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

Semivolatiles

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 21, 2009

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844538

Sample Identification

PB061608B
PC-40B
H-48B
MC-66BD
MC-66BDRE
MC-65B
MC-66B
MC-66BRE
PC-37B
PC-72B
M-94BX
M-94BXRE
MC-62B

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	6/23/08	Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate Naphthalene	0.31 ug/L 1.8 ug/L 0.22 ug/L 0.060 ug/L	PB061608B PC-40B H-48B

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
PB061608B	Naphthalene	0.085 ug/L	0.085U ug/L
PC-40B	Naphthalene	0.048 ug/L	0.048U ug/L
H-48B	Diethylphthalate Naphthalene	0.20 ug/L 0.066 ug/L	0.20U ug/L 0.066U ug/L

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Diethylphthalate Naphthalene	0.18 ug/L 0.075 ug/L	PC-40B H-48B MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B

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

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB061608B	6/16/08	Bis(2-ethylhexyl)phthalate Naphthalene	0.21 ug/L 0.085 ug/L	PC-40B H-48B MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B

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	Naphthalene	0.048 ug/L	0.048U ug/L
H-48B	Bis(2-ethylhexyl)phthalate Naphthalene Diethylphthalate	0.22 ug/L 0.066 ug/L 0.20 ug/L	0.22U ug/L 0.066U ug/L 0.20U ug/L
MC-66BD	Naphthalene	0.038 ug/L	0.038U ug/L
MC-66BDRE	Naphthalene	0.048 ug/L	0.048U ug/L
MC-66B	Naphthalene	0.056 ug/L	0.056U ug/L
MC-66BRE	Naphthalene	0.056 ug/L	0.056U ug/L
PC-72B	Naphthalene	0.066 ug/L	0.066U ug/L
M-94BX	Naphthalene Diethylphthalate	0.047 ug/L 0.14 ug/L	0.047U ug/L 0.14U ug/L
M-94BXRE	Naphthalene Diethylphthalate	0.047 ug/L 0.19 ug/L	0.047U ug/L 0.19U ug/L
MC-62B	Naphthalene	0.075 ug/L	0.075U ug/L
PC-37B	Diethylphthalate	0.13 ug/L	0.13U 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) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (PB061608B PC-40B H-48B SBLK1)	Di-n-butylphthalate Di-n-octylphthalate	200 (50-120) 138 (50-120)	168 (50-120) 144 (50-120)	- -	J+ (all detects) J+ (all detects)	P
LCS/D1 (PB061608B PC-40B H-48B SBLK1)	1,4-Dioxane Pyridine	42 (50-120) 32 (50-120)	44 (50-120) 33 (50-120)	- -	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P
LCS/D2 (MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B SBLK2)	Di-n-butylphthalate Di-n-octylphthalate Pyridine	134 (50-120) 140 (50-120) 180 (50-120)	128 (50-120) 134 (50-120) -	- - -	J+ (all detects) J+ (all detects) J+ (all detects)	P

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D2 (MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B SBLK2)	1,4-Dioxane	40 (50-120)	40 (50-120)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MC-66BD	Perylene-d12	0 (153834-615336)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
MC-66B	Perylene-d12	15000 (153834-615336)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A
MC-66BDRE	Perylene-d12	0 (141763-567050)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
MC-66BRE	Perylene-d12	0 (141763-567050)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-94BX	Perylene-d12	0 (141763-567050)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-94BXRE	Perylene-d12	0 (141763-567050)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

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-66BDRE MC-66BRE M-94BXRE	All TCL compounds	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 and samples MC-66BDRE and MC-66BRE were identified as field duplicates. No semivolatiles 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				
1,4-Dioxane	0.36	0.38	-	0.02 (≤2.0)	-	-
Naphthalene	0.038	0.056	-	0.018 (≤0.20)	-	-

Compound	Concentration (ug/L)		RPD (Limits)	Difference (Limits)	Flags	A or P
	MC-66BDRE	MC-66BRE				
1,4-Dioxane	0.36	0.32	-	0.04 (≤2.0)	-	-
Naphthalene	0.048	0.056	-	0.008 (≤0.20)	-	-

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844538	PB061608B PC-40B H-48B MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B	Di-n-butylphthalate Di-n-octylphthalate	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844538	PB061608B PC-40B H-48B	1,4-Dioxane Pyridine	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844538	MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844538	MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B	Pyridine	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844538	MC-66BD MC-66BDRE MC-66BRE M-94BX M-94BXRE	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844538	MC-66B	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R2844538	PB061608B PC-40B H-48B MC-66BD MC-66BDRE MC-65B MC-66B MC-66BRE PC-37B PC-72B M-94BX M-94BXRE MC-62B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844538	MC-66BDRE MC-66BRE M-94BXRE	All TCL compounds	X	A	Overall assessment of data (o)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844538	PB061608B	Naphthalene	0.085U ug/L	A	bl
R2844538	PC-40B	Naphthalene	0.048U ug/L	A	bl
R2844538	H-48B	Diethylphthalate Naphthalene	0.20U ug/L 0.066U ug/L	A	bl

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

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844538	PC-40B	Naphthalene	0.048U ug/L	A	bf,bp
R2844538	H-48B	Naphthalene	0.066U ug/L	A	bf,bp

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844538	H-48B	Bis(2-ethylhexyl)phthalate	0.22U ug/L	A	bp
R2844538	H-48B	Diethylphthalate	0.20U ug/L	A	bf
R2844538	MC-66BD	Naphthalene	0.038U ug/L	A	bf,bp
R2844538	MC-66BDRE	Naphthalene	0.048U ug/L	A	bf,bp
R2844538	MC-66B	Naphthalene	0.056U ug/L	A	bf,bp
R2844538	MC-66BRE	Naphthalene	0.056U ug/L	A	bf,bp
R2844538	PC-72B	Naphthalene	0.066U ug/L	A	bf,bp
R2844538	M-94BX	Naphthalene	0.047U ug/L	A	bf,bp
R2844538	M-94BX	Diethylphthalate	0.14U ug/L	A	bf
R2844538	M-94BXRE	Naphthalene	0.047U ug/L	A	bf,bp
R2844538	M-94BXRE	Diethylphthalate	0.19U ug/L	A	bf
R2844538	MC-62B	Naphthalene	0.075U ug/L	A	bf,bp
R2844538	PC-37B	Diethylphthalate	0.13U ug/L	A	bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257A2a
SDG #: R2844538
Laboratory: Columbia Analytical Services

Date: 8/11/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/16-23/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	20 RSD r²
IV.	Continuing calibration/ICV	~~JVG SW~~ A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 4, 7 D_2 = 5, 8
XVII.	Field blanks	SW	PB = 1 FB 061608 GW AR2A1 (R2844650)

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	M-94BX	+ 21 1	SBLK1	31	
2 1	PC-40CB	12	M-94BRE X	− 22 2	SBLK2	32	
3 1	H-48B	13	MC-62B ^	23		33	
4	MC-066BD D_1	14		24		34	
5	MC-066BDRE D_2	15		25		35	
6	MC-65B 1	16		26		36	
7	MC-66B D_1	17		27		37	
8	MC-66BRE D_2	18		28		38	
9	PC-37B	19		29		39	
10	PC-72B	20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

(6 L)

Blank extraction date: 6/23/08 **Blank analysis date:** 6/27/08
Conc. units: ug/L Associated Samples: 1-3

Compound	Blank ID	Sample Identification								
	SBLK1	1	2	3						
AAA	0.31									
XX	1.8									
LL	0.22			0.20 /U						
S	0.060	0.085 /U	0.048 /U	0.066 /U						

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

Compound	Blank ID	Sample Identification								

LDC #: 21257A2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

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

Sampling date: 6/16/08

Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: All except 1 (bp)

Compound	Blank ID	Sample Identification									
	1	2	3	4	5	7	8	10	11	12
EEE	0.21		0.22/U							
1.05 S	0.085	0.048/U	0.066/U	0.038/U	0.048/U	0.056/U	0.056/U	0.066/U	0.047/U	0.047/U
0.17										
CRQL										

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

Sampling date: _____ Same as above

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

Compound	Blank ID	Sample Identification									
	1	13									
EEE	0.21										
S	0.085	0.075/U									
CRQL											

2x - all others
5x - phthalates

LDC #: 21257
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer: [signature]

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

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

(bf)

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08
Field blank type: (circle one) ~~Field Blank~~ / Rinsate / Other: _____ Associated Samples: All except 1

Compound	FB062408GWAREA1 Blank ID	Sample Identification								
	6/24/08	2	3	4	5	7	8	~~10~~ 9	10	11
LL	0.18		0.20/U					0.13/U		0.14/U
S	0.075	0.048/U	0.066/U	0.038/U	0.048/U	0.056/U	0.056/U	~~0~~	0.066/U	0.047/U
CRQL										

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

Compound	Blank ID	Sample Identification								
	FB	12	13							
LL	0.18	0.19/U								
S	0.075	0.047/U	0.075/U							
CRQL										

5x Phthalates
2x all others

LDC #: 21257A2a
SDG #: Sa Cmov

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 1	XX	200 (50-120)	168 (50-120)	( )	1-3, SBlk1	J+ dets/p (l, ld)
			UUU	42 ( )	44 ( )	( )		J-/UJ/p
			FFF	138 ( )	144 ( )	( )		J+ dets/p
			RRR	32 ( )	33 ( )	( )		J-/UJ/p
				( )	( )	( )		
				( )	( )	( )		
		LCS/D 2	XX	134 (50-120)	128 (50-120)	( )	4-13, SBlk2	J+ dets/p (l, ld)
			UUU	40 ( )	40 ( )	( )		J-/UJ/p
			FFF	140 ( )	134 ( )	( )		J+ dets/p
			RRR	180 ( )	( )	( )		(l)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257A2a
SDG #: In Cond

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were 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
		4	PRY	0 (153834 - 615336)		J / R / A (i)
		7	PRY	15000		J / NJ / A
		5		0 (141763 - 567050)		J / R / A
		8		0		
		11		0		
		12		0		
						(qual FFF, GGG, HHH, III, JJJ, KKK, LLL)

* QC limits are advisory
IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

(no recoveries - no R.T.'s)

LDC #: 21257A29
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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
		5, 8, 12	Reruns for IS outside criteria		X/A (O)

Comments: _____

LDC #: 21257A 29
SDG #: Su Creek

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/L)		Diff ~~RPD~~
	4	7	
NNN	0.36	~~0.~~ 0.38	0.02 (≤ 2.0)
S	0.038	0.056	0.018 (≤ 0.20)

Compound	Concentration (ug/L)		RPD
	5	8	
NNN	0.36	0.32	0.04 (≤ 2.0)
S	0.048	0.056	0.008 (≤ 0.20)

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 24 through June 27, 2008

LDC Report Date: September 17, 2009

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844650

Sample Identification

M-44B
H-49AB
FB062408GWAREA1
MC-45B
MC-53B
M-23B
M-23BRE
MC-97B
MC-94B
MC-94BRE
MW-16B
M-5AB
EB062608GW3
M-61B
M-88BB
M-7BB
M-67B
M-6AB
M-57AB
M-57ABRE
M-95B
M-68B
M-7BBMS
M-7BBMSD

Introduction

This data review covers 24 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
6/26/08	Pyridine	44.4	All samples in SDG R2844650	J+ (all detects)	A

All of the continuing calibration RRF values were greater than or equal to 0.05 .

