2.4U ug/L 3.4U ug/L 0.22U ug/L
M-124BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	4.0 ug/L 4.7 ug/L 3.1 ug/L 0.46 ug/L	4.0U ug/L 4.7U ug/L 3.1U ug/L 0.46U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS2	2-Hexanone	71 (75-125)	M-39BDL TR-2B CLD3-RBDL CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1 METBLK2	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
M-39B CLD3-RB CLD1-RB M-124B	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 R2844866	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-39B CLD3-RB CLD1-RB M-124B	Chloroform	X	A
M-39BDL CLD3-RBDL CLD1-RBDL M-124BDL	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, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844866

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844866	M-124B M-124BDL M-123B TB071108-W1	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Cooler temperature (st)
R2844866	M-39B M-39BDL TR-2B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD3-RBDL CLD1-RB CLD1-RBDL TB071008-W1 TB071008GW2 M-124B M-124BDL M-123B TB071108-W1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844866	M-39B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD1-RB M-39BDL TR-2B CLD3-RBDL CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1	2-Hexanone	J- (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (c)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844866	M-39B M-39BDL TR-2B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD3-RBDL CLD1-RB CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844866	M-124BDL M-123B	tert-Butyl alcohol Acetone	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844866	M-39BDL TR-2B CLD3-RBDL CLD1-RBDL TB071008-W1 TB071008GW2 M-124B TB071108-W1	2-Hexanone	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844866	M-39B CLD3-RB CLD1-RB M-124B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844866	M-39B M-39BDL TR-2B M-69B I-BB TB070808GW2 M-96BF M-48B TR-4B TB070908GW2 TB070908-W1 CLD3-RB CLD3-RBDL CLD1-RB CLD1-RBDL TB071008-W1 TB071008GW2 M-124B M-124BDL M-123B TB071108-W1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844866	M-39B CLD3-RB CLD1-RB M-124B	Chloroform	X	A	Overall assessment of data (o)
R2844866	M-39BDL CLD3-RBDL CLD1-RBDL M-124BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844866

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844866

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844866	M-39B	Acetone tert-Butyl alcohol	1.0U ug/L 2.8U ug/L	A	bt,bf
R2844866	M-39B	1,4-Dichlorobenzene Methylene chloride	1.5U ug/L 0.26U ug/L	A	bf
R2844866	M-39BDL	Acetone tert-Butyl alcohol 1,4-Dichlorobenzene	9.1U ug/L 10U ug/L 1.6U ug/L	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844866	TR-2B	1,4-Dichlorobenzene	0.37U ug/L	A	bf
R2844866	TR-2B	tert-Butyl alcohol	2.9U ug/L	A	bt,bf
R2844866	M-69B	Acetone tert-Butyl alcohol	1.1U ug/L 2.4U ug/L	A	bt,bf
R2844866	M-69B	1,4-Dichlorobenzene Methylene chloride	2.7U ug/L 0.23U ug/L	A	bf
R2844866	I-BB	Acetone	1.2U ug/L	A	bt,bf
R2844866	I-BB	tert-Butyl alcohol 1,4-Dichlorobenzene Methylene chloride	3.8U ug/L 1.3U ug/L 0.21U ug/L	A	bf
R2844866	M-96BF	Acetone tert-Butyl alcohol	1.7U ug/L 3.3U ug/L	A	bt,bf
R2844866	M-96BF	1,4-Dichlorobenzene Methylene chloride	1.5U ug/L 0.47U ug/L	A	bf
R2844866	M-48B	Acetone tert-Butyl alcohol	1.1U ug/L 1.9U ug/L	A	bt,bf
R2844866	M-48B	1,4-Dichlorobenzene	.85U ug/L	A	bf
R2844866	TR-4B	tert-Butyl alcohol	2.2U ug/L	A	bt,bf
R2844866	CLD3-RB	tert-Butyl alcohol	2.3U ug/L	A	bf
R2844866	CLD3-RBDL	Acetone	10U ug/L	A	bf
R2844866	CLD1-RB	Acetone tert-Butyl alcohol	1.6U ug/L 2.6U ug/L	A	bt,bf
R2844866	CLD1-RB	1,4-Dichlorobenzene Methylene chloride	.88U ug/L 0.43U ug/L	A	bf
R2844866	CLD1-RBDL	Acetone	12U ug/L	A	bf
R2844866	M-124B	Acetone tert-Butyl alcohol	3.6U ug/L 2.4U ug/L	A	bt,bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844866	M-124B	2-Butanone 1,4-Dichlorobenzene Methylene chloride	0.24U ug/L 3.4U ug/L 0.22U ug/L	A	bf
R2844866	M-124BDL	Acetone tert-Butyl alcohol	4.0U ug/L 4.7U ug/L	A	bt,bf
R2844866	M-124BDL	1,4-Dichlorobenzene Methylene chloride	3.1U ug/L 0.46U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257H1
SDG #: R2844866
Laboratory: Columbia Analytical Services

Date: 8/13/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/08-11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD ✓ ✓
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS ✓
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	TB = 6 10, 11 16, 17, 21 PB = PB061608B FB = FB062408GWAREA ✓ (from R2844650) from R2844538

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

Validated Samples:

water

1 1	M-39B	11 1	TB070908-W1	21 ✓	TB071108-W1	31 1	MET BLK 1 (7/6)
2 ✓	M-39BDL	12 1	CLD3-RB	22 1	M-96BFMS	32 ✓	MET BLK 2 (7/7)
3 ✓	TR-2B	13 ✓	CLD3-RBDL	23 1	M-96BFMSD	33 ✓	MET BLK 3 (7/8)
4 1	M-69B	14 1	CLD1-RB	24		34	
5 1	I-BB	15 ✓	CLD1-RBDL	25		35	
6 1	TB070808GW2	16 ✓	TB071008-W1	26		36	
7 1	M-96BF	17 ✓	TB071008GW2	27		37	
8 1	M-48B	18 ✓	M-124B	28		38	
9 1	TR-4B	19 ✓	M-124BDL	29		39	
10 1	TB070908GW2	20 ✓	M-123B	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	lll. 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 #: 21257H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: JK
2nd Reviewer: [illegible]

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

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

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
18-21	W	Cooler	Temp =	8°C			J-/UJ/A (SB)

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 #: 21257411
SDG #: Sa Cruz

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: JVG
2nd Reviewer: ______

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

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

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

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	6/26/08	ICAL	ZZZ		0.021	All + Blks	J/UJ/A (C)

INICAL.1SB

LDC #: 21257A1
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
	7/16/08	B1135	Z (-)	27.3		1,4-12,14,22,23	J-/UJ/A (c)
			ZZZ		0.020	MET BLK 1	J/UJ/A
	7/17/08	B1157	Z (-)	28.2		2,3,13,15-18,	J-/UJ/A C
			ZZZ		0.016	21, MET BLK 2	J/UJ/A
	7/18/08	B1180	ZZZ		0.019	19,20, MET BLK 3	J/UJ/A (cc)
			F		0.049		

CONCAL.1SB

LDC #: 21257 H1
SDG #: Sw Conv

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 5
Reviewer: JVC
2nd Reviewer:

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1 - 5

Compound	Blank ID 6	Blank ID	Sample Identification							
Sampling Date	7/08/08	1	2	3	4	5				
F (2K)	1.8	1.0/U	(9.1)		1.1/U	1.2/U				
ZZZ 3.6 3.4	1.7	2.8/U	(10)	2.9/U	2.4/U	(3.8)				
CRQL										

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

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

Compound	Blank ID 10	Blank ID	Sample Identification							
Sampling Date	7/09/08		7							
F	5.1		1.7/U							
ZZZ	4.0		3.3/U							
CRQL										