*V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK2	6/30/08	Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.39 ug/L 1.7 ug/L 0.13 ug/L 0.25 ug/L 0.040 ug/L	MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B

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
MC-53B	Butylbenzylphthalate	0.71 ug/L	0.71U ug/L
M-23B	Diethylphthalate Naphthalene	0.17 ug/L 0.056 ug/L	0.17U ug/L 0.056U ug/L
M-23BRE	Diethylphthalate Naphthalene	0.20 ug/L 0.066 ug/L	0.20U ug/L 0.066U ug/L

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
MC-97B	Di-n-butylphthalate Diethylphthalate Naphthalene	1.5 ug/L 0.20 ug/L 0.067 ug/L	1.5U ug/L 0.20U ug/L 0.067U ug/L
MC-94B	Bis(2-ethylhexyl)phthalate Naphthalene	0.75 ug/L 0.070 ug/L	0.75U ug/L 0.070U ug/L
MC-94BRE	Bis(2-ethylhexyl)phthalate Naphthalene	0.75 ug/L 0.070 ug/L	0.75U ug/L 0.070U ug/L
MW-16B	Bis(2-ethylhexyl)phthalate	0.54 ug/L	0.54U ug/L
M-5AB	Naphthalene	0.048 ug/L	0.048U ug/L
EB062608GW3	Diethylphthalate Naphthalene	0.38 ug/L 0.050 ug/L	0.38U ug/L 0.050U ug/L
M-67B	Naphthalene	0.049 ug/L	0.049U ug/L
M-6AB	Bis(2-ethylhexyl)phthalate Naphthalene	0.26 ug/L 0.059 ug/L	0.26U ug/L 0.059U ug/L
M-57AB	Naphthalene	0.040 ug/L	0.040U ug/L
M-57ABRE	Naphthalene	0.040 ug/L	0.040U ug/L
M-95B	Bis(2-ethylhexyl)phthalate Naphthalene	0.022 ug/L 0.038 ug/L	0.022U ug/L 0.038U ug/L
M-68B	Naphthalene	0.041 ug/L	0.041U ug/L

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

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB062608GW3	6/26/08	Diethylphthalate Naphthalene	0.38 ug/L 0.050 ug/L	MW-16B M-5AB

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB062408GWAREA1	6/16/08	Naphthalene Diethylphthalate	0.075 ug/L 0.18 ug/L	M-44B H-49AB MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B

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

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB061608B	6/16/08	Bis(2-ethylhexyl)phthalate Naphthalene	0.21 ug/L 0.085 ug/L	M-44B H-49AB MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B

*Removed samples MW-16B and M-5AB from above table.

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
H-49AB	Naphthalene Diethylphthalate	0.080 ug/L 0.15 ug/L	0.080U ug/L 0.15U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
M-23B	Naphthalene Diethylphthalate	0.056 ug/L 0.17 ug/L	0.056U ug/L 0.17U ug/L
M-23BRE	Naphthalene Diethylphthalate	0.066 ug/L 0.20 ug/L	0.066U ug/L 0.20U ug/L
MC-97B	Naphthalene Diethylphthalate	0.067 ug/L 0.20 ug/L	0.067U ug/L 0.20U ug/L
MC-94B	Bis(2-ethylhexyl)phthalate Naphthalene	0.75 ug/L 0.070 ug/L	0.75U ug/L 0.070U ug/L
MC-94BRE	Bis(2-ethylhexyl)phthalate Naphthalene	0.75 ug/L 0.070 ug/L	0.75U ug/L 0.070U ug/L
M-5AB	Naphthalene	0.048 ug/L	0.048U ug/L
M-67B	Naphthalene	0.049 ug/L	0.049U ug/L
M-6AB	Bis(2-ethylhexyl)phthalate Naphthalene	0.26 ug/L 0.059 ug/L	0.26U ug/L 0.059U ug/L
M-57AB	Naphthalene	0.040 ug/L	0.040U ug/L
M-57ABRE	Naphthalene	0.040 ug/L	0.040U ug/L
M-95B	Bis(2-ethylhexyl)phthalate Naphthalene	0.22 ug/L 0.038 ug/L	0.22U ug/L 0.038U ug/L
M-68B	Naphthalene	0.041 ug/L	0.041U 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)	Di-n-butylphthalate	320 (50-150)	200 (50-150)	46 (≤30)	J+ (all detects)	A
M-7BBMS/MSD (M-7BB)	Pyridine	38 (50-150)	34 (50-150)	-	J- (all detects) UJ (all non-detects)	A

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (MW-16B M-5AB EB062608GW3 SBLK1)	Di-n-butylphthalate Di-n-octylphthalate	134 (50-120) 140 (50-120)	128 (50-120) 134 (50-120)	- -	J+ (all detects) J+ (all detects)	P
LCS/D1 (MW-16B M-5AB EB062608GW3 SBLK1)	1,4-Dioxane	40 (50-120)	40 (50-120)	-	J- (all detects) UJ (all non-detects)	P

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D2 (MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B SBLK2)	Di-n-butylphthalate	460 (50-120)	480 (50-120)	-	J+ (all detects)	P
LCS/D2 (MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B SBLK2)	Pyridine	14 (50-120)	0 (50-120)	200 (≤30)	J- (all detects) R (all non-detects)	P

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
M-23B	Perylene-d12	0 (141763-567050)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-23BRE	Perylene-d12	0 (127170-508680)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
MC-94B	Perylene-d12	46528 (127170-508680)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
MC-94BRE	Perylene-d12	27916 (127170-508680)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-57AB	Perylene-d12	24566 (127170-508680)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-57ABRE	Perylene-d12	1051 (127170-508680)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (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.

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

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-23BRE MC-94BRE M-57ABRE	All TCL compounds	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
Semivolatiles - Data Qualification Summary - SDG R2844650

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B	Pyridine	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R2844650	M-7BB	Di-n-butylphthalate	J+ (all detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD) (m,ld)
R2844650	M-7BB	Pyridine	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(m)
R2844650	MW-16B M-5AB EB062608GW3	Di-n-butylphthalate Di-n-octylphthalate	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844650	MW-16B M-5AB EB062608GW3	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B	Di-n-butylphthalate	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844650	MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B	Pyridine	J- (all detects) R (all non-detects)	P	Laboratory control samples (%R) (l)
R2844650	M-23B M-23BRE MC-94B MC-94BRE M-57AB M-57ABRE	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A	Internal standards (area) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844650	M-44B H-49AB FB062408GWAREA1 MC-45B MC-53B M-23B M-23BRE MC-97B MC-94B MC-94BRE MW-16B M-5AB EB062608GW3 M-61B M-88BB M-7BB M-67B M-6AB M-57AB M-57ABRE M-95B M-68B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844650	M-23BRE MC-94BRE M-57ABRE	All TCL compounds	X	A	Overall assessment of data (o)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844650	MC-53B	Butylbenzylphthalate	0.71U ug/L	A	bl
R2844650	M-23B	Diethylphthalate Naphthalene	0.17U ug/L 0.056U ug/L	A	bl
R2844650	M-23BRE	Diethylphthalate Naphthalene	0.20U ug/L 0.066U ug/L	A	bl
R2844650	MC-97B	Di-n-butylphthalate Diethylphthalate Naphthalene	1.5U ug/L 0.20U ug/L 0.067U ug/L	A	bl
R2844650	MC-94B	Bis(2-ethylhexyl)phthalate Naphthalene	0.75U ug/L 0.070U ug/L	A	bl
R2844650	MC-94BRE	Bis(2-ethylhexyl)phthalate Naphthalene	0.75U ug/L 0.070U ug/L	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844650	MW-16B	Bis(2-ethylhexyl)phthalate	0.54U ug/L	A	bl
R2844650	M-5AB	Naphthalene	0.048U ug/L	A	bl
R2844650	EB062608GW3	Diethylphthalate Naphthalene	0.38U ug/L 0.050U ug/L	A	bl
R2844650	M-67B	Naphthalene	0.049U ug/L	A	bl
R2844650	M-6AB	Bis(2-ethylhexyl)phthalate Naphthalene	0.26U ug/L 0.059U ug/L	A	bl
R2844650	M-57AB	Naphthalene	0.040U ug/L	A	bl
R2844650	M-57ABRE	Naphthalene	0.040U ug/L	A	bl
R2844650	M-95B	Bis(2-ethylhexyl)phthalate Naphthalene	0.22U ug/L 0.038U ug/L	A	bl
R2844650	M-68B	Naphthalene	0.041U ug/L	A	bl

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

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	H-49AB	Diethylphthalate	0.15U ug/L	A	bf
R2844650	H-49AB	Naphthalene	0.080U ug/L	A	bf,bp
R2844650	M-23B	Diethylphthalate	0.17U ug/L	A	bf
R2844650	M-23B	Naphthalene	0.056U ug/L	A	bf,bp
R2844650	M-23BRE	Naphthalene	0.066U ug/L	A	bf,bp
R2844650	M-23BRE	Diethylphthalate	0.20U ug/L	A	bf
R2844650	MC-97B	Naphthalene	0.067U ug/L	A	bf,bp

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844650	MC-97B	Diethylphthalate	0.20U ug/L	A	bf
R2844650	MC-94B	Naphthalene	0.070U ug/L	A	bf,bp
R2844650	MC-94B	Bis(2-ethylhexyl)phthalate	0.75U ug/L	A	bp
R2844650	MC-94BRE	Naphthalene	0.070U ug/L	A	bf,bp
R2844650	MC-94BRE	Bis(2-ethylhexyl)phthalate	0.75U ug/L	A	bp
R2844650	M-5AB	Naphthalene	0.048U ug/L	A	be,bf
R2844650	M-67B	Naphthalene	0.049U ug/L	A	bf,bp
R2844650	M-6AB	Naphthalene	0.059U ug/L	A	bf,bp
R2844650	M-6AB	Bis(2-ethylhexyl)phthalate	0.26U ug/L	A	bp
R2844650	M-57AB	Naphthalene	0.040U ug/L	A	bf,bp
R2844650	M-57ABRE	Naphthalene	0.040U ug/L	A	bf,bp
R2844650	M-95B	Naphthalene	0.038U ug/L	A	bf,bp
R2844650	M-95B	Bis(2-ethylhexyl)phthalate	0.22U ug/L	A	bp
R2844650	M-68B	Naphthalene	0.041U ug/L	A	bf,bp

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257B2a
SDG #: R2844650
Laboratory: Columbia Analytical Services

Date: 8/18/09
Page: 1 of 1
Reviewer: JV
2nd Reviewer: CV

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/24 - 27/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	A	
XII.	Compound quantitation/CRQLs	A	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	A	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	FB = 3 EB = 13 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	M-44B	11	MW-16B	21	M-95B	31	SB2E1
2	H-49AB	12	M-5AB	22	M-68B	32	SB2E2
3	FB062408GWAREA1	13	EB062608GW3	23	M-7BBMS	33	
4	MC-45B	14	M-61B	24	M-7BBMSD	34	
5	MC-53B	15	M-88BB	25		35	
6	M-23B	16	M-7BB	26		36	
7	M-23BRE	17	M-67B	27		37	
8	MC-97B	18	M-6AB	28		38	
9	MC-94B	19	M-57AB	29		39	
10	MC-94BRE	20	M-57ABRE	30		40	

LDC #: 21257 B1A
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV
2nd Reviewer: [illegible]

Method: Semivolatiles (EPA SW 846 Method 8270C)

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

LDC #: 21257 B2A
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: Q

Validation Area	Yes	No	NA	Findings/Comments
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X Performance Evaluation Samples				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X Internal Standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?		✓		
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
X 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 and 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				
Overall assessment of data was found to be acceptable.	✓	✓		
XVI Field Duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII Field Blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

LDC #: 21257B29

SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

Reviewer: JVG

2nd Reviewer: [illegible]

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

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

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	6/26/08	AR938 (ICV)	RRR (7)	44.4		All + Blks	J+ dets/A (c)

CONCAL.2S

LDC #: 21257 B2a
SDG #: Ice Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
2nd Reviewer: CL

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

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

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

Blank extraction date: 6/30/08 **Blank analysis date:** 7/01/08
Conc. units: ug/L Associated Samples: 4 - 22 (bl)

Compound	Blank ID	Sample Identification								
	SBLK2	5	6	7	8	9	10	11	12	13
AAA	0.39	0.71/U								
XX	1.7				≤ 1.5/U					
LL	0.13		0.17/U	0.20/U	0.20/U					0.38/U
EEE	0.25					0.75/U	0.75/U	0.54/U		
S	0.040		0.056/U	0.066/U	0.067/U	0.070/U	0.070/U	~~0.048~~	0.048/U	0.050/U

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

Compound	Blank ID	Sample Identification								
	SBLK2	17	18	19	20	21	22			
AAA	0.39									
XX	1.7									
LL	0.13									
EEE	0.25		0.26/U	(2.8)	(2.7)	0.22/U				
S	0.040	0.049/U	0.059/U	0.040/U	0.040/U	0.038/U	0.041/U			

LDC #: 21257B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 7
Reviewer: JV6
2nd Reviewer: [illegible]

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: FB =

PB = 1, 2, 4-10, 14-22 ↓ +11,12

(bp ; bf)

Compound	Blank ID	Sample Identification								
	PB061608B	FB 3	2	6	7	8	9	10	12	17
EEE	0.21						0.75/U	0.75/U		
S	0.085	0.075	0.080/U	0.056/U	0.066/U	0.067/U	0.070/U	0.070/U	0.048/U	0.049/U
LL		0.18	0.15/U	0.17/U	0.20 ~~0.066~~/U	0.20/U				
CRQL										

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

Same as above

(bp, bf)

Compound	Blank ID	Sample Identification								
	PB	FB (3)	18	19	20	21	22	#	#	
EEE	0.21		0.26/U	(2.8)	(2.7)	0.22/U		(0.52)	0.54/U	
S	0.085	0.075	0.059/U	0.040/U	0.040/U	0.038/U	0.041/U			
LL		0.18								
CRQL										

5X - Phthalates
2X - all others

LDC #: 21257Bra
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/26/08
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11, 12 (be)

Compound	Blank ID	Sample Identification								
	13	12								
LL	0.38									
S	0.050	0.048/U								
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

LDC #: 21257B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: VC
2nd Reviewer: 9

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		23/24	XX	320 (50-150)	200 (50-150)	46 (30)	16	J+ detB/A (m, ld)
			kkk	( )	127 (47-176)	( )		No qual (MS in)
			RRR	38 ( )	34 (50-150)	( )		J-/UJ/A (m, ld)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257B2a
SDG #: Eq Conv

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

Y (N) N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D1	XX	134 (50-120)	128 (50-120)	( )	1-3, SBLK1	J+ dets/P (L)
			UUU	40 ( )	40 ( )	( )		J-/UJ/P
			FFF	140 ( )	134 ( )	( )		J+ dets/P
			RRR	180 ( )	( )	77 (30)		No qual (LCSD only)
				( )	( )	( )		
				( )	( )	( )		
		LCS/D2	AAA	178 (50-120)	188 (50-120)	( )	4-22, SBLK2	No qual (LCS, LCSD in)
			XX	460 ( )	480 ( )	( )		J+ dets/P (L, Ld)
			UUU	46 ( )	47 ( )	( )		No qual (LCS, LCSD in)
			FFF	138 ( )	140 ( )	( )		
			RRR	14 ( )	0 ( )	200 (30)		J-/R/P (L, Ld)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 B2a
SDG #: Sediment

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: JVB
2nd Reviewer: [signature]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		6	PRY	0 (141 763 – 567 050		J / R / A (1)
		7	PRY	0. (127 170 – 508 680)		
		9		46 528		
		10		27 916		
		19		24 566		
		20	↓	1051 ↓		↓
						(Qual, FFF, GGG, HHH, III, JJJ, KKK, LLL)

* QC limits are advisory
IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 21257B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		7, 10, 20	Confirmation runs for	IS exceedance	X/A (O)

Comments:

LDC #: 21257B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

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

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1.0 std)	Recalculated RRF (1.0 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/26/08	~~Phenol~~ (1st internal standard) RRR	1.887	1.887	1.903	1.903	5.04	5.03
			Naphthalene (2nd internal standard)	1.001	1.001	1.028	1.028	3.95	3.95
			~~Fluorene~~ (3rd internal standard) LL	1.231	1.231	1.640	1.640	14.14	14.14
			~~Pentachlorophenol~~ (4th internal standard) UU	1.008	1.008	1.019	1.019	5.57	5.57
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.659	0.659	0.724	0.724	9.91	9.86
			~~Benzo(a)pyrene~~ (6th internal standard)	1.114	1.114	1.203	1.203	14.05	14.05
2			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			~~Benzo(a)pyrene~~ (6th internal standard)						
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to 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 #: 21257B2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 2
Reviewer: JD/6
2nd Reviewer: [illegible]

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	AR982	6/20/08	~~Phenol~~ (1st internal standard) RRR	1.903	2.057	2.057	8.1	8.1
			Naphthalene (2nd internal standard)	1.028	1.098	1.098	6.8	6.8
			~~Fluorene~~ (3rd internal standard) ~~PCP~~ LL	1.640	1.514	1.514	7.7	7.7
			~~Pentachlorophenol~~ (4th internal standard) UU	1.019	1.102	1.102	8.1	8.1
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.724	0.819	0.819	13.1	13.1
			Benzo(a)pyrene (6th internal standard)	1.203	1.283	1.283	6.7	6.6
2	AS011	7/01/08	~~Phenol~~ (1st internal standard) RRR		2.055	2.055	8.0	8.0
			Naphthalene (2nd internal standard) S		1.128	1.128	9.7	9.7
			~~Fluorene~~ (3rd internal standard) LL		1.577	1.577	7.7	7.7
			~~Pentachlorophenol~~ (4th internal standard) UU		1.097	1.097	~~Hr~~ → 7.7	7.7
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.806	0.806	11.3	11.3
			Benzo(a)pyrene (6th internal standard)		1.327	1.327	10.3	10.3
3	AS035	7/02/08	~~Phenol~~ (1st internal standard) RRR		2.061	2.061	8.3	8.3
			Naphthalene (2nd internal standard)		1.095	1.095	6.5	6.5
			~~Fluorene~~ (3rd internal standard) LL		1.484	1.484	9.5	9.5
			~~Pentachlorophenol~~ (4th internal standard) UU		1.077	1.077	5.7	5.7
			Bis(2-ethylhexyl)phthalate (5th internal standard)		0.809	0.809	11.7	11.7
			Benzo(a)pyrene (6th internal standard)	✓	1.328	1.328	10.4	10.4

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

LDC #: 21257B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: Q

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	A5061	7/03/08	~~Phenol~~ (1st internal standard) RRR	1.983	2.054	2.054	7.9	7.96
			Naphthalene (2nd internal standard)	1.028	1.063	1.063	3.4	3.4
			~~Fluorene~~ (3rd internal standard) LL	1.640	1.477	1.477	9.9	9.9
			~~Pentachlorophenol~~ (4th internal standard) NN	1.019	1.076	1.076	5.6	5.6
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.724	0.786	0.786	8.6	8.6
			~~Benzo(a)pyrene~~ (6th internal standard)	1.203	1.295	1.295	7.6	7.6
2			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3			Phenol (1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Pentachlorophenol (4th internal standard)					
			Bis(2-ethylhexyl)phthalate (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

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

LDC #: 21257 B24
SDG #: Sre Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: # 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	2.00	1.41	71	71	0
2-Fluorobiphenyl		1.21	61	61	
Terphenyl-d14		1.70	85	85	
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 21257B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JR
2nd Reviewer: [illegible]

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

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 concentation

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

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

MS/MSD samples: 23/24

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
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	0.500	0.500	0	0.420	0.480	84	84	96	96	11	11
Pentachlorophenol											
Pyrene	0.500	0.500	↓	0.410	0.460	82	82	92	92	11	11

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 #: 21257 B2q
SDG #: See Cover

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

Reviewer: JVC
2nd Reviewer:

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

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

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

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

LCS/LCSD samples: LCS/D 2

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	0.50	0.50	0.480	0.470	96	96	94	94	✓	✓
Pentachlorophenol										
Pyrene	0.50	0.50	0.450	0.470	90	90	94	94	4	4

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

LDC #: 21257B29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVL
2nd reviewer:

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 6 . 1,4-Dioxane

Conc. = $\frac{(941)(1)(1\text{ ml})(1000)(\quad)}{(90837)(0.574)(1000\text{ ml})(\quad)(\quad)}$

= 0.17 ug/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 26, 2008

LDC Report Date: August 17, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844666

Sample Identification

SA180-0.5B
SA180-0.5BD
SA180-10B
SA180-10BDL
SA180-20B
SA180-30B
SA57-0.5B
SA57-10B
SA57-20B
SA57-20BDL
SA57-30B
SA57-10BD
SA180-10BMS
SA180-10BMSD

Introduction

This data review covers 14 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/10/08	Butylbenzylphthalate Phenanthrene	9.0 ug/L 1.8 ug/L	All samples in SDG R2844666

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
SA180-0.5B (5x)	Butylbenzylphthalate	65 ug/Kg	65U ug/Kg
SA180-10B	Butylbenzylphthalate	15 ug/Kg	15U ug/Kg
SA180-10BDL (3x)	Butylbenzylphthalate Phenanthrene	33 ug/Kg 9.8 ug/Kg	33U ug/Kg 9.8U ug/Kg
SA180-20B (3x)	Butylbenzylphthalate	41 ug/Kg	41U ug/Kg
SA57-10B (3x)	Phenanthrene	9.0 ug/Kg	9.0U ug/Kg
SA57-20B	Butylbenzylphthalate	43 ug/Kg	43U ug/Kg
SA57-30B (5x)	Butylbenzylphthalate	73 ug/Kg	73U ug/Kg
SA57-10BD (5x)	Phenanthrene	5.8 ug/Kg	5.8U ug/Kg

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for sample SA57-20B. Since the sample was diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag	A or P
SA180-10BMS/MSD (SA180-10B SA180-10BDL)	Di-n-butylphthalate	157 (50-150)	46 (50-150)	46 (≤30)	J (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (All samples in SDG R2844666)	Di-n-butylphthalate	143 (50-120)	150 (50-120)	-	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
SA180-10B SA57-20B	Di-n-butylphthalate	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 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

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
SA180-10B SA57-20B	Di-n-butylphthalate	X	A
SA180-10BDL SA57-20BDL	All TCL compounds except Di-n-butylphthalate	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 semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA180-0.5B	SA180-0.5BD				
Anthracene	24	40U	-	16 (≤40)	-	-
Benzo(a)anthracene	160	29	-	131 (≤40)	J (all detects)	A
Benzo(a)pyrene	110	32	-	78 (≤40)	J (all detects)	A
Benzo(b)fluoranthene	110	32	-	78 (≤40)	J (all detects)	A
Benzo(g,h,i)perylene	74	27	-	47 (≤40)	J (all detects)	A
Benzo(k)fluoranthene	110	33	-	77 (≤40)	J (all detects)	A
Butylbenzylphthalate	65	1000U	-	935 (≤1000)	-	-
Di-n-Butylphthalate	1700	1300	-	400 (≤1000)	-	-
Indeno(1,2,3-cd)pyrene	69	23	-	46 (≤40)	J (all detects)	A
Chrysene	190	46	-	144 (≤40)	J (all detects)	A
Dibenzo(a,h)anthracene	23	40U	-	17 (≤40)	-	-
Fluoranthene	350	71	-	279 (≤40)	J (all detects)	A
Hexachlorobenzene	20	19	-	1 (≤40)	-	-
Phenanthrene	190	41	-	149 (≤40)	J (all detects)	A
Pyrene	270	51	-	219 (≤40)	J (all detects)	A

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA57-10B	SA57-10BD				
Di-n-Butylphthalate	850	1500	-	650 (≤920)	-	-
Diethylphthalate	62	920U	-	858 (≤920)	-	-
Fluoranthene	4.4	36U	-	31.6 (≤36)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA57-10B	SA57-10BD				
Phenanthrene	9.0	5.8	-	3.2 (≤36)	-	-

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844666	SA180-10B SA180-10BDL	Di-n-butylphthalate	J (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD) (m, ld)
R2844666	SA180-0.5B SA180-0.5BD SA180-10B SA180-10BDL SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-20BDL SA57-30B SA57-10BD	Di-n-butylphthalate	J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844666	SA180-10B SA57-20B	Di-n-butylphthalate	J (all detects)	A	Project Quantitation Limit (e)
R2844666	SA180-0.5B SA180-0.5BD SA180-10B SA180-10BDL SA180-20B SA180-30B SA57-0.5B SA57-10B SA57-20B SA57-20BDL SA57-30B SA57-10BD	All compounds reported below the PQL.	J (all detects)	A	Project quantitation Limit (sp)
R2844666	SA180-10B SA57-20B	Di-n-butylphthalate	X	A	Overall assessment of data (o)
R2844666	SA180-10BDL SA57-20BDL	All TCL compounds except Di-n-butylphthalate	X	A	Overall assessment of data (o)
R2844666	SA180-0.5B SA180-0.5BD	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Indeno(1,2,3-cd)pyrene Chrysene Fluoranthene Phenanthrene Pyrene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Field duplicates (Difference) (fd)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844666	SA180-0.5B (5x)	Butylbenzylphthalate	65U ug/Kg	A	bl
R2844666	SA180-10B	Butylbenzylphthalate	15U ug/Kg	A	bl
R2844666	SA180-10BDL (3x)	Butylbenzylphthalate Phenanthrene	33U ug/Kg 9.8U ug/Kg	A	bl
R2844666	SA180-20B (3x)	Butylbenzylphthalate	41U ug/Kg	A	bl
R2844666	SA57-10B (3x)	Phenanthrene	9.0U ug/Kg	A	bl
R2844666	SA57-20B	Butylbenzylphthalate	43U ug/Kg	A	bl
R2844666	SA57-30B (5x)	Butylbenzylphthalate	73U ug/Kg	A	bl
R2844666	SA57-10BD (5x)	Phenanthrene	5.8U ug/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21257C2a **VALIDATION COMPLETENESS WORKSHEET** Date: 8/14/09