LDC #: 42578 1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 5
Reviewer: JVB
2nd Reviewer:

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

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

Blank units: ug/L **Associated sample units:** ug/L
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 8 9 (bt)

Compound	Blank ID 11	Blank ID	Sample Identification							
Sampling Date	7/09/08		8	9						
F	2.7		1.1 U							
ZZZ	2.6		1.9 U	2.2 U						
HHH	0.29		(0.85)							
CRQL										

(2x)
5.4
5.2
0.58

Blank units: _____ **Associated sample units:** _____
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 12, 13

Compound	Blank ID 16	Blank ID	Sample Identification							
Sampling Date	7/10/08		13							
F	1.5		(10)							
CRQL										

3.0

LDC #: 21237H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVC
2nd Reviewer:

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

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

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

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

Compound	Blank ID 17	Blank ID	Sample Identification							
Sampling Date	7/10/08		14	15						
2.8 F	1.4		1.6/U	(12)						
3.4 ZZZ	1.7		2.6/U	(11)						
0.50 HHH	0.25		(0.88)							
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / ~~Trip Blank~~ / Other: _____ Associated Samples: 18 20 (bt)

Compound	Blank ID 21	Blank ID	Sample Identification							
Sampling Date	7/11/08		18	19	20					
5.8 F	2.9		3.6/U	4.0/U	(340)					
8.2 ZZZ	4.1		2.4/U	4.7/U	(460)					
CRQL										

LDC #: 21257H1
SDG #: R2847666

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV
2nd Reviewer:

(bf)

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

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

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

Field blank type: (circle one) (Field Blank) / Rinsate / Trip Blank / Other: Associated Samples: 1-5 7-9 12-15 18-20

Compound	FB062408GW Blank ID	AREA1 Blank ID	Sample Identification							
Sampling Date	6/24/08		1	2	3	4	5	7	8	9
F	16		1.0/U	9.1/U		1.1/U	1.2/U	1.7/U	1.1/U	
M	2.5									
ZZZ	4.1		2.8/U	10/U	2.9/U	2.4/U	3.8/U	3.3/U	1.9/U	2.2/U
AAAA	0.29									
HHH	2.2		1.5/U	1.6/U	0.37/U	2.7/U	1.3/U	1.5/U	0.85/U	
L	0.35									
E	0.25		0.26/U	(1.2)		0.23/U	0.21/U	0.47/U		
CC	1.8									
RRR	0.26									

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

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

Compound	FB062408GW Blank ID	AREA1 Blank ID	Sample Identification							
Sampling Date	6/24/08		12	13	14	15	18	19	20	
F	16			10/U	1.6/U	12/U	3.6/U	4.0/U	(340)	
M	2.5						0.24/U			
ZZZ	4.1		2.3/U	(18)	2.6/U	(11)	2.4/U	4.7/U	(460)	
AAAA	0.29									
HHH	2.2				0.88/U		3.4/U	3.1/U	(1200)	
L	0.35									
E	0.25		(0.57)	(2.6)	0.43/U	(1.3)	0.22/U	0.46/U	(110)	
CC	1.8									
RRR	0.26									

LDC #: 21257 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV6
2nd Reviewer:

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: PB Associated Samples: 1-5, 7, 8, 12-15, 18-20 (ND)

Compound	PB061608B Blank ID	Blank ID	Sample Identification							
Concentration Date	6/16/08									
~~Methylene chloride~~ L	0.24									
~~Acetone~~ EE	0.22									
~~Chloroform~~ FF	0.25									
CC	5.4									
RRR	0.49									
SSS	0.24									
CRQL										

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

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

Compound	Blank ID	Blank ID	Sample Identification							
Concentration Date										
Methylene chloride										
Acetone										
Chloroform										
CRQL										

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

LDC #: 21257 H1
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
		22/23	D	134 (70-130)	( )	( )	7	No qual (LCSin)
			A	134 ( )	132 (70-130)	( )		
			JJ	142 ( )	140 ( )	( )		
			H	134 ( )	132 ( )	( )		
			FF	8 ( )	8 ( )	( )		
			C	138 ( )	136 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 21257 #1
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
		LCS 1	Z	68 (75-125)	( )	( )	1, 4-12, 14, MET BLK1	No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		LCS 2	Z	71 (75-125)	( )	( )	2, 3, 13, 15-18, 21,	J-/UJ/P (d)
				( )	( )	( )	MET BLK 2	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 H1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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 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, 12, 14, 18	K > cal range		J dets/A (c)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257#1
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: _____

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1, 12, 14, 18	K > cal range		X / A (O)
		2, 13, 15, 19	All except K dil		

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 8 through July 9, 2008

LDC Report Date: August 19, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844885

Sample Identification

RSAN2-30B
RSAN2-30BD
RSAN2-30BDDL
RSAN2-35B
RSAO2-0.5B
RSAO2-10B
RSAO2-20B
RSAO2-20BDL
RSAO2-20BD
RSAO2-20BDDL
RSAO2-30B
RSAO2-30BDL
RSAO2-33B
SA183-10B
SA183-10BD
SA183-20B
SA183-30B
SA183-33B
RSA04-0.5B
RSA04-10B
RSA04-20B
RSA04-30B
RSA04-36B
TB070808SB2
TB070908SB1

Introduction

This data review covers 23 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
7/16/08	tert-Butyl alcohol	0.043 (≥0.05)	RSAN2-30B RSAN2-30BDDL RSAN2-35B RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL RSAO2-33B TB070908SB1 MEDBLK3 MEDBLK4 METBLK4	J (all detects) UJ (all non-detects)	A
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	TB070808SB2 METBLK5	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/14/08 (M2181)	Acetone tert-Butyl alcohol	33.1 28.9	RSAN2-30BD RSAO2-30B SA183-10B METBLK2	J+ (all detects) J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/17/08 (K8439)	tert-Butyl alcohol	0.043 (≥0.05)	RSAN2-30B RSAN2-30BDDL RSAN2-35B MEDBLK3	J (all detects) UJ (all non-detects)	A
7/18/08 (K8452))	tert-Butyl alcohol	0.043 (≥0.05)	RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL RSAO2-33B TB070908SB1 MEDBLK4 METBLK4	J (all detects) UJ (all non-detects)	A
7/21/08 (B1204)	tert-Butyl alcohol	0.018 (≥0.05)	TB070808SB2 METBLK5	J (all detects) UJ (all non-detects) 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
METBLK1	7/11/08	Methylene chloride Trichloroethene	0.39 ug/Kg 0.57 ug/Kg	RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BD SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B

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
RSAO2-10B	Methylene chloride	0.63 ug/Kg	0.63U ug/Kg
RSAO2-20B	Methylene chloride	0.78 ug/Kg	0.78U ug/Kg
SA183-20B	Methylene chloride	0.73 ug/Kg	0.73U ug/Kg
SA183-33B	Methylene chloride	0.78 ug/Kg	0.78U ug/Kg
RSA04-0.5B	Methylene chloride	0.51 ug/Kg	0.51U ug/Kg
RSA04-10B	Methylene chloride	0.46 ug/Kg	0.46U ug/Kg

Samples TB070808SB2 and TB070908SB1 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
TB070808SB2	7/8/08	Acetone tert-Butyl alcohol	1.6 ug/L 1.9 ug/L	RSAN2-30B RSAN2-30BD RSAN2-30BDDL RSAN2-35B RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BDL RSAO2-20BD RSAO2-20BDDL RSAO2-30B RSAO2-30BDL RSAO2-33B
TB070908SB1	7/9/08	Acetone	1.4 ug/L	SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B