SDG #: R2844666 Stage 2B Page: 1 of 1

Laboratory: Columbia Analytical Services Reviewer: JVG

2nd Reviewer: A

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 15%
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	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 = 8.1%
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	SA180-0.5B D_1	11	SA57-30B	21	SBLK1	31	
2	SA180-0.5BD D_1	12	SA57-10BD D_2	22		32	
3	SA180-10B	13	SA180-10BMS	23		33	
4	SA180-10BDL	14	SA180-10BMSD	24		34	
5	SA180-20B	15		25		35	
6	SA180-30B	16		26		36	
7	SA57-0.5B	17		27		37	
8	SA57-10B D_2	18		28		38	
9	SA57-20B	19		29		39	
10	SA57-20BDL	20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

(b1)

Blank extraction date: 7/10/08 **Blank analysis date:** 7/11/08
Conc. units: ug/kg Associated Samples: All

Compound	Blank ID	Sample Identification								
	SBLK1	1 (5x)	2 (5x)	3	4 (3x)	5 (3x)	6 (3x)	7 (3x)	8 (3x)	9
AAA	9.0	65/U		15/U	33/U	41/U				43/U
UU	1.8	(190)	(41)	(8.6)	9.8/U	(13)	(11)	(31)	9.0/U	(9.5)

45
3.6

(b1)

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

Compound	Blank ID	Sample Identification								
	SBLK1	11 (5x)	12 (5x)							
AAA	9.0	73/U								
UU	1.8		5.8/U							

LDC #: 21257 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

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

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

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

(Y) N N/A Were percent recoveries (%R) for surrogates within QC limits?
(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
(Y) N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		9 (32X)	TPH	DQ (45-135)	No qual
			NBZ	( )	
			FBP	( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21257C2a
SDG #: Eu Cov

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		13/14	GG	( )	( )	67 (30)	3, 4	No qual (MS/MSD in
			DD	( )	( )	70 ( )		
			VV	( )	( )	53 ( )		
			XX	157 (50-150)	46 (50-150)	46 ( )		J/UJ/A (MSD)
			LL	30 ( )	( )	67 ( )		No qual (MSD in)
			CC	( )	( )	72 ( )		(MS/MSD in)
			UUU	( )	( )	57 ( )		
			NN	51 (54-124)	( )	69 ( )		(MSD in)
			SS	47 (50-150)	( )	63 ( )		
			W	44 ( )	( )	60 ( )		
			S	( )	( )	50 ( )		(MS/MSD in)
			L	42 ( )	( )	56 ( )		(MSD in)
			TTT	( )	( )	43 ( )		(MS/MSD in)
			UU	( )	( )	50 ( )		
			RRR	28 ( )	46 (50-150)	60 ( )		(LCS/D in)
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: Q

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

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

(Y) N N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D	XX	143 (50-120)	150 (50-120)	( )	All + Blk	J+ dets/P (l, ld)
			EEE	180 (↓)	135 (↓)	( )	↓	No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LCSLCSD.2S

LDC #: 21257 C2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JVG
2nd Reviewer: Q

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

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

Y N N/A Were 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, 9	XX > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257C29
SDG #: Eu Creek

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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, 9	XX > cal range		X / A (CQ)
		4, 10	All except XX dil		

Comments: _____

LDC#: 21257C2
SDG#:See cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Quals (Parent Only)
	1	2			
Anthracene	24	40U		16 (≤40)	
Benzo(a)anthracene	160	29		131 (≤40)	J dets/A (fd)
Benzo(a)pyrene	110	32		78	
Benzo(b)fluoranthene	110	32		78	
Benzo(g,h,i)perylene	74	27		47	
Benzo(k)fluoranthene	110	33		77	
Butylbenzylphthalate	65	1000U		935 (≤1000)	-
Di-n-Butylphthalate	1700	1300		400	-
Indeno(1,2,3-cd)pyrene	69	23		46 (≤40)	J dets/A
Chrysene	190	46		144	
Dibenzo(a,h)anthracene	23	40U		17	-
Fluoranthene	350	71		279	J dets/A
Hexachlorobenzene	20	19		1	-
Phenanthrene	190	41		149	J dets/A
Pyrene	270	51		219	

Compound Name	Conc (ug/Kg)		RPD (≤50%)	Diff	Quals (Parent Only)
	8	12			
Di-n-Butylphthalate	850	1500		650 (≤920)	-
Diethylphthalate	62	920U		858	-
Fluoranthene	4.4	36U		31.6 (≤36)	-
Phenanthrene	9.0	5.8		3.2	-

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 15, 2009

Matrix: Water

Parameters: Semivolatiles

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

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/2/08	Naphthalene	0.060 ug/L	All samples in SDG R2844768

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-126B	Naphthalene	0.075 ug/L	0.075U ug/L
M-14ADBF	Naphthalene	0.047 ug/L	0.047U ug/L
M-14ABF	Naphthalene	0.056 ug/L	0.056U ug/L

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Diethylphthalate Naphthalene	0.18 ug/L 0.075 ug/L	All samples in SDG R2844768

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

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB061608B	6/16/08	Bis(2-ethylhexyl)phthalate Naphthalene	0.21 ug/L 0.085 ug/L	All samples in SDG R2844768

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	Diethylphthalate Bis(2-ethylhexyl)phthalate	0.21 ug/L 0.24 ug/L	0.21U ug/L 0.24U ug/L
M-126B	Naphthalene	0.075 ug/L	0.075U ug/L
M-14ADBF	Diethylphthalate Naphthalene	0.22 ug/L 0.047 ug/L	0.22U ug/L 0.047U ug/L
M-14ABF	Diethylphthalate Naphthalene	0.13 ug/L 0.056 ug/L	0.13U ug/L 0.056U ug/L
M-84B	Diethylphthalate	0.13 ug/L	0.13U 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) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (All samples in SDG R2844768)	Di-n-butylphthalate Diethylphthalate	280 (50-120) 128 (50-120)	240 (50-120) 126 (50-120)	- -	J+ (all detects) J+ (all detects)	P
LCS/D1 (All samples in SDG R2844768)	1,4-Dioxane	46 (50-120)	46 (50-120)	-	J- (all detects) UJ (all non-detects)	P
LCS/D1 (All samples in SDG R2844768)	Pyridine	5 (50-120)	10 (50-120)	67 (≤30)	J- (all detects) R (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

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 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

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 semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ADBF	M-14ABF				
Diethylphthalate	0.22	0.13	-	0.09 (≤4.7)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-14ADBF	M-14ABF				
Naphthalene	0.047	0.056	-	0.009 (≤0.19)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - 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	Di-n-butylphthalate Diethylphthalate	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF	1,4-Dioxane	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF	Pyridine	J- (all detects) R (all non-detects)	P	Laboratory control samples (%R) (l)
R2844768	M-79B M-126B M-84B M-14ADBF M-14ABF	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844768	M-126B	Naphthalene	0.075U ug/L	A	bl
R2844768	M-14ADBF	Naphthalene	0.047U ug/L	A	bl
R2844768	M-14ABF	Naphthalene	0.056U ug/L	A	bl

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

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844768	M-79B	Diethylphthalate	0.21U ug/L	A	bf

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844768	M-79B	Bis(2-ethylhexyl)phthalate	0.24U ug/L	A	bp
R2844768	M-126B	Naphthalene	0.075U ug/L	A	bp, bf
R2844768	M-14ADBF	Diethylphthalate	0.22U ug/L	A	bf
R2844768	M-14ADBF	Naphthalene	0.047U ug/L	A	bp, bf
R2844768	M-14ABF	Diethylphthalate	0.13U ug/L	A	bf
R2844768	M-14ABF	Naphthalene	0.056U ug/L	A	bp, bf
R2844768	M-84B	Diethylphthalate	0.13U ug/L	A	bf

*Corrected codes in above table.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257D2a
SDG #: R2844768
Laboratory: Columbia Analytical Services

Date: 3/16/09
Page: 1 of 1
Reviewer: SW
2nd Reviewer:

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/29-30/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 4, 5
XVII.	Field blanks	SW	PB = PB061608B (from R2844538) FB = FB062408GW AREA1 (from R 2844650)

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-79B	11		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	SBLK1	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

LDC #: 21257 D2a
SDG #: Eq Canary

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank extraction date: 7/02/08 **Blank analysis date:** 7/02/08
Conc. units: ug/L Associated Samples: All

Compound	Blank ID	Sample Identification								
	SBLK1	2	4	5						
S	0.060	0.075/4	0.047/4	0.056/4						

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

Compound	Blank ID	Sample Identification								

LDC #: 21257D2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: All (bp)

Compound	Blank ID	Sample Identification								
	PB061608B	1	2	4	5					
EEE	0.21	0.24/u								
S	0.085		0.075/u	0.047/u	0.056 u					
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All (bf)

Compound	Blank ID	Sample Identification								
	FB062408	GWAREA1	1	2	3	4	5			
LL	0.18		0.21/u		0.13/u	0.22/u	0.13/u			
S	0.075			0.075/u		0.047/u	0.056/u			
CRQL										

5x- phthalates
2x- all others

LDC #: 21257B2a
SDG #: See Cover

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

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D1	XX	280 (50-120)	240 (50-120)	( )	All + Blk	J+ dets/P (l, ld)
			LL	128 ( )	126 ( )	( )	↓	↓
			UUU	46 ( )	46 ( )	( )		[illegible]
			TTT	( )	( )	33 (30)		No qual (LCS/LCSD)
			RRR	5 (↓)	10 (↓)	67 (↓)	↓	J-/R/P (l, ld)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257D2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/L)		Diff RPD
	4	5	
LL	0.22	0.13	0.09 (≤4.7)
S	0.047	0.056	0.009 (≤0.19)

Compound	Concentration ( )		RPD

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 30 through July 2, 2008

LDC Report Date: August 20, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844797

Sample Identification

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

Introduction

This data review covers 14 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
7/10/08	Nitrobenzene	66.9	SA207-0.5BDL SA207-10BRE SA181-0.5B SA181-20B SA181-30B SA181-35B SBLK2	J+ (all detects)	A

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/7/08	Bis(2-ethylhexyl)phthalate Di-n-octylphthalate	460 ug/Kg 26 ug/Kg	SA207-0.5B SA207-0.5BDL SA207-10B SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B
SBLK2	7/10/08	Butylbenzylphthalate Phenanthrene	9.0 ug/Kg 1.8 ug/Kg	SA207-10BRE

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
SA207-20B	Bis(2-ethylhexyl)phthalate	66 ug/Kg	66U ug/Kg
SA207-30B	Bis(2-ethylhexyl)phthalate	430 ug/Kg	430U ug/Kg
SA207-40B	Bis(2-ethylhexyl)phthalate	340 ug/Kg	340U ug/Kg
SA181-0.5B	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA207-40B	Bis(2-ethylhexyl)phthalate	340 ug/Kg	340U ug/Kg
SA181-0.5B	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg
SA181-10B	Bis(2-ethylhexyl)phthalate	170 ug/Kg	170U ug/Kg
SA181-20B	Bis(2-ethylhexyl)phthalate	360 ug/Kg	360U ug/Kg
SA181-30B	Bis(2-ethylhexyl)phthalate	130 ug/Kg	130U ug/Kg
SA181-35B	Bis(2-ethylhexyl)phthalate	63 ug/Kg	63U ug/Kg
SA207-10BRE (8x)	Butylbenzylphthalate	110 ug/Kg	110U ug/Kg

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
SA207-10BRE (8x)	Nitrobenzene-d5 2-Fluorobiphenyl	25 (45-135) 27 (45-135)	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) was not within QC limits for one compound, and the MS/MSD relative percent difference (RPD) were not within QC limits for some compounds, the MS/MSD and LCSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D2 (SA207-10BRE) SBLK2)	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	143 (50-120) 180 (50-120)	150 (50-120) 135 (50-120)	- -	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

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	Hexachlorobenzene Octachlorostyrene	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 R2844538	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

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	Hexachlorobenzene Octachlorostyrene	X X	A
SA207-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	X	A
SA207-10BRE	All TCL compounds	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
Semivolatiles - Data Qualification Summary - SDG R2844797

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844797	SA207-0.5BDL SA207-10BRE SA181-0.5B SA181-20B SA181-30B SA181-35B	Nitrobenzene	J+ (all detects)	A	Continuing calibration (ICV %D) (c)
R2844797	SA207-10BRE (8x)	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate recovery (%R) (s)
R2844797	SA207-10BRE	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	J+ (all detects) J+ (all detects)	P	Laboratory control samples (%R) (l)
R2844797	SA207-0.5B	Hexachlorobenzene Octachlorostyrene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R2844797	SA207-0.5B SA207-0.5BDL SA207-10B SA207-10BRE SA207-20B SA207-30B SA207-40B SA181-0.5B SA181-10B SA181-20B SA181-30B SA181-35B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844797	SA207-0.5B	Hexachlorobenzene Octachlorostyrene	X X	A	Overall assessment of data (o)
R2844797	SA207-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	X	A	Overall assessment of data (o)
R2844797	SA207-10BRE	All TCL compounds	X	A	Overall assessment of data (o)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844797	SA207-20B	Bis(2-ethylhexyl)phthalate	66U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844797	SA207-30B	Bis(2-ethylhexyl)phthalate	430U ug/Kg	A	bl
R2844797	SA207-40B	Bis(2-ethylhexyl)phthalate	340U ug/Kg	A	bl
R2844797	SA181-0.5B	Bis(2-ethylhexyl)phthalate	140U ug/Kg	A	bl
R2844797	SA181-10B	Bis(2-ethylhexyl)phthalate	170U ug/Kg	A	bl
R2844797	SA181-20B	Bis(2-ethylhexyl)phthalate	360U ug/Kg	A	bl
R2844797	SA181-30B	Bis(2-ethylhexyl)phthalate	130U ug/Kg	A	bl
R2844797	SA181-35B	Bis(2-ethylhexyl)phthalate	63U ug/Kg	A	bl
R2844797	SA207-10BRE (8x)	Butylbenzylphthalate	110U ug/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21257E2a
SDG #: R2844797
Laboratory: Columbia Analytical Services

Date: 8/11/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: Q

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/30- 7/02/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD r ✓
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	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	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	SA207-0.5B	11	SA181-30B	21	SBLK1	31	
2	SA207-0.5BDL	12	SA181-35B	22	✓ SBLK2	32	
10X 3	SA207-10B	13	SA207-30BMS	23		33	
8X 4 ✓	SA207-10B~~DL~~ RE	14	SA207-30BMSD	24		34	
5	SA207-20B	15		25		35	
6	SA207-30B	16		26		36	
7	SA207-40B	17		27		37	
8	SA181-0.5B	18		28		38	
9	SA181-10B	19		29		39	
10	SA181-20B	20		30		40	

LDC #: 21257 E2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: CL

Method: Semivolatiles (EPA SW 846 Method 8270C)

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

LDC #: 21257 E2a
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: NB
2nd Reviewer: [illegible]

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

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257F2a

SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

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

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

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

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

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

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

#	Date	Standard ID	Compound	Finding %D (Limit: <25.0%)	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	7/10/09	AS134 (ICV)	L (+)	66.9		2, 4, 8, 10-12, SBLK2	J+ dets/A (c)

(Passing ICV for ICAL acquired on 6/26 found on 21257A)

CONCAL.2S

LDC #: 21257E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank extraction date: 7/07/08 **Blank analysis date:** 7/07/08 (bl)
Conc. units: ug/kg Associated Samples: All except 4

Compound	Blank ID	Sample Identification								
	SBLK1	5	6	7	8	9	10	11	12	
EEE	460	66/U	430/U	340/U	140/U	170/U	360/U	130/U	63/U	
FFF	26									

Blank extraction date: 7/10/08 **Blank analysis date:** 7/11/08 (bl)
Conc. units: ug/kg Associated Samples: 4

Compound	Blank ID	Sample Identification								
	SBLK2	4 (8X)								
18 AAA	9.0	110/U								
3.6 UU	1.8	(140)								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above 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 #: 21257E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

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

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

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

X (N) N/A Were percent recoveries (%R) for surrogates within QC limits?
(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y (N) N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		2 (40.0x)	All	DO (45-135)	NO qual (S)
		3 (10x)	FBP	168 ( )	
		4 (8x)	NBZ	25 ( )	J- /UJ /A
			FBP	27 ( )	

* QC limits are advisory

	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21257E2a
SDG #: Sa Creek

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	No Qual (%R MS/MSD) Qualifications
		13/14	AAA	( )	( )	42 (30)	6	J (all sa) (o)
			XX	( )	( )	38 ( )		
			RRR	32 (50-150)	0 (50-150)	~~200~~ ( )		~~J (all sa)~~ (m, ll, o)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 1	EEE	180 (50-120)	158 (50-120)	( )	All except 4, SBLK1	J+ dets/P (1, det)
			RKR	47 (↓)	( )	( )	↓	J/UJ/P (2)
				( )	( )	( )		(MS/MSD, LCSD, ...)
				( )	( )	( )		
		LCS/D 2	XX	143 (50-120)	150 (50-120)	( )	4, SBLK2	J+ dets/P (1, det)
			EEE	180 (↓)	135 (↓)	( )	↓	↓
				( )	( )	( )		
				( )	( )	( )		

No Qual

LCSLCSD.2S

LDC #: 21257E 2a
SDG #: Su Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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

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

Y N N/A 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	SS, TTT > cal range	1	J detects /A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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	SS, TTT > cal range		~~X~~ /A (o)
		2	All except SS, TTT dil		(o)
		4	Confirmation run for #3 only		(o)

Comments: _____

LDC #: 21257 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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

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

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

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

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (1.00 std)	Recalculated RRF (1.00 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/26/08	~~Phenol~~ (1st internal standard) 1,4-Dioxane	0.534	0.534	0.574	0.574	7.14	7.17
			Naphthalene (2nd internal standard)	1.001	1.001	1.028	1.028	3.95	3.95
			~~Fluorene~~ (3rd internal standard) LL	1.231	1.231	1.640	1.640	14.14	14.15
			~~Pentachlorophenol~~ (4th internal standard) UU	1.008	1.008	1.019	1.019	5.57	5.58
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.659	0.653	0.724	0.724	9.91	9.88
			~~Benzo(a)pyrene~~ (6th internal standard)	1.114	1.114	1.203	1.203	14.05	14.64
2	ICAL	7/10/09	~~Phenol~~ (1st internal standard) 1,4-Dioxane	(10) 0.585	(10) 0.585	0.616	0.616	11.94	11.95
			Naphthalene (2nd internal standard)	0.963	0.963	1.024	1.024	4.44	4.43
			~~Fluorene~~ (3rd internal standard) LL	1.345	1.345	1.214	1.214	6.05	6.04
			~~Pentachlorophenol~~ (4th internal standard) UU	0.954	0.954	1.027	1.027	4.1V	4.13
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.808	0.808	0.76V	0.76V	8.95	8.95
			~~Benzo(a)pyrene~~ (6th internal standard)	1.358	1.358	1.177	1.177	10.5V	10.53
3			Phenol (1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Pentachlorophenol (4th internal standard)						
			Bis(2-ethylhexyl)phthalate (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to 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 #: 21257 E29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer:

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	AS089	7/07/08	~~Phenol~~ (1st internal standard) UUU	0.574	0.587	0.587	2.3	2.3
			Naphthalene (2nd internal standard)	1.028	1.056	1.056	2.7	2.7
			~~Fluorene~~ (3rd internal standard) LL	1.640	1.323	1.323	19.3	19.3
			~~Pentachlorophenol~~ (4th internal standard) UU	1.019	1.082	1.082	6.2	6.1
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.724	0.778	0.778	7.5	7.5
			Benzo(a)pyrene (6th internal standard)	1.203	1.280	1.280	6.4	6.4
2	AS127	7/10/09	~~Phenol~~ (1st internal standard) UUU	0.616	0.651	0.651	5.7	5.7
			Naphthalene (2nd internal standard)	1.024	1.060	1.066	3.5	3.5
			~~Fluorene~~ (3rd internal standard) LL	1.214	1.269	1.269	4.5	4.5
			~~Pentachlorophenol~~ (4th internal standard) UU	1.027	1.063	1.063	3.5	3.5
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.762	0.780	0.780	2.4	2.4
			Benzo(a)pyrene (6th internal standard)	1.177	1.217	1.217	3.4	3.4
3	AS147	7/11/08	~~Phenol~~ (1st internal standard) UUU	0.616	0.678	0.678	10.1	10.1
			Naphthalene (2nd internal standard)	1.024	1.082	1.082	5.7	5.7
			~~Fluorene~~ (3rd internal standard) LL	1.214	1.328	1.328	9.4	9.4
			~~Pentachlorophenol~~ (4th internal standard) UU	1.027	1.113	1.113	8.4	8.4
			Bis(2-ethylhexyl)phthalate (5th internal standard)	0.762	0.846	0.846	11.0	11.0
			Benzo(a)pyrene (6th internal standard)	1.177	1.270	1.270	7.9	7.9

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 E2a
SDG #: Sy Cmar

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

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

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	66.7	(7.02 x5)	53	53	0
2-Fluorobiphenyl	↓	(12.53x5)	94	94	↓
Terphenyl-d14	↓	(9.31x5)	70	70	↓
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

$\frac{(2\ ppm)(1ml)(100)}{30g} = 66.7$

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 21257 E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

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

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

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 concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 13/14

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
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	149	149	0	97.3	78.3	65	65	53	53	22	22
Pentachlorophenol											
Pyrene	149	149	↓	145	109	97	97	73	73	28	28

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 #: 21257 E29
SDG #: See Cover

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

Reviewer: JVG
2nd Reviewer: [signature]

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

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

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

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

LCS/LCSD samples: LCS/D 1

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	133.3	133.3	88	91	66	66	68	68	3	3
Pentachlorophenol										
Pyrene	133.3	133.3	130.69	132.47	98	98	98	99	0	1

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

LDC #: 21257E2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVL
2nd reviewer: [illegible]

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

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

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

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

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

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

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

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

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

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #1 , S :

Conc. = $\frac{88776 \times 1.6 \times 5 \times 1\text{ml} \times 1000}{38310 \times 1.028 \times 30\text{g} \times 6.784 \times (\ )}$

= 48.14 ng/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 18, 2009

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844803

Sample Identification

M-55B
M-55DB
M-78B
M-65B
EB070208GW1
M-78BMS
M-78BMSD

Introduction

This data review covers 7 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

*V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/7/08	Acenaphthene Diethylphthalate Naphthalene Phenanthrene	0.020 ug/L 0.22 ug/L 0.080 ug/L 0.040 ug/L	All samples in SDG R2844803

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	Diethylphthalate Naphthalene	0.20 ug/L 0.088 ug/L	0.20U ug/L 0.088U ug/L
M-55DB	Diethylphthalate Naphthalene	0.23 ug/L 0.10 ug/L	0.23U ug/L 0.10U ug/L
M-78B	Diethylphthalate Naphthalene	0.18 ug/L 0.066 ug/L	0.18U ug/L 0.066U ug/L
M-65B	Diethylphthalate Naphthalene	0.26 ug/L 0.13 ug/L	0.26U ug/L 0.13U ug/L
EB070208GW1	Naphthalene Phenanthrene	0.088 ug/L 0.059 ug/L	0.088U ug/L 0.059U ug/L

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

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB070208GW1	7/2/08	Butylbenzylphthalate Di-n-butylphthalate Diethylphthalate Dimethylphthalate Bis(2-ethylhexyl)phthalate 2-Methylnaphthalene Naphthalene Phenanthrene	0.33 ug/L 3.0 ug/L 5.9 ug/L 3.0 ug/L 0.62 ug/L 0.039 ug/L 0.088 ug/L 0.059 ug/L	M-65B

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Diethylphthalate Naphthalene	0.18 ug/L 0.075 ug/L	M-55B M-55DB M-78B

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

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB061608B	6/16/08	Bis(2-ethylhexyl)phthalate Naphthalene	0.21 ug/L 0.085 ug/L	M-55B M-55DB M-78B

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-65B	Di-n-butylphthalate Diethylphthalate 2-Methylnaphthalene Naphthalene	1.4 ug/L 0.26 ug/L 0.066 ug/L 0.13 ug/L	1.4U ug/L 0.26U ug/L 0.066U ug/L 0.13U ug/L
M-55B	Diethylphthalate Naphthalene	0.20 ug/L 0.088 ug/L	0.20U ug/L 0.088U ug/L
M-55DB	Diethylphthalate Naphthalene	0.23 ug/L 0.10 ug/L	0.23U ug/L 0.10U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
M-78B	Diethylphthalate Naphthalene	0.18 ug/L 0.066 ug/L	0.18U ug/L 0.066U ug/L

*Corrected compound concentrations in table above.