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

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS3	Dichlorodifluoromethane Methyl-tert-butyl ether	139 (75-125) 130 (75-125)	RSAN2-30B RSAN2-30BDDL RSAN2-35B MEDBLK3	J+ (all detects) J+ (all detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSAN2-30BD RSAO2-20B RSAO2-20BD RSAO2-30B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2844885	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
RSAN2-30BD RSAO2-20B RSAO2-20BD RSAO2-30B	Chloroform	X	A
RSAN2-30BDDL RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL	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 RSAN2-30B and RSAN2-30BD, samples RSAN2-30B and RSAN2-30BDDL, samples RSAO2-20B and RSAO2-20BD, samples RSAO2-20BDL and RSAO2-20BDDL, and samples SA183-10B and SA183-10BD 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
	RSAN2-30B	RSAN2-30BD				
Acetone	3300U	21	-	3279 (≤3300)	-	-
Benzene	5100	9.4U	-	5090.6 (≤9.4)	J (all detects) UJ (all non-detects)	A
2-Butanone	1700U	4.0	-	1696 (≤1700)	-	-
Carbon tetrachloride	1000	9.4U	-	990.6 (≤9.4)	J (all detects) UJ (all non-detects)	A
Chlorobenzene	11000	9.4U	-	10990.6 (≤9.4)	J (all detects) UJ (all non-detects)	A
Chloroform	13000	1200	166 (≤50)	-	J (all detects)	A
1,2-Dichlorobenzene	680	9.4U	-	670.6 (≤9.4)	J (all detects) UJ (all non-detects)	A
1,4-Dichlorobenzene	1200	9.4U	-	1190.6 (≤9.4)	J (all detects) UJ (all non-detects)	A
Methylene chloride	830U	1.1	-	828.9 (≤830)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAN2-30B	RSAN2-30BD				
Tetrachloroethene	830U	1.1	-	828.9 (≤830)	-	-
Toluene	830U	0.78	-	829.22 (≤830)	-	-
Trichlorofluoromethane	78	9.4U	-	68.6 (≤9.4)	J (all detects) UJ (all non-detects)	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAN2-30B	RSAN2-30BDDL				
Benzene	5100	880U	-	4220 (≤880)	-	-
Carbon tetrachloride	1000	880U	-	120 (≤880)	J (all detects) UJ (all non-detects)	A
Chlorobenzene	11000	880U	-	10120 (≤880)	J (all detects) UJ (all non-detects)	A
Chloroform	13000	1000	171 (≤50)	-	J (all detects)	A
1,2-Dichlorobenzene	680	880U	-	200 (≤880)	-	A
1,4-Dichlorobenzene	1200	880U	-	320 (≤880)	-	A
Trichlorofluoromethane	78	880U	-	802 (≤880)	-	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAO2-20B	RSAO2-20BD				
Acetone	21	20	-	1 (≤35.7)	-	-
Carbon tetrachloride	18	19	-	1 (≤8.9)	-	-
Chloroform	1100	1300	17 (≤50)	-	-	-
Methylene chloride	0.78	1.0	-	0.22 (≤8.9)	-	-
Tetrachloroethene	4.0	3.7	-	0.3 (≤8.9)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAO2-20B	RSAO2-20BD				
Trichlorofluoromethane	8.9U	0.68	-	8.22 (≤8.9)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAO2-20BDL	RSAO2-20BDDL				
Chloroform	740	400	60 (≤50)	-	J (all detects)	A

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844885

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844885	RSAN2-30B RSAN2-30BDDL RSAN2-35B RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL RSAO2-33B TB070908SB1 TB070808SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844885	RSAN2-30BD RSAO2-30B SA183-10B	Acetone tert-Butyl alcohol	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R2844885	RSAN2-30B RSAN2-30BDDL RSAN2-35B RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL RSAO2-33B TB070908SB1 TB070808SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844885	RSAN2-30B RSAN2-30BDDL RSAN2-35B	Dichlorodifluoromethane Methyl-tert-butyl ether	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844885	RSAN2-30BD RSAO2-20B RSAO2-20BD RSAO2-30B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844885	RSAN2-30B RSAN2-30BD RSAN2-30BDDL RSAN2-35B RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BDL RSAO2-20BD RSAO2-20BDDL RSAO2-30B RSAO2-30BDL RSAO2-33B SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B TB070808SB2 TB070908SB1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844885	RSAN2-30BD RSAO2-20B RSAO2-20BD RSAO2-30B	Chloroform	X	A	Overall assessment of data (o)
R2844885	RSAN2-30BDDL RSAO2-20BDL RSAO2-20BDDL RSAO2-30BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R2844885	RSAN2-30B RSAN2-30BD RSAN2-30BDDL RSAO2-20BDL RSAO2-20BDDL	Chloroform	J (all detects)	A	Field duplicates (RPD) (fd)
R2844885	RSAN2-30B RSAN2-30BD	Benzene Carbon tetrachloride Chlorobenzene 1,2-Dichlorobenzene 1,4-Dichlorobenzene Trichlorofluoromethane	J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)
R2844885	RSAN2-30B RSAN2-30BDDL	Carbon tetrachloride Chlorobenzene	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844885

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844885	RSAO2-10B	Methylene chloride	0.63U ug/Kg	A	bl
R2844885	RSAO2-20B	Methylene chloride	0.78U ug/Kg	A	bl
R2844885	SA183-20B	Methylene chloride	0.73U ug/Kg	A	bl
R2844885	SA183-33B	Methylene chloride	0.78U ug/Kg	A	bl
R2844885	RSA04-0.5B	Methylene chloride	0.51U ug/Kg	A	bl
R2844885	RSA04-10B	Methylene chloride	0.46U ug/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844885

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257I1
SDG #: R2844885
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/08-09/08
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	N	client spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 1, 2 D_2 = 1, 3 D_3 = 7, 9 D_4 = 8, 10 D_5 = 14, 15
XVII.	Field blanks	SW	TB = 24, 25

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	3	RSAN2-30B	D_1, D_2 S	11	3	RSAO2-30B	S	21	1	RSA04-20B	S	31	1	MET BLK 1	7/11
2	3	RSAN2-30BD	D_1	12	4	RSAO2-30BDL		22	1	RSA04-30B		32	2	MET BLK 2	7/14
3	3	RSAN2-30BDDL	D_2	13	4	RSAO2-33B		23	1	RSA04-36B		33	3	MED BLK 3	7/17
4	3	RSAN2-35B		14	2	SA183-10B	D_5	24	6	TB070808SB2	W	34	4	MED BLK 4	7/18
5	1	RSAO2-0.5B		15	1	SA183-10BD	D_5	25	5	TB070908SB1		35	5	MET BLK 4	7/18
6	1	RSAO2-10B		16	1	SA183-20B		26				36	6	MET BLK 5	7/21
7	1	RSAO2-20B	D_3	17	1	SA183-30B		27				37			
8	4	RSAO2-20BDL	D_4	18	1	SA183-33B		28				38			
9	1	RSAO2-20BD	D_3	19	1	RSA04-0.5B		29				39			
10	4	RSAO2-20BDDL	D_4	20	1	RSA04-10B		30				40			

(no ICV)

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	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 #: 21257I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial 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 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
	7/16/08	ICAL-MS5	ZZZ		0.043	1, 3, 4, MEDBLK3, 8, 10, 12, 13, MEDBLK4, 25, METBLK4	J/UJ/A (c)
	8/26/08	ICAL-MS10	ZZZ		0.021	24, METBLK5	(c)