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-78BMS/MSD (M-78B)	Pyridine	33 (50-150)	45 (50-150)	32 (≤30)	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (All samples in SDG R2844803)	Pyridine	30 (50-120)	28 (50-120)	-	J- (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

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 semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	M-55B	M-55DB				
Diethylphthalate	0.20	0.23	-	0.03 (≤5.1)	-	-
1,4-Dioxane	1.0	0.96	-	0.04 (≤2.0)	-	-
Naphthalene	0.088	0.10	-	0.012 (≤0.20)	-	-

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844803	M-78B	Pyridine	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)(RPD) (m, ld)
R2844803	M-55B M-55DB M-78B M-65B EB070208GW1	Pyridine	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844803	M-55B M-55DB M-78B M-65B EB070208GW1	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844803	M-55B	Diethylphthalate Naphthalene	0.20U ug/L 0.088U ug/L	A	bl
R2844803	M-55DB	Diethylphthalate Naphthalene	0.23U ug/L 0.10U ug/L	A	bl
R2844803	M-78B	Diethylphthalate Naphthalene	0.18U ug/L 0.066U ug/L	A	bl
R2844803	M-65B	Diethylphthalate Naphthalene	0.26U ug/L 0.13U ug/L	A	bl
R2844803	EB070208GW1	Naphthalene Phenanthrene	0.088U ug/L 0.059U ug/L	A	bl

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

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844803	M-65B	Di-n-butylphthalate Diethylphthalate 2-Methylnaphthalene Naphthalene	1.4U ug/L 0.26U ug/L 0.066U ug/L 0.13U ug/L	A	be
R2844803	M-55B	Diethylphthalate	0.20U ug/L	A	bf
R2844803	M-55B	Naphthalene	0.088U ug/L	A	bf,bp
R2844803	M-55DB	Diethylphthalate	0.23U ug/L	A	bf
R2844803	M-55DB	Naphthalene	0.10U ug/L	A	bf,bp
R2844803	M-78B	Diethylphthalate	0.18U ug/L	A	bf
R2844803	M-78B	Naphthalene	0.066U ug/L	A	bf,bp

*Corrected codes in above table.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257F2a
SDG #: R2844803
Laboratory: Columbia Analytical Services

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

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/01-02/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 30% r^2
IV.	Continuing calibration/ICV	A	%D/CCV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D = 1, 2
XVII.	Field blanks	SW	EB = 5 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	M-55B D	11	SBLK1	21		31	
2	M-55DB D	12		22		32	
3	M-78B	13		23		33	
4	M65B	14		24		34	
5	EB070208GW1	15		25		35	
6	M-78BMS	16		26		36	
7	M-78BMSD	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

LDC #: 21257F2a
SDG #: Sq Conv

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JV6
2nd Reviewer: Q

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

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

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

Blank extraction date: 7/07/08 **Blank analysis date:** 7/08/08 All

Conc. units: ug/L Associated Samples:

Compound	Blank ID	Sample Identification								
	SBLK1	1	2	3	4	5				
GG	0.020									
LL	0.22	0.20 /U	0.23/U	0.18/U	0.26/U	(5.9)				
S	0.080	0.088/U	0.10/U	0.066/U	0.13/U	0.088/U				
UU	0.040				(0.20)	0.059/U				

Blank extraction date: _____ **Blank analysis date:** _____

Conc. units: _____ Associated Samples:

Compound	Blank ID	Sample Identification								

LDC #: 21257 F2c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JVG
2nd Reviewer:

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 7/02/08
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4

Compound	Blank ID	Sample Identification								
	5	4								
AAA	0.33									
XX	3.0	1.4 /U								
LL	5.9	0.26 /U								
CC	3.0									
EEE	0.62									
W	0.039	0.066/U								
CRQL S	0.088	0.13/U								

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

Compound	Blank ID	Sample Identification								
	5	4								
UU	0.059	(0.20)								
CRQL										

5x - phthalates
2x - All others

LDC #: 21257
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JV6
2nd Reviewer:

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: 1-3 (6 p)

Compound	Blank ID	Sample Identification								
	PB061608B	1	2	3						
EEE	0.21									
S	0.085	0.088/U	0.10/U	0.066/U						
CRQL										

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: 1-3 (6 f)

Compound	Blank ID	Sample Identification								
	FB062408	GW AREA1	1	2	3					
LL	0.18		0.20/U	0.23/U	0.18/U					
S	0.075		0.088/U	0.10/U	0.066/U					
CRQL										

5X - Phthalates
2X - All others

LDC #: 21257F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		6/7	GG	9 (44-112)	7 (44-112)	( )	3	N or qual (LCS/LCSD in)
			DD	3 (51-115)	2 (51-115)	( )		
			VV	3 (54-119)	2 (54-119)	32 (30)		
			CCC	10 (58-115)	8 (58-115)	( )		
			III	1 (36-119)	1 (36-119)	( )		
			LLL	( )	38 (39-127)	( )		(MS in)
			HHH	21 (47-119)	15 (47-119)	33 (30)		(LCS/LCSD in)
			DDD	35 (55-113)	38 (55-113)	( )		
			KKK	35 (47-116)	35 (47-116)	( )		
			YY	53 (59-117)	50 (59-117)	( )		
			W	17 (42-130)	16 (42-130)	( )		
			UU	53 (54-114)	50 (54-114)	( )		
			ZZ	11 (55-115)	9 (55-115)	( )		
			RRR	33 (50-150)	45 (50-150)	32 (30)		J-/UJ/A (m,ld)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	II.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
E.	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	KK.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
J.	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	TT.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
R.	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	ZZ.	Pyrene	35-142%	< 36%	26-127%	< 31%
V.	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

LDC #: 21257 F2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D1	UUU	45 (50-120)	48 (50-120)	( )	All + Blk	No qual (MS/MSD in)
			RRR	30 (↓)	28 (↓)	( )	↓	J-/UJ/P (L, [illegible])
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 F2a
SDG #: Lu Creek

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/L)		Diff RPD
	1	2	
LL	0.20	0.23	0.03 (≤5.1)
UUU	1.0	0.96	0.04 (≤2.0)
S	0.088	0.10	0.012 (≤0.20)

Compound	Concentration ( )		RPD

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 7 through July 8, 2008

LDC Report Date: August 20, 2009

Matrix: Soil

Parameters: Semivolatiles

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
RSAN2-10BMS
RSAN2-10BMSD

Introduction

This data review covers 16 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/16/08	Bis(2-ethylhexyl)phthalate Phenanthrene	360 ug/Kg 1.2 ug/Kg	All samples in SDG R2844862

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
SA47-10B	Bis(2-ethylhexyl)phthalate	140 ug/Kg	140U ug/Kg
SA47-20B	Bis(2-ethylhexyl)phthalate Phenanthrene	340 ug/Kg 2.4 ug/Kg	340U ug/Kg 2.4U ug/Kg
SA47-30B	Bis(2-ethylhexyl)phthalate	430 ug/Kg	430U ug/Kg
SA47-35B	Bis(2-ethylhexyl)phthalate Phenanthrene	140 ug/Kg 2.3 ug/Kg	140U ug/Kg 2.3U ug/Kg
SA183-0.5B	Bis(2-ethylhexyl)phthalate Phenanthrene	240 ug/Kg 1.5 ug/Kg	240U ug/Kg 1.5U ug/Kg
SA67-0.5B	Bis(2-ethylhexyl)phthalate	110 ug/Kg	110U ug/Kg
SA67-10B	Bis(2-ethylhexyl)phthalate Phenanthrene	240 ug/Kg 1.3 ug/Kg	240U ug/Kg 1.3U ug/Kg
SA67-20B	Phenanthrene	2.0 ug/Kg	2.0U ug/Kg
SA67-30B	Bis(2-ethylhexyl)phthalate Phenanthrene	380 ug/Kg 2.3 ug/Kg	380U ug/Kg 2.3U ug/Kg
SA67-35B	Bis(2-ethylhexyl)phthalate	210 ug/Kg	210U ug/Kg
RSAN2-0.5B	Bis(2-ethylhexyl)phthalate Phenanthrene	110 ug/Kg 2.2 ug/Kg	110U ug/Kg 2.2U ug/Kg
RSAN2-10B	Bis(2-ethylhexyl)phthalate Phenanthrene	110 ug/Kg 2.2 ug/Kg	110U ug/Kg 2.2U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAN2-20B	Bis(2-ethylhexyl)phthalate Phenanthrene	100 ug/Kg 2.2 ug/Kg	100U ug/Kg 2.2U ug/Kg

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

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
RSAN2-10BMS/MSD (RSAN2-10B)	Bis(2-ethylhexyl)phthalate	159 (50-150)	250 (50-150)	32 (≤30)	J (all detects)	P

Although the MS/MSD percent recoveries (%R) were not within QC limits for two compounds, the MS and LCS/D percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (All samples in SDG R2844862)	Bis(2-ethylhexyl)phthalate	270 (50-120)	323 (50-120)	-	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

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
Semivolatiles - Data Qualification Summary - SDG R2844862

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844862	RSAN2-10B	Bis(2-ethylhexyl)phthalate	J (all detects)	P	Matrix spike/Matrix spike duplicates (%R)(RPD) (m, ld)
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	Bis(2-ethylhexyl)phthalate	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	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844862	SA47-10B	Bis(2-ethylhexyl)phthalate	140U ug/Kg	A	bl
R2844862	SA47-20B	Bis(2-ethylhexyl)phthalate Phenanthrene	340U ug/Kg 2.4U ug/Kg	A	bl
R2844862	SA47-30B	Bis(2-ethylhexyl)phthalate	430U ug/Kg	A	bl
R2844862	SA47-35B	Bis(2-ethylhexyl)phthalate Phenanthrene	140U ug/Kg 2.3U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844862	SA183-0.5B	Bis(2-ethylhexyl)phthalate Phenanthrene	240U ug/Kg 1.5U ug/Kg	A	bl
R2844862	SA67-0.5B	Bis(2-ethylhexyl)phthalate	110U ug/Kg	A	bl
R2844862	SA67-10B	Bis(2-ethylhexyl)phthalate Phenanthrene	240U ug/Kg 1.3U ug/Kg	A	bl
R2844862	SA67-20B	Phenanthrene	2.0U ug/Kg	A	bl
R2844862	SA67-30B	Bis(2-ethylhexyl)phthalate Phenanthrene	380U ug/Kg 2.3U ug/Kg	A	bl
R2844862	SA67-35B	Bis(2-ethylhexyl)phthalate	210U ug/Kg	A	bl
R2844862	RSAN2-0.5B	Bis(2-ethylhexyl)phthalate Phenanthrene	110U ug/Kg 2.2U ug/Kg	A	bl
R2844862	RSAN2-10B	Bis(2-ethylhexyl)phthalate Phenanthrene	110U ug/Kg 2.2U ug/Kg	A	bl
R2844862	RSAN2-20B	Bis(2-ethylhexyl)phthalate Phenanthrene	100U ug/Kg 2.2U ug/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257G2a
SDG #: R2844862
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/07- 08/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD or r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	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	SA47-0.5B	11	SA67-35B	21	SBLK1	31	
2	SA47-10B	12	RSAN2-0.5B	22		32	
3	SA47-20B	13	RSAN2-10B	23		33	
4	SA47-30B	14	RSAN2-20B	24		34	
5	SA47-35B	15	RSAN2-10BMS	25		35	
6	SA183-0.5B	16	RSAN2-10BMSD	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	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257 G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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

Blank extraction date: 7/16/08 **Blank analysis date:** 7/22/08
Conc. units: ug/kg Associated Samples: All

Compound	Blank ID	Sample Identification								
	SBLK1	1	2	3	4	5	6	7	8	9
EEE	360		140/U	340/U	430/U	140/U	240/U	110/U	240/U	
1800 UU 2.4	1.2	(27)	(2.5)	2.4/U	(2.9)	2.3/U	1.5/U	(14)	1.3/U	2.0/U

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

Compound	Blank ID	Sample Identification								
	SBLK1	10	11	12	13	14				
EEE	360	380/U	210/U	110/U	110/U	100/U				
UU	1.2	2.3/U	(2.5)	2.2/U	2.2/U	2.2/U				

LDC #: 21257 G2a
SDG #: Cu Conv

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JV6
2nd Reviewer: [signature]

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		15/16	XX	( )	173 (50-150)	( )	13	No qual (MS in
			EEE	159 (50-150)	250 ( )	32 (30)		J dets/p (m. b
			RRR	41 ( )	40 ( )	( )		No qual (LCS/D in
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257G2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D1	EEE	270 (50-120)	323 (50-120)	( )	All + Blk	J+ dets/P (1, [illegible])
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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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 31, 2009