INICAL.1SB

LDC #: 21257 I1
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
	7/14/08	M2181	F (+)	33.1		2, 11, 14 METBLK2	J+ Acts/A (c)
			ZZZ (+)	28.9		↓	
	7/17/08	K8439	ZZZ		0.043	1, 3, 4, MEDBLK3	J/UJ/A (c)
	7/18/08	K8452	ZZZ		0.043	8, 10, 12, 13, 25, MEDBLK4, METBLK4	J/UJ/A (c)
	7/21/08	B1204	ZZZ		0.018	24, METBLK5	J/UJ/A (c)

CONCAL.1SB

LDC #: 21257I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank analysis date: 7/11/08
Conc. units: ug/kg
Associated Samples: 5-7, 9, 15-23

Compound	Blank ID	Sample Identification								
	MET BLK1	6	7	9	16	18	19	20		
0.78 Methylene chloride E	0.39	0.63/U	0.78/U	(1.0)	0.73/U	0.78/U	0.51/U	0.46/U		
1.14 ~~Acetone~~ S	0.57									
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21257 I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 1-13

Compound	Blank ID 24	Blank ID	Sample Identification							
Sampling Date	7/08/08	2	5	6	7	9	11			
(2x) F	1.6	(21)	(17)	(49)	(21)	(20)	(20)			
3.2 ZZZ	1.9									
3.8										
CRQL										

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: Associated Samples: 14-23

Compound	Blank ID 25	Blank ID	Sample Identification							
Sampling Date	7/09/08	16	19	23						
2.8 F	1.4	(14)	(25)	(13)						
CRQL										

LDC #: 21257I1
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
		LCS 3	JJ	139 (75-125)	( )	( )	1, 3, 4, MEDBlk3	J+dets/P (l)
			LL	130 (↓)	( )	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 42571 1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: JV6
2nd Reviewer: a

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 7, 9, 11	K > Cal range		J (all detects) / A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257I1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		2, 7, 9, 11	K > cal range		X / A (o)
		3, 8, 10, 12	All except K dil		

Comments: _____

LDC#: 21257I1
SDG#: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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	Quals (Parent Only)
	1	2			
Acetone	3300U	21		3279 (≤ 3300)	-
Benzene	5100	9.4U		5090.6 (≤ 9.4)	J/UJ/A (fd)
2-Butanone	1700U	4.0		1696 (≤ 1700)	-
Carbon tetrachloride	1000	9.4U		990.6 (≤ 9.4)	J/UJ/A
Chlorobenzene	11000	9.4U		10990.6 ↓	↓
Chloroform	13000	12000	166		Jdets/A
1,2-Dichlorobenzene	680	9.4U		670.6 (≤ 9.4)	J/UJ/A
1,4-Dichlorobenzene	1200	9.4U		1190.6 ↓	↓
Methylene chloride	830U	1.1		828.9 (≤ 830)	-
Tetrachloroethene	830U	1.1		828.9 ↓	-
Toluene	830U	0.78		829.22 ↓	-
Trichlorofluoromethane	78	9.4U		68.6 (≤ 9.4)	J/UJ/A

fluo

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Quals (Parent Only)
	1	3			
Benzene	5100	880U		4220 (≤880) ~~(≤ 880)~~	J/UJ/A
Carbon tetrachloride	1000	880U		120 (≤ 880)	-
Chlorobenzene	11000	880U		10120 ↓	J/UJ/A
Chloroform	13000	1000	171	-	Jdets/A
1,2-Dichlorobenzene	680	880U		200 (≤ 880)	-
1,4-Dichlorobenzene	1200	880U		320 ↓	-
Trichlorofluoromethane	78	880U		802 ↓	-

fluo

LDC#: 21257I1
SDG#: See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVJ
2nd Reviewer: V

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

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	Quals (Parent Only)
	7	9			
Acetone	21	20		1 (≤ 35.7)	—
Carbon tetrachloride	18	19		1 (≤ 8.9)	—
Chloroform	1100	1300	17	—	—
Methylene chloride	0.78	1.0		0.22 (≤ 8.9)	—
Tetrachloroethene	4.0	3.7		0.3	—
Trichlorofluoromethane	8.9U	0.68		8.22	—

fluo

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Quals (Parent Only)
	8	10			
Chloroform	740	400	60		J dets/A (fd)

V:\FIELD DUPLICATES\21257I1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 9 through July 10, 2008

LDC Report Date: August 21, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844902

Sample Identification

SA46-0.5B
SA46-10B
SA46-20B
SA46-30B
SA46-30BD
SA48-0.5B
SA48-10B
SA48-20B
SA48-30B
SA48-35B
SA48-35BDL
RSAJ7-0.5B
RSAJ7-10B
RSAJ7-20B
RSAK7-0.5B
RSAK7-10B
RSAK7-10BD
RSAK7-20B
RSAK7-27B
TB071008SB1
TB071008SB2

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
7/16/08	tert-Butyl alcohol	0.043 (≥0.05)	All water samples in SDG R2844866	J (all detects) UJ (all non-detects)	A
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	SA48-35BDL METBLK5	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

Date	Compound	%D	Associated Samples	Flag	A or P
7/14/08 (M1281)	Acetone tert-Butyl alcohol	33.1 28.9	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B METBLK1	J+ (all detects) J+ (all detects)	A

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/18/08 (K8452)	tert-Butyl alcohol	0.043 (≥0.05)	All water samples in SDG R2844902	J (all detects) UJ (all non-detects)	A
7/22/08 (B1204)	Acetone tert-Butyl alcohol	0.049 (≥0.05) 0.018 (≥0.05)	SA48-35BDL METBLK5	J (all detects) UJ (all non-detects) 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
METBLK4	7/22/08	Trichlorofluoromethane	0.92 ug/L	RSAK7-0.5B

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

Samples TB071008SB1 and TB071008SB2 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
TB071008SB1	7/10/08	Acetone	2.2 ug/L	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B SA48-35BDL
TB071008SB2	7/10/08	Acetone	1.5 ug/L	RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B

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
SA48-35BDL (103X)	Acetone	150 ug/L	150U ug/L

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS3	tert-Butyl alcohol 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane	139 (75-125) 126 (75-125) 126 (75-125)	SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B METBLK3	J+ (all detects) J+ (all detects) J+ (all detects)	P
LCS4	Dichlorodifluoromethane	129 (75-125)	RSAK7-0.5B METBLK4	J+ (all detects)	P
LCS5	Dichlorodifluoromethane	128 (75-125)	SA48-35BDL METBLK5	J+ (all detects)	P
LCS5	2-Hexanone 4-Methyl-2-pentanone	67 (75-125) 74 (75-125)	SA48-35BDL METBLK5	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA48-35B	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 R2844902	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
SA48-35B	Chloroform	X	A
SA48-35BDL	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 SA46-30B and SA46-30BD and samples RSAK7-10B and RSAK7-10BD 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
	SA46-30B	SA46-30BD				
Acetone	14	15	-	1 (≤28.8)	-	-
Chloroform	7.3	6.4	-	0.9 (≤7.2)	-	-
Methylene chloride	0.57	7.2U	-	6.63 (≤7.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA46-30B	SA46-30BD				
Toluene	1.3	1.9	-	0.6 (≤7.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK7-10B	RSAK7-10BD				
Acetone	11	30	-	19 (≤24.4)	-	-
Methylene chloride	6.1U	0.30	-	5.8 (≤6.1)	-	-
4-Methyl-2-pentanone	12U	0.92	-	11.08 (≤12)	-	-
Toluene	0.68	1.6	-	0.92 (≤6.1)	-	-
1,2,4-Trichlorobenzene	1.4	2.4	-	1.0 (≤6.1)	-	-
1,2,3-Trichlorobenzene	3.2	4.8	-	1.6 (≤6.1)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844902

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844902	SA48-35BDL TB071008SB1 TB071008SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844902	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B	Acetone tert-Butyl alcohol	J+ (all detects) J+ (all detects)	A	Continuing calibration (%D) (c)
R2844902	TB071008SB1 TB071008SB2	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844902	SA48-35BDL	Acetone tert-Butyl alcohol	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844902	SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	tert-Butyl alcohol 1,1,2,2-Tetrachloroethane 1,2,3-Trichloropropane	J+ (all detects) J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844902	RSAK7-0.5B SA48-35BDL	Dichlorodifluoromethane	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844902	SA48-35BDL	2-Hexanone 4-Methyl-2-pentanone	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844902	SA48-35B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844902	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B SA48-35BDL RSAJ7-0.5B RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B TB071008SB1 TB071008SB2	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844902	SA48-35B	Chloroform	X	A	Overall assessment of data
R2844902	SA48-35BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844902

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844902

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844902	SA48-35BDL (103X)	Acetone	150U ug/L	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257J1
SDG #: R2844902
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: JVC
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: 7/09 - 10/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD r²
IV.	Continuing calibration ~~ver~~	SW	CCV ≤ 25 %
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 4, 5 D_2 = 16, 17
XVII.	Field blanks	SW	TB = 20, 21

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	SA46-0.5B	S	11	SA48-35BDL	S	21	TB071008SB2	W	31 MET BLK 1
2	SA46-10B		12	RSAJ7-0.5B		22			32 WAT BLK 2
3	SA46-20B		13	RSAJ7-10B		23			33 MET BLK 3
4	SA46-30B	D_1	14	RSAJ7-20B		24			34 MET BLK 4
5	SA46-30BD	D_1	15	RSAK7-0.5B		25			35 MET BLK 5
6	SA48-0.5B		16	RSAK7-10B	D_2	26			36
7	SA48-10B		17	RSAK7-10BD	D_2	27			37
8	SA48-20B		18	RSAK7-20B		28			38
9	SA48-30B		19	RSAK7-27B		29			39
10	SA48-35B		20	TB071008SB1	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	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 #: 21257J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

(Y) N N/A 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
	7/16/08	ICAL- MS#5	ZZZ		0.043	20,21, WATBLK2	J/UJ/A (CC)
	6/26/08	ICAL- MS 10	ZZZ		0.021	11, METBLK5	

INICAL.1SB

LDC #: 21257J1
SDG #: Lu Corr

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: DL
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".

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/14/08	~~M12~~ M2181	F (+)	33.1		1-8, METBLK1	J+ dets/A (C)
			ZZZ (+)	28.9			
	7/18/08	K8452	ZZZ		0.043	20, 21, WATBLK2	J/UJ/A (C)
	7/22/08	B1204	F		0.049	11, METBLK5	J/UJ/A C
			ZZZ		0.018	↓	↓ ↓

CONCAL.1SB

LDC #: 21257J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

Blank analysis date: 7/22/08
Conc. units: ug/kg Associated Samples: 15 (MD)

Compound	Blank ID	Sample Identification								
	METBLK4									
~~Methylene chloride~~ KK	0.9J									
Acetone										
CRQL										

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

LDC #: 21257J1
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: _____ Associated Samples: 1 - 11 (bt)

Compound	Blank ID 20	Blank ID	Sample Identification							
Sampling Date	7/10/08		2	3	4	5	7	9	10	11 (10x)
F	2.2		(24)	(18)	(14)	(15)	(9.4)	(11)	(6.0)	150/4
CRQL										

4.4

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

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: 12 - 19

Compound	Blank ID 21	Blank ID	Sample Identification							
Sampling Date	7/10/08		12	13	14	15	16	17	18	19
F	1.5		(35)	(30)	(36)	(8.6)	(11)	(30)	(26)	(19)
CRQL										

3.0

LDC #: 21257J1
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
7/14		LCS 3	ZZ	139 (75-125)	( )	( )	9-10, 12-14, 16-19,	J+ dets/P (l)
			BB	126 ( )	( )	( )	METBLK3	
			XX	126 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
7/22		LCS 4	JJ	129 (75-125)	( )	( )	15, METBLK4	J+ dets/P (l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
7/27		LCS 5	JJ	128 (75-125)	( )	( )	11, METBLK5	J+ dets/P (l)
			Z	67 ( )	( )	( )		J-/NJ/P
			Y	74 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21857J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

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

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

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

Y N N/A — Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?
Y N N/A — Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

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

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257J1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: SVL
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
		10	K > cal range		X/A (o)
		11	All except K	dil	

Comments: _____

LDC #: 21257J1
SDG #: 3rd Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: JV

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

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

Compound	Concentration (ug/kg) 4	5	Diff RPD
F	14	15	1 (≤ 28.8)
K	7.3	6.4	0.9 (≤ 7.2)
E	0.57	7.2 U	6.63
CC	1.3	1.9	0.6

Compound	Concentration (ug/kg) 16	17	Diff RPD
F	11	30	19 (≤ 24.4)
E	6.1 U	0.30	5.8 (≤ 6.1)
Y	12 U	0.92	11.08 (≤ 12)
CC	0.68	1.6	0.92 (≤ 6.1)
KKK	1.4	2.4	1.0
NNN	3.2	4.8	1.6

Compound	Concentration ( )		RPD

Compound	Concentration ( )		RPD

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 10 through July 11, 2008

LDC Report Date: August 20, 2009

Matrix: Soil/Water

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844922

Sample Identification

RSAJ8-0.5B
RSAJ8-10B
RSAJ8-20B
RSAJ8-30B
RSAJ8-33B
RSAI7-0.5B
RSAI7-10B
RSAI7-20B
RSAI7-30B
RSAI7-30BRE
RSAL2-0.5B
RSAL2-10B
RSAL2-20B
RSAL2-20BD
RSAL2-30B
RSAL2-30BDL
RSAL2-37B
RSAL2-40B
RSAL2-40BDL
RSAK2-0.5B
RSAK2-0.5BRE
RSAK2-10B
RSAK2-20B
RSAK2-20BD
RSAK2-30B
RSAK2-35B
TB071008SB2
TB071108SB1
RSA17-32B
RSAL2-0.5BMS
RSAL2-0.5BMSD

Introduction

This data review covers 29 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.

All samples were received in good condition with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
TB071008SB2 TB071108SB1	All TCL compounds	A headspace was apparent in the sample containers.	There should be no headspace in the sample containers.	J- (all detects) UJ (all non-detects)	A

All samples were properly stored with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
All soil samples in SDG R2844922	All TCL compounds	The soil samples were not placed in the freezer until after 48 hours from receipt.	The soil samples should be placed in the freezer within 48 hours from receipt.	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
7/16/08	tert-Butyl alcohol	0.043 (≥0.05)	TB071008SB2 WATBLK1	J (all detects) UJ (all non-detects)	A
6/26/08	tert-Butyl alcohol	0.021 (≥0.05)	RSAL2-30BDL RSAL2-40BDL TB071108SB1 METBLK5 METBLK6	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
7/18/08 (K8452)	tert-Butyl alcohol	0.043 (≥0.05)	TB071008SB2 WATBLK1	J (all detects) UJ (all non-detects)	A
7/21/08 (B1204)	tert-Butyl alcohol	0.018 (≥0.05)	TB071108SB1 METBLK5	J (all detects) UJ (all non-detects)	A
7/24/08 (B1253)	tert-Butyl alcohol	0.019 (≥0.05)	RSAL2-30BDL RSAL2-40BDL METBLK6	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
METBLK2	7/22/08	Acetone	1.6 ug/Kg	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-10B
METBLK3	7/23/08	Acetone Methylene chloride	12 ug/Kg 0.31 ug/Kg	RSAI7-0.5B RSAI7-30BRE RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B
METBLK6	7/24/08	2-Butanone Methylene chloride 1,2,3-Trichlorobenzene	0.49 ug/Kg 0.88 ug/Kg 0.48 ug/Kg	RSAL2-30BDL RSAL2-40BDL
METBLK4	7/24/08	Acetone	2.4 ug/Kg	RSAK2-0.5BRE RSAK2-10B RSAK2-20B
WATBLK1	7/18/08	Hexachlorobutadiene	1.8 ug/L	TB071008SB2