Matrix: Water

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844866

Sample Identification

M-39B
TR-2B
M-69B
M-69BRE
I-BB
I-BBRE
M-96BF
M-48B
TR-4B
CLD3-RB
CLD1-RB
M-124B
M-123B
M-96BFMS
M-96BFMSD

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
M-124B M-123B	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 semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

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

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB062408GWAREA1	6/24/08	Diethylphthalate Naphthalene	0.18 ug/L 0.075 ug/L	All samples in SDG R2844866

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

Pump Blank ID	Sampling Date	Compound	Concentration	Associated Samples
PB061608B	6/16/08	Bis(2-ethylhexyl)phthalate Naphthalene	0.21 ug/L 0.085 ug/L	M-39B TR-2B M-69B M-69BRE I-BB I-BBRE M-96BF M-48B CLD3-RB CLD1-RB M-124B 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	Naphthalene	0.075 ug/L	0.075U ug/L

Sample	Compound	Reported Concentration	Modified Final Concentration
TR-2B	Bis(2-ethylhexyl)phthalate	0.22 ug/L	0.22U ug/L
M-96BF	Naphthalene Diethylphthalate	0.066 ug/L 0.14 ug/L	0.066U ug/L 0.14U ug/L
M-48B	Bis(2-ethylhexyl)phthalate Naphthalene Diethylphthalate	0.25 ug/L 0.12 ug/L 0.26 ug/L	0.25U ug/L 0.12U ug/L 0.26U ug/L
CLD3-RB	Naphthalene	0.094 ug/L	0.094U ug/L
M-124B	Naphthalene	0.056 ug/L	0.056U ug/L
M-39B	Naphthalene	0.075 ug/L	0.075U ug/L
CLD1-RB	Diethylphthalate Naphthalene	0.13 ug/L 0.075 ug/L	0.13U ug/L 0.075U 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-96BFMS/MSD (M-96BF)	Pyridine	33 (50-150)	40 (50-150)	-	J- (all detects) UJ (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (M-39B TR-2B M-69B M-69BRE I-BB I-BBRE M-96BF M-48B TR-4B)	Pyridine	16 (50-120)	0 (50-120)	200 (≤30)	J (all detects) R (all non-detects)	P
LCS/D2 (CLD3-RB CLD1-RB M-124B M-123B)	1,4-Dioxane	35 (50-120)	43 (50-120)	-	J- (all detects) UJ (all non-detects)	P
	Pyridine	30 (50-120)	25 (50-120)	-	J- (all detects) UJ (all non-detects)	

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
I-BB	Perylene-d12	80747 (115242-460968)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A
I-BBRE	Perylene-d12	19439 (115242-460968)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A
M-69B	Perylene-d12	41859 (115242-460968)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
M-69BRE	Perylene-d12	29800 (115242-460968)	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

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-69BRE I-BBRE	All TCL compounds	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
Semivolatiles - Data Qualification Summary - SDG R2844866

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844866	M-124B M-123B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Cooler temperature (st)
R2844866	M-96BF	Pyridine	J- (all detects) UJ (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R2844866	M-39B TR-2B M-69B M-69BRE I-BB I-BBRE M-96BF M-48B TR-4B	Pyridine	J (all detects) R (all non-detects)	P	Laboratory control samples (%R)(RPD) (l)
R2844866	CLD3-RB CLD1-RB M-124B M-123B	1,4-Dioxane Pyridine	J- (all detects) UJ (all non-detects) J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (l)
R2844866	I-BB	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R2844866	I-BBRE M-69B M-69BRE	Di-n-octylphthalate Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	J (all detects) R (all non-detects)	A	Internal standards (area) (i)
R2844866	M-39B TR-2B M-69B M-69BRE I-BB I-BBRE M-96BF M-48B TR-4B CLD3-RB CLD1-RB M-124B M-123B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844866	M-69BRE I-BBRE	All TCL compounds	X	A	Overall assessment of data (o)

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

No Sample Data Qualified in this SDG

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

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R2844866	M-39B	Naphthalene	0.075U ug/L	A	bp,bf
R2844866	TR-2B	Bis(2-ethylhexyl)phthalate	0.22U ug/L	A	bp
R2844866	M-96BF	Naphthalene	0.066U ug/L	A	bp,bf
R2844866	M-96BF	Diethylphthalate	0.14U ug/L	A	bf
R2844866	M-48B	Bis(2-ethylhexyl)phthalate	0.25U ug/L	A	bp
R2844866	M-48B	Naphthalene	0.12U ug/L	A	bp,bf
R2844866	M-48B	Diethylphthalate	0.26U ug/L	A	bf
R2844866	CLD3-RB	Naphthalene	0.094U ug/L	A	bp,bf
R2844866	CLD1-RB	Naphthalene	0.075U ug/L	A	bp,bf
R2844866	CLD1-RB	Diethylphthalate	0.13U ug/L	A	bf
R2844866	M-124B	Naphthalene	0.056U ug/L	A	bp,bf

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257H2a
SDG #: R2844866
Laboratory: Columbia Analytical Services

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

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/08 – 11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r²
IV.	Continuing calibration/ICV	SW A	CCV/ICV ± 25 %
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	N	
XVII.	Field blanks	SW	PB = PB061608B from R2844538 FB = FB062408GWAREA1 from R2844650

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-39B	11	CLD1-RB	21	SBLK1	31	
2	TR-2B	12	M-124B	22	SBLK2	32	
3	M-69B	13	M-123B	23		33	
4	M-69BRE	14	M-96BFMS	24		34	
5	I-BB	15	M-96BFMSD	25		35	
6	I-BBRE	16		26		36	
7	M-96BF	17		27		37	
8	M-48B	18		28		38	
9	TR-4B	19		29		39	
10	CLD3-RB	20		30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257H2a
SDG #: See Cover

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 BNA (EPA SW 846 Method 8270)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
12, 13	Cooler Temp = 8°C						J/UJ/A (st)

TECHNICAL HOLDING TIME CRITERIA

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

LDC #: 21257H2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/16/08
Field blank type: (circle one) Field Blank / Rinsate / Other: PB Associated Samples: All except 9

Compound	Blank ID	Sample Identification								
	PB061608B	1	2	7	8	10	11	12		
1.05 EEE	0.21		0.22/U		0.25/U					
0.17 S	0.085	0.075/U		0.066/U	0.12/U	0.094/U	0.075/U	0.056/U		
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

5X- phthalates
2X- all others

LDC #: 21257#2a
SDG #: Sa Cmar

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SVG
2nd Reviewer:

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

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

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 6/24/08
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: All

Compound	Blank ID: FB062408GWXREA1	Sample Identification								
	6/24/08	1	7	8	10	11	12			
LL	0.18		0.14/U	0.26/U		0.13/U				
S	0.075	0.075/U	0.066/U	0.12/U	0.094/U	0.075/U	0.056/U			
CRQL										

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

Compound	Blank ID	Sample Identification								
CRQL										

LDC #: 21257H2a
SDG #: Sw Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JVb
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		14/15	VV	40 (~~51-51~~ 51-119)	40 (~~51-51~~ 51-119)	( )	7	No qual (LCS/Dup)
			III	28 (36-119)	25 (36-119)	( )	↓	↓
			RRR	33 (~~50-150~~ 50-150)	40 (50-150)	( )	↓	J-/UJ/A (m, ~~pa~~)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	II.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
E.	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	KK.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
J.	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	TT.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
R.	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	ZZ.	Pyrene	35-142%	< 36%	26-127%	< 31%
V.	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

LDC #: 21257H2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

(Y) N N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 1	UUU	35 (50-120)	43 (50-120)	( )	1-9, SBLK1	No qual (MS/MSD in)
			RRR	16 (↓)	0 (↓)	200 (30)	↓	J/R/P (1, 1d)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
		LCS/D 2	UUU	35 (50-120)	43 (50-120)	( )	10-13, SBLK2	J-/UJ/P (1, 1d)
			RRR	30 (↓)	25 (↓)	( )	↓	↓ ↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 #2a
SDG #: Eq Conv

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A 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
		#5	PRY	80747 (115242 - 460968)		J/UJ/A (i)
*		6		19439		J/R/A
*		3		41859		
		4		29800		
						(qual FFF, GGG, HHH, III, JJJ, KKK, LLL)

(x < 252, R)

* QC limits are advisory
IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 21257H2a
SDG #: Sw Cover

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

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

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

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

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

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

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		4, 6	Confirmation runs for	IS outside limits	X/A (o)

Comments: _____

OVR.2S

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 8 through September 8, 2008

LDC Report Date: August 18, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844885

Sample Identification

RSAN2-30B
RSAN2-30BD
RSAN2-35B
RSAO2-0.5B
RSAO2-10B
RSAO2-20B
RSAO2-20BD
RSAO2-30B
RSAO2-33B
SA183-10B
SA183-10BD
SA183-20B
SA183-30B
SA183-33B
RSA04-0.5B
RSA04-10B
RSA04-20B
RSA04-30B
RSA04-36B
RSA04-30BMS
RSA04-30BMSD

Introduction

This data review covers 21 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/15/08	Diethylphthalate Phenanthrene	3.8 ug/Kg 1.5 ug/Kg	All samples in SDG R2844885

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
RSAN2-30B	Diethylphthalate Phenanthrene	9.6 ug/Kg 3.0 ug/Kg	9.6U ug/Kg 3.0U ug/Kg
RSAN2-30BD	Diethylphthalate	11 ug/Kg	11U ug/Kg
RSAN2-35B	Phenanthrene	2.4 ug/Kg	2.4U ug/Kg
RSAO2-0.5B	Diethylphthalate Phenanthrene	9.3 ug/Kg 2.9 ug/Kg	9.3U ug/Kg 2.9U ug/Kg
RSAO2-10B	Diethylphthalate Phenanthrene	8.8 ug/Kg 2.9 ug/Kg	8.8U ug/Kg 2.9U ug/Kg
RSAO2-20B	Phenanthrene	2.5 ug/Kg	2.5U ug/Kg
RSAO2-20BD	Diethylphthalate Phenanthrene	4.5 ug/Kg 2.3 ug/Kg	4.5U ug/Kg 2.3U ug/Kg
RSAO2-30B	Diethylphthalate	15 ug/Kg	15U ug/Kg
RSAO2-33B	Diethylphthalate Phenanthrene	8.7 ug/Kg 2.9 ug/Kg	8.7U ug/Kg 2.9U ug/Kg
SA183-10B	Diethylphthalate	8.8 ug/Kg	8.8U ug/Kg
SA183-10BD	Diethylphthalate Phenanthrene	6.2 ug/Kg 2.5 ug/Kg	6.2U ug/Kg 2.5U ug/Kg
SA183-20B	Diethylphthalate Phenanthrene	6.5 ug/Kg 2.6 ug/Kg	6.5U ug/Kg 2.6U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
SA183-30B	Diethylphthalate	8.4 ug/Kg	8.4U ug/Kg
SA183-33B	Diethylphthalate	14 ug/Kg	14U ug/Kg
RSA04-10B	Diethylphthalate Phenanthrene	7.2 ug/Kg 2.1 ug/Kg	7.2U ug/Kg 2.1U ug/Kg
RSA04-20B	Diethylphthalate Phenanthrene	7.6 ug/Kg 2.5 ug/Kg	7.6U ug/Kg 2.5U ug/Kg
RSA04-30B	Diethylphthalate	11 ug/Kg	11U ug/Kg
RSA04-36B	Diethylphthalate	9.6 ug/Kg	9.6U ug/Kg

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

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recoveries (%R) were not within QC limits for two compounds, the MS/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 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

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 RSAO2-20B and RSAO2-20BD, and samples SA183-10B and SA183-10BD were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAN2-30B	RSAN2-30BD				
Butylbenzylphthalate	260U	5.3	-	254.7 (≤260)	-	-
Diethylphthalate	9.6	11	-	1.4 (≤280)	-	-
Phenanthrene	3.0	6.2	-	3.2 (≤11)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAO2-20B	RSAO2-20BD				
Butylbenzylphthalate	6.4	230U	-	224 (≤230)	-	-
Diethylphthalate	250U	4.5	-	245.5 (≤250)	-	-
Phenanthrene	2.5	2.3	-	0.2 (≤9.7)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	SA183-10B	SA183-10BD				
Butylbenzylphthalate	3.2	190U	-	186.8 (≤190)	-	-
Diethylphthalate	8.8	6.2	-	2.6 (≤190)	-	-
Phenanthrene	3.1	2.5	-	0.6 (≤7.5)	-	-

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844885	RSAN2-30B RSAN2-30BD RSAN2-35B RSAO2-0.5B RSAO2-10B RSAO2-20B RSAO2-20BD RSAO2-30B RSAO2-33B SA183-10B SA183-10BD SA183-20B SA183-30B SA183-33B RSA04-0.5B RSA04-10B RSA04-20B RSA04-30B RSA04-36B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844885	RSAN2-30B	Diethylphthalate Phenanthrene	9.6U ug/Kg 3.0U ug/Kg	A	bl
R2844885	RSAN2-30BD	Diethylphthalate	11U ug/Kg	A	bl
R2844885	RSAN2-35B	Phenanthrene	2.4U ug/Kg	A	bl
R2844885	RSAO2-0.5B	Diethylphthalate Phenanthrene	9.3U ug/Kg 2.9U ug/Kg	A	bl
R2844885	RSAO2-10B	Diethylphthalate Phenanthrene	8.8U ug/Kg 2.9U ug/Kg	A	bl
R2844885	RSAO2-20B	Phenanthrene	2.5U ug/Kg	A	bl
R2844885	RSAO2-20BD	Diethylphthalate Phenanthrene	4.5U ug/Kg 2.3U ug/Kg	A	bl
R2844885	RSAO2-30B	Diethylphthalate	15U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844885	RSAO2-33B	Diethylphthalate Phenanthrene	8.7U ug/Kg 2.9U ug/Kg	A	bl
R2844885	SA183-10B	Diethylphthalate	8.8U ug/Kg	A	bl
R2844885	SA183-10BD	Diethylphthalate Phenanthrene	6.2U ug/Kg 2.5U ug/Kg	A	bl
R2844885	SA183-20B	Diethylphthalate Phenanthrene	6.5U ug/Kg 2.6U ug/Kg	A	bl
R2844885	SA183-30B	Diethylphthalate	8.4U ug/Kg	A	bl
R2844885	SA183-33B	Diethylphthalate	14U ug/Kg	A	bl
R2844885	RSA04-10B	Diethylphthalate Phenanthrene	7.2U ug/Kg 2.1U ug/Kg	A	bl
R2844885	RSA04-20B	Diethylphthalate Phenanthrene	7.6U ug/Kg 2.5U ug/Kg	A	bl
R2844885	RSA04-30B	Diethylphthalate	11U ug/Kg	A	bl
R2844885	RSA04-36B	Diethylphthalate	9.6U ug/Kg	A	bl

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257I2a
SDG #: R2844885
Laboratory: Columbia Analytical Services

Date: 8/14/09
Page: 1 of 1
Reviewer: JV6
2nd Reviewer: N

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/08-09/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r
IV.	Continuing calibration/ICV	~~JVG~~ SW A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	SW	D_1 = 1, 2 D_2 = 6, 7 D_3 = 10, 11
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	RSAN2-30B D_1	11	SA183-10BD D_2	21	RSA04-30BMSD	31	SB LCS
2	RSAN2-30BD D_1	12	SA183-20B	22		32	
3	RSAN2-35B	13	SA183-30B	23		33	
4	RSAO2-0.5B	14	SA183-33B	24		34	
5	RSAO2-10B	15	RSA04-0.5B	25		35	
6	RSAO2-20B D_2	16	RSA04-10B	26		36	
7	RSAO2-20BD D_2	17	RSA04-20B	27		37	
8	RSAO2-30B	18	RSA04-30B	28		38	
9	RSAO2-33B	19	RSA04-36B	29		39	
10	SA183-10B D_3	20	RSA04-30BMS	30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257I2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

(bl)

Blank extraction date: 7/15/08 **Blank analysis date:** 7/18/08 All
Conc. units: ug/kg Associated Samples:

Compound		Blank ID	Sample Identification								
		SBLK1	1	2	3	4	5	6	7	8	9
(5x) = 19.0	LL	3.8	9.6/U	11/U		9.3/U	8.8/U		4.5/U	15/U	8.7/U
(2x) = 3.0	UU	1.5	3.0/U	(6.2)	2.4/U	2.9/U	2.9/U	2.5/U	2.3/U	(3.6)	2.9/U

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

Compound		Blank ID	Sample Identification								
		SBLK1	10	11	12	13	14	16	17	18	19
	LL	3.8	8.8/U	6.2/U	6.5/U	8.4/U	14/U	7.2/U	7.6/U	11/U	9.6/U
	UU	1.5	(3.1) #	2.5/U	2.6/U	(3.4)	(4.6)	2.1/U	2.5/U	(3.7)	(3.2)

LDC #: 21257 I2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		20/21	XX	( )	188 (50-150)	44 (30)	18	No qual (MS in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257I2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

(Y) N N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS 1	XX	128 (50-120)	( )	( )	All + Blk	No qual (MS in)
			EEE	128 (↓)	( )	( )	↓	↓ (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 I 2a
SDG #: Gu Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 1	2	Diff ~~RPD~~	Parent only
AAA	260 U	5.3	254.7 (≤ 260)	-
LL	9.6	11	1.4 (≤ 280)	-
UU	3.0	6.2	3.2 (≤ 11)	-

Compound	Concentration (ug/kg) 6	7	Diff ~~RPD~~	Parent only
AAA	6.4	230 U	224 (≤ 230)	-
LL	250 U	4.5	245.5 (≤ 250)	-
UU	2.5	2.3	0.2 (≤ 9.7)	-

Compound	Concentration (ug/kg) 10	11	RPD	Parent only
AAA	3.2	190 U	186.8 (≤ 190)	-
LL	8.8	6.2	2.6 ↓	-
UU	3.1	2.5	0.6 (≤ 7.5)	-

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 9 through July 10, 2008

LDC Report Date: August 20, 2009

Matrix: Soil

Parameters: Semivolatiles

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
RSAJ7-0.5B
RSAJ7-0.5BDL
RSAJ7-10B
RSAJ7-20B
RSAK7-0.5B
RSAK7-0.5BDL
RSAK7-10B
RSAK7-10BD
RSAK7-20B
RSAK7-27B
SA48-35BMS
SA48-35BMSD

Introduction

This data review covers 22 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/17/08	Butylbenzylphthalate Diethylphthalate Phenanthrene	2.8 ug/Kg 6.4 ug/Kg 1.6 ug/Kg	All samples in SDG R2844902
SBLK1RE	7/17/08	Phenanthrene	1.5 ug/Kg	All samples in SDG R2844902

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
SA46-0.5B	Diethylphthalate Phenanthrene	7.5 ug/Kg 2.5 ug/Kg	7.5U ug/Kg 2.5U ug/Kg
SA46-10B	Diethylphthalate Phenanthrene	9.0 ug/Kg 2.3 ug/Kg	9.0U ug/Kg 2.3U ug/Kg
SA46-20B	Diethylphthalate Phenanthrene	8.1 ug/Kg 2.6 ug/Kg	8.1U ug/Kg 2.6U ug/Kg
SA46-30B	Diethylphthalate Phenanthrene	15 ug/Kg 3.2 ug/Kg	15U ug/Kg 3.2U ug/Kg
SA46-30BD	Phenanthrene	2.1 ug/Kg	2.1U ug/Kg
SA48-10B	Diethylphthalate Phenanthrene	4.7 ug/Kg 1.8 ug/Kg	4.7U ug/Kg 1.8U ug/Kg
SA48-30B	Diethylphthalate Phenanthrene	7.1 ug/Kg 2.0 ug/Kg	7.1U ug/Kg 2.0U ug/Kg
SA48-35B	Diethylphthalate Phenanthrene	11 ug/Kg 2.5 ug/Kg	11U ug/Kg 2.5U ug/Kg
RSAJ7-0.5B (10x)	Phenanthrene	25 ug/Kg	25U ug/Kg
RSAJ7-20B	Diethylphthalate Phenanthrene	6.0 ug/Kg 2.1 ug/Kg	6.0U ug/Kg 2.1U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAK7-10B	Phenanthrene	1.5 ug/Kg	1.5U ug/Kg
RSAK7-10BD	Diethylphthalate Phenanthrene	5.5 ug/Kg 1.7 ug/Kg	5.5U ug/Kg 1.7U ug/Kg
RSAK7-20B	Diethylphthalate Phenanthrene	6.4 ug/Kg 1.8 ug/Kg	6.4U ug/Kg 1.8U ug/Kg
RSAK7-27B	Phenanthrene	2.3 ug/Kg	2.3U ug/Kg

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for samples RSAJ7-0.5BDL and RSAK7-0.5BDL. Since these samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS/D percent recoveries (%R) were not within QC limits for several compounds and the relative percent difference (RPD) for one compound, the LCS and MS/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 with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag	A or P
RSAK7-0.5BDL	Chrysene-d12	100763 (106904-427614)	Butylbenzylphthalate Pyrene Bis(2-ethylhexyl)phthalate Benzo(a)anthracene Chrysene	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
RSAJ7-0.5B RSAK7-0.5B	Hexachlorobenzene Octachlorostyrene	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 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

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
RSAJ7-0.5B RSAK7-0.5B	Hexachlorobenzene Octachlorostyrene	X X	A
RSAJ7-0.5BDL RSAK7-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	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 semivolatiles 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				
Diethylphthalate	15	250U	-	235 (≤250)	-	-
Bis(2-ethylhexyl)phthalate	200	220	-	20 (≤250)	-	-
Phenanthrene	3.2	2.1	-	1.1 (≤9.9)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK7-10B	RSAK7-10BD				
Diethylphthalate	190U	5.5	-	184.5 (≤190)	-	-
Hexachlorobenzene	5.6	12	-	6.4 (≤7.2)	-	-
Phenanthrene	1.5	1.7	-	0.2 (≤7.2)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R2844902

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844902	RSAK7-0.5BDL	Butylbenzylphthalate Pyrene Bis(2-ethylhexyl)phthalate Benzo(a)anthracene Chrysene	J (all detects) UJ (all non-detects)	A	Internal standards (area) (i)
R2844902	RSAJ7-0.5B RSAJ7-10B	Hexachlorobenzene Octachlorostyrene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R2844902	SA46-0.5B SA46-10B SA46-20B SA46-30B SA46-30BD SA48-0.5B SA48-10B SA48-20B SA48-30B SA48-35B RSAJ7-0.5B RSAJ7-0.5BDL RSAJ7-10B RSAJ7-20B RSAK7-0.5B RSAK7-0.5BDL RSAK7-10B RSAK7-10BD RSAK7-20B RSAK7-27B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844902	RSAJ7-0.5B RSAK7-0.5B	Hexachlorobenzene Octachlorostyrene	X X	A	Overall assessment of data (o)
R2844902	RSAJ7-0.5BDL RSAK7-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	X	A	Overall assessment of data (o)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R2844902

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844902	SA46-0.5B	Diethylphthalate Phenanthrene	7.5U ug/Kg 2.5U ug/Kg	A	bl
R2844902	SA46-10B	Diethylphthalate Phenanthrene	9.0U ug/Kg 2.3U ug/Kg	A	bl

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844902	SA46-20B	Diethylphthalate Phenanthrene	8.1U ug/Kg 2.6U ug/Kg	A	bl
R2844902	SA46-30B	Diethylphthalate Phenanthrene	15U ug/Kg 3.2U ug/Kg	A	bl
R2844902	SA46-30BD	Phenanthrene	2.1U ug/Kg	A	bl
R2844902	SA48-10B	Diethylphthalate Phenanthrene	4.7U ug/Kg 1.8U ug/Kg	A	bl
R2844902	SA48-30B	Diethylphthalate Phenanthrene	7.1U ug/Kg 2.0U ug/Kg	A	bl
R2844902	SA48-35B	Diethylphthalate Phenanthrene	11U ug/Kg 2.5U ug/Kg	A	bl
R2844902	RSAJ7-0.5B (10x)	Phenanthrene	25U ug/Kg	A	bl
R2844902	RSAJ7-20B	Diethylphthalate Phenanthrene	6.0U ug/Kg 2.1U ug/Kg	A	bl
R2844902	RSAK7-10B	Phenanthrene	1.5U ug/Kg	A	bl
R2844902	RSAK7-10BD	Diethylphthalate Phenanthrene	5.5U ug/Kg 1.7U ug/Kg	A	bl
R2844902	RSAK7-20B	Diethylphthalate Phenanthrene	6.4U ug/Kg 1.8U ug/Kg	A	bl
R2844902	RSAK7-27B	Phenanthrene	2.3U ug