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
RSAI7-0.5B (1.15X)	Acetone Methylene chloride	13 ug/Kg 0.71 ug/Kg	13U ug/Kg 0.71U ug/Kg
RSAL2-20BD	Methylene chloride	0.38 ug/Kg	0.38U ug/Kg
RSAL2-30B	Acetone Methylene chloride	11 ug/Kg 0.89 ug/Kg	11U ug/Kg 0.89U ug/Kg
RSAL2-37B	Methylene chloride	0.51 ug/Kg	0.51U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAL2-40B	Acetone Methylene chloride	14 ug/Kg 0.53 ug/Kg	14U ug/Kg 0.53U ug/Kg
RSAK2-0.5B	Acetone Methylene chloride	3.2 ug/Kg 0.40 ug/Kg	3.2U ug/Kg 0.40U ug/Kg
RSAK2-20BD	Acetone Methylene chloride	15 ug/Kg 0.36 ug/Kg	15U ug/Kg 0.36U ug/Kg
RSA17-32B	Acetone	11 ug/Kg	11U ug/Kg
RSAL2-30BDL (124X)	Methylene chloride	49 ug/Kg	49U ug/Kg
RSAL2-40BDL (101.5X)	2-Butanone Methylene chloride	75 ug/Kg 36 ug/Kg	75U ug/Kg 36U ug/Kg

Samples TB071008SB2 and TB071108SB1 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
TB071108SB1	7/11/08	Acetone tert-Butyl alcohol	1.7 ug/L 5.4 ug/L	RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-30BDL RSAL2-37B RSAL2-40B RSAL2-40BDL RSAK2-0.5B RSAK2-0.5BRE RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B

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
RSAK2-0.5B	Acetone	3.2 ug/kg	3.2U 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
RSAI7-30B	Bromofluorobenzene	65 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A
RSAI7-30BRE	Bromofluorobenzene	61 (70-130)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS or MSD percent recoveries (%R) were not within QC limits for several 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. Percent recoveries (%R) were within QC limits with the following exceptions:

LCS ID	Compound	%R (Limits)	Associated Samples	Flag	A or P
LCS3	Dichlorodifluoromethane	132 (75-125)	RSAI7-0.5B RSAI7-30BRE RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B RSAL2-20B METBLK3	J+ (all detects)	P
LCS6	1,2-Dibromo-3-chloropropane	69 (75-125)	RSAL2-30BDL RSAL2-40BDL METBLK6	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAI7-30B	Pentafluorobenzene	106179 (122405-489620)	Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Butyl alcohol Ethyl-tert-butyl ether	J (all detects) UJ (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAI7-30BRE	Pentafluorobenzene 1,4-Dichlorobenzene-d4	125124 (164158-656630) 86927 (97799-391196)	Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Butyl alcohol Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A
RSAK2-0.5BRE	Pentafluorobenzene 1,4-Difluorobenzene Chlorobenzene-d5 1,4-Dichlorobenzene-d4	116976 (162503-650010) 237590 (310407-1241628) 209606 (274652-1098608) 78669 (104296-417184)	All TCL compounds	J (all detects) UJ (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSAL2-30B	Chloroform	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A
RSAL2-40B	Benzene Chlorobenzene	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 R2844922	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
RSAL2-30B	Chloroform	X	A
RSAL2-30BDL	All TCL compounds except Chloroform	X	A
RSAL2-40B	Benzene Chlorobenzene	X X	A
RSAL2-40BDL	All TCL compounds except Benzene Chlorobenzene	X	A

Sample	Compound	Flag	A or P
RSAI7-30BRE RSAK2-0.5BRE	All TCL compounds	X	A

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

XVI. Field Duplicates

Samples RSAL2-20B and RSAL2-20BD and samples RSAK2-20B and RSAK2-20BD 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
	RSAL2-20B	RSAL2-20BD				
Acetone	48	44	-	4 (≤22)	-	-
Benzene	3.1	13	-	9.9 (≤5.6)	J (all detects)	A
2-Butanone	7.7	6.6	-	1.1 (≤11)	-	-
Chlorobenzene	4.4	15	-	10.6 (≤5.6)	J (all detects)	A
Chloroform	0.80	0.97	-	0.17 (≤5.6)	-	-
Chloromethane	0.55	0.54	-	0.01 (≤5.6)	-	-
1,2-Dichlorobenzene	5.6U	1.4	-	4.2 (≤5.6)	-	-
1,4-Dichlorobenzene	1.3	3.4	-	2.1 (≤5.6)	-	-
Methylene chloride	5.6U	0.38	-	5.22 (≤5.6)	-	-
Toluene	1.3	1.4	-	0.1 (≤5.6)	-	-
1,2,4-Trichlorobenzene	1.1	1.1	-	0 (≤5.6)	-	-
Trichloroethene	1.3	5.2U	-	3.9 (≤5.2)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK2-20B	RSAK2-20BD				
Acetone	11	15	-	4 (≤26)	-	-
Chloroform	1.0	0.61	-	0.39 (≤6.5)	-	-
Methylene chloride	0.49	0.36	-	0.13 (≤6.5)	-	-
4-Methyl-2-pentanone	13U	0.64	-	12.36 (≤13)	-	-
1,2,3-Trichlorobenzene	1.8	1.7	-	0.1 (≤6.5)	-	-
Trichloroethene	0.83	0.50	-	0.33 (≤6.5)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2844922

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	TB071008SB2 TB071108SB1	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Sample condition (vh)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAI7-30BRE RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-30BDL RSAL2-37B RSAL2-40B RSAL2-40BDL RSAK2-0.5B RSAK2-0.5BRE RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Sample storage (h)
R2844922	RSAL2-30BDL RSAL2-40BDL TB071008SB2 TB071108SB1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2844922	RSAL2-30BDL RSAL2-40BDL TB071008SB2 TB071108SB1	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2844922	RSAI7-30B RSAI7-30BRE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	RSAI7-0.5B RSAI7-30BRE RSAL2-20BD RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-20BD RSAK2-30B RSAK2-35B RSA17-32B RSAL2-20B	Dichlorodifluoromethane	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844922	RSAL2-30BDL RSAL2-40BDL	1,2-Dibromo-3-chloropropane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844922	RSAI7-30B	Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Butyl alcohol Ethyl-tert-butyl ether	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	RSAI7-30BRE	Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride Acetone 1,1-Dichloroethene 1,1-Dichloroethane Chloroform 2-Butanone 1,1,1-Trichloroethane Dichlorodifluoromethane Trichlorofluoromethane Methyl-tert-butyl ether 2,2-Dichloropropane Bromochloromethane trans-1,2-Dichloroethene cis-1,2-Dichloroethene Di-isopropyl ether tert-Butyl alcohol Ethyl-tert-butyl ether 1,1,2,2-Tetrachloroethane 1,2-Dibromo-3-chloropropane Bromobenzene 1,2,3-Trichloropropane n-Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene tert-Butylbenzene 1,2,4-Trimethylbenzene sec-Butylbenzene 1,3-Dichlorobenzene p-Isopropyltoluene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2,4-Trichlorobenzene Hexachlorobutadiene Naphthalene 1,2,3-Trichlorobenzene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R2844922	RSAK2-0.5BRE	All TCL compounds	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R2844922	RSAL2-30B	Chloroform	J (all detects)	A	Project Quantitation Limit (e)
R2844922	RSAL2-40B	Benzene Chlorobenzene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	RSAJ8-0.5B RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAI7-30BRE RSAL2-0.5B RSAL2-10B RSAL2-20B RSAL2-20BD RSAL2-30B RSAL2-30BDL RSAL2-37B RSAL2-40B RSAL2-40BDL RSAK2-0.5B RSAK2-0.5BRE RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-30B RSAK2-35B TB071008SB2 TB071108SB1 RSA17-32B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)
R2844922	RSAL2-30B	Chloroform	X	A	Overall assessment of data (o)
R2844922	RSAL2-30BDL	All TCL compounds except Chloroform	X	A	Overall assessment of data (o)
R2844922	RSAL2-40B	Benzene Chlorobenzene	X X	A	Overall assessment of data (o)
R2844922	RSAL2-40BDL	All TCL compounds except Benzene Chlorobenzene	X	A	Overall assessment of data (o)
R2844922	RSAI7-30BRE RSAK2-0.5BRE	All TCL compounds	X	A	Overall assessment of data (o)
R2844922	RSAL2-20B RSAL2-20BD	Benzene Chlorobenzene	J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2844922

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844922	RSAI7-0.5B (1.15X)	Acetone Methylene chloride	13U ug/Kg 0.71U ug/Kg	A	bl
R2844922	RSAL2-20BD	Methylene chloride	0.38U ug/Kg	A	bl
R2844922	RSAL2-30B	Acetone Methylene chloride	11U ug/Kg 0.89U ug/Kg	A	bl
R2844922	RSAL2-37B	Methylene chloride	0.51U ug/Kg	A	bl
R2844922	RSAL2-40B	Acetone Methylene chloride	14U ug/Kg 0.53U ug/Kg	A	bl
R2844922	RSAK2-0.5B	Acetone Methylene chloride	3.2U ug/Kg 0.40U ug/Kg	A	bl
R2844922	RSAK2-20BD	Acetone Methylene chloride	15U ug/Kg 0.36U ug/Kg	A	bl
R2844922	RSA17-32B	Acetone	11U ug/Kg	A	bl
R2844922	RSAL2-30BDL (124X)	Methylene chloride	49U ug/Kg	A	bl
R2844922	RSAL2-40BDL (101.5X)	2-Butanone Methylene chloride	75U ug/Kg 36U ug/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2844922

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844922	RSAK2-0.5B	Acetone	3.2U ug/Kg	A	bt

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257K1
SDG #: R2844922
Laboratory: Columbia Analytical Services

Date: 8/15/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/10-11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	2 RSD r
IV.	Continuing calibration/~~ICV~~	SW	CCV ≤ 25 2
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	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 13, 14 D_2 = 23, 24
XVII.	Field blanks	SW	TB = ~~27~~ 28

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	RSAJ8-0.5B	S	11	RSAL2-0.5B	S	21	RSAK2-0.5BRE	S	31	RSAL2-0.5BMSD	S
2	RSAJ8-10B		12	RSAL2-10B		22	RSAK2-10B		32	WAT BLK 1	7/8
3	RSAJ8-20B		13	RSAL2-20B	D_1	23	RSAK2-20B	D_2	33	MET BLK 2	7/22
4	RSAJ8-30B		14	RSAL2-20BD	D_1	24	RSAK2-20BD	D_2	34	MET BLK 3	
5	RSAJ8-33B		15	RSAL2-30B		25	RSAK2-30B		35	MET BLK 4	
6	RSAI7-0.5B		16	RSAL2-30BDL		26	RSAK2-35B		36	MET BLK 5	
7	RSAI7-10B		17	RSAL2-37B		27	TB071008SB2	W	37	MET BLK 6	
8	RSAI7-20B		18	RSAL2-40B		28	TB071108SB1		38		
9	RSAI7-30B		19	RSAL2-40BDL		29	RSA17-32B	S	39		
10	RSAI7-30BRE		20	RSAK2-0.5B		30	RSAL2-0.5BMS		40		

LDC #: 21257k1
SDG #: Sa Grav

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

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

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
27, 28	W	Vials	contained	pea size	headspace		J-/UJ/A (vh)
All soils	Due to lab error samples were not placed into the freezer until after 48 hours						J-/UJ/A (h)

TECHNICAL HOLDING TIME CRITERIA

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

LDC #: 21257k1
SDG #: Su Cmv

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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

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

(Y) N N/A 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
	7/16/08	ICAL	ZZZ		0.043	27, WATBLK1	J/NJ/A (c)
	6/26/08	ICAL	ZZZ		0.021	16, 19, 28, METBLK5, METBLK6	

INICAL.1SB

LDC #: 21257k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	7/18/08	K8452	ZZZ		0.043	27, WATBLK1	J/UJ/A (c)
	7/21/08	B1204	ZZZ		0.018	28, METBLK5	J/UJ/A (c)
	7/24/08	B1253	ZZZ		0.019	16, 19, METBLK6	J/UJ/A (c)

CONCAL.1SB

LDC #: 21257K1
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 3
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.

(b2)

Blank analysis date: 7/22/08
Conc. units: ug/kg
Associated Samples: 1-5, 7-9, 11, 12

Compound	Blank ID	Sample Identification								
	METBlk2	2	3	4	5	7	8	9	12	
3.V Methylene chloride F	1.6	(24)	(23)	(38)	(14)	(9.6)	(15)	(95)	(10)	
Acetone										
CRQL										

Blank analysis date: 7/23/08
Conc. units: ug/kg
Associated Samples: 6, 10, 13-15, 17, 18, 20, 24, 25, 26, 29

Compound	Blank ID	Sample Identification											
	MET Blk 3	6 (1.15x)	10	13	14	15	17	18	20	24	25	26	29
24 Methylene chloride F	~~12~~	13/U	(81)	(48)	(44)	11/U	(45)	14/U	3.2/U	15/U	(47)	(49)	11/U
0.6V Acetone E	0.31	0.71/U	(2.8)		0.38/U	0.89/U	0.57/U	0.53/U	0.40/U	0.36/U	(1.2)	(1.1)	
CRQL													

LDC #: 21257K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 3
Reviewer: JVC
2nd Reviewer:

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

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

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

(6 l)

Blank analysis date: 7/24/08
Conc. units: ug/kg
Associated Samples: 16, 19

Compound	Blank ID	Sample Identification								
	METBLK 6	16 (124x)	19 (101.5x)							
~~Methylene chloride~~ M	0.49		75/U							
~~Acetone~~ E	0.88	49/U	36/U							
NNN	0.48									
CRQL										

Blank analysis date: 7/24/08
Conc. units: ug/kg
Associated Samples: 21-23

Compound	Blank ID	Sample Identification								
	METBLK 4	22	23							
4,8 ~~Methylene chloride~~ F	2.4	(8.9)	(11)							
Acetone										
CRQL										

LDC #: 21257k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVL
2nd Reviewer:

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

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

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

Blank analysis date: 7/18/08
Conc. units: ug/L
Associated Samples: 27 (ND)

Compound	Blank ID	Sample Identification								
	WAT BLK1									
~~Methylene chloride~~ LLL	1.8									
Acetone										
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 21257k1
SDG #: Eq. Cov ✓

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

Field blank type: (circle one) Field Blank / Rinsate / (Trip Blank) / Other: _____ Associated Samples: 11 - 26 (b7)

Compound	Blank ID 28	Blank ID	Sample Identification							
Sampling Date	7/11/08	12	13	14	15	17	18	20	22	23
F	1.7	(10)	(48)	(44)	(11)	(45)	(19)	3.2/4	(8.9)	(11)
222	5.4									
CRQL										

3.4

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

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

Compound	Blank ID 28	Blank ID	Sample Identification							
Sampling Date	7/11/08		24	25	26					
F	1.7		(15)	(47)	(49)					
222	5.4									
CRQL										

LDC #: 21257k1
SDG #: Sw Cmov

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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

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

Y (N) N/A Were all 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
		9	BFB	65 (70-130)	J-/UJ/A (S)
				( )	
		10	BFB	61 ( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	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 #: 21257K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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 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
		30/31	LL	61 (70-130)	63 (70-130)	( )	11	No qual (LCSin)
			Z	62 ( )	( )	( )		(MSDin)
			KKK	51 ( )	64 ( )	( )		(LCSin)
			NNN	47 ( )	61 ( )	( )		
			F	166 (50-150)	194 (50-150)	( )		
			III	67 (70-130)	( )	( )		(MSDin)
			JJJ	69 ( )	( )	( )		
			HHH	66 ( )	( )	( )		
			FFF	66 ( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	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 #: 21257K1
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
		LCS 2	JJ	129 (75-125)	( )	( )	1-5, 7-9, 11, 12,	No qual (MS/MSD in)
				( )	( )	( )	METBLK2	
				( )	( )	( )		
				( )	( )	( )		
		LCS 3	JJ	132 (75-125)	( )	( )	6, 10, 14, 15, 17, 18,	J+ dets/P (1)
				( )	( )	( )	20, 24-26, 29, 13	
				( )	( )	( )	METBLK3	
				( )	( )	( )		
		LCS 6	MM	69 (75-125)	( )	( )	16, 19, METBLK6	J-/UJ/P (1)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

(LCS3 - No MS/MSD)
(↓ 6 ↑)

LDC #: 21257k1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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

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

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

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

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		9	PFB	106179 (122405 - 489620)		J/UJ/A (i)
						See compound list
		10	PFB	125124 (164158 - 656630)		(i)
			4DCB	86927 (97799 - 391196)		
		21	PFB	116976 (162503 - 650010)		(All TCL) (i)
			DFB	237590 (310407 - 1241628)		
			CBZ	209606 (274652 - 1098608)		
			4DCB	78669 (104296 - 417184)		

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

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA SW 846 Method 8260B)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. p-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.

PBF PFB DFB CBZ 4DCB

LDC #: 21257k1
SDG #: Sw Cmw

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: SB
2nd Reviewer: _____

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

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

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

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

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

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257K1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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".

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		15	K >cal range		X / A (o)
		16	All except K dil		
		18	V, DD > cal range		
		19	All except V, DD dil		
		10	Confirmation for 15 & Surr exceedance		
		21	IS outside limits		↓ ✓

Comments: [#21 – rerun of #20 for possible carryover contamination)

OVR.1SB

LDC#: 21257K1
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 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	Quals (Parent Only)
	13	14			
Acetone	48	44		4 (≤22)	
Benzene	3.1	13		9.9 (≤5.6)	J dets /A (fd)
2-Butanone	7.7	6.6		1.1 (≤11)	
Chlorobenzene	4.4	15		10.6 (≤5.6)	J dets /A (fd)
Chloroform	0.80	0.97		0.17	
Chloromethane	0.55	0.54		0.01	
1,2-Dichlorobenzene	5.6U	1.4		4.2	
1,4-Dichlorobenzene	1.3	3.4		2.1	
Methylene chloride	5.6U	0.38		5.22	
Toluene	1.3	1.4		0.1	
1,2,4-Trichlorobenzene	1.1	1.1		0	
Trichloroethene	1.3	5.2U		3.9 (≤5.2)	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Quals (Parent Only)
	23	24			
Acetone	11	15		4 (≤26)	-
Chloroform	1.0	0.61		0.39 (≤6.5)	-
Methylene chloride	0.49	0.36		0.13	-
4-Methyl-2-pentanone	13U	0.64		12.36 (≤13)	-
1,2,3-Trichlorobenzene	1.8	1.7		0.1 (≤6.5)	-
Trichloroethene	0.83	0.50		0.33	-

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada

Collection Date: July 11, 2008

LDC Report Date: August 27, 2009

Matrix: Soil

Parameters: Volatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2845025

Sample Identification

RSAI7-10B(119157)

Samples in this SDG underwent SPLP extraction.

Introduction

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

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until SPLP Extraction	Required Holding Time (in Days) From Sample Collection Until SPLP Extraction	Flag	A or P
All samples in SDG R2845025	All TCL compounds	17	14	J- (all detects) UJ (all non-detects)	P

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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
7/28/08	tert-Butyl alcohol	0.017 (≥0.05)	All samples in SDG R2845025	J (all detects) UJ (all non-detects)	A

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

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

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
8/4/08	tert-Butyl alcohol	0.020 (≥0.05)	All samples in SDG R2845025	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
VBLK1	8/4/08	Methylene chloride Naphthalene	0.20 ug/L 0.20 ug/L	RSAI7-10B(119157)
SPLPBLK1	8/4/08	Methylene chloride Acetone	0.37 ug/L 2.3 ug/L	RSAI7-10B(119157)

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
RSAI7-10B(119157) (10x)	Methylene chloride Acetone	2.8 ug/L 18 ug/L	2.8U ug/L 18U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R2845025	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

XIV. System Performance

Raw data were not reviewed for this SDG.

XV. Overall Assessment of Data

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

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Data Qualification Summary - SDG R2845025

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2845025	RSAI7-10B(119157)	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R2845025	RSAI7-10B(119157)	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Initial calibration (RRF) (c)
R2845025	RSAI7-10B(119157)	tert-Butyl alcohol	J (all detects) UJ (all non-detects)	A	Continuing calibration (RRF) (c)
R2845025	RSAI7-10B(119157)	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Laboratory Blank Data Qualification Summary - SDG R2845025

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2845025	RSAI7-10B(119157) (10x)	Methylene chloride Acetone	2.8U ug/L 18U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Volatiles - Field Blank Data Qualification Summary - SDG R2845025

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257L1
SDG #: R2845025
Laboratory: Columbia Analytical Services

Date: 8/13/09
Page: 1 of 1
Reviewer: JVC
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	SW	Sampling dates: 7/11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	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	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	RSAI7-10B(119157)	11		21		31	
2	VBLK1	12		22		32	
3	SPLPBLK1	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

SPLP (no r2)

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 #: 21257C1
SDG #: Sa Cove

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: VV
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	(SPLP) Extraction date	Analysis date	Total # of Days	Qualifier
All	S	N	7/11/08	7/28/08	8/04/08	17	J/UJ/R (h)

TECHNICAL HOLDING TIME CRITERIA

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

LDC #: 21257L1
SDG #: See Cover

Reviewer: JVG
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET

Initial Calibration

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

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

- (Y) N N/A — Did the laboratory perform a 5 point calibration prior to sample analysis?
- (Y) N N/A — Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
- (Y) N N/A — Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation? 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
	7/28/08	ICAL	222		0.017	All + Blk	J/UJ/A (c)

LDC #: 21257L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	8/04/08	Z3141	ZZZ		0.020	All + Blks	J/UJ/A (c)

LDC #: 21257L1
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: DVB
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: 8/04/08
Conc. units: ug/L
Associated Samples: 1 (bl)

Compound	Blank ID	Sample Identification								
	VBLK1	SPLPBLK1	1 (10X)							
Methylene chloride E	0.20	0.37	2.8/U							
~~Acetone~~ MMM	0.20									
F		2.3	18/U							
CRQL										

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								
Methylene chloride										
Acetone										
CRQL										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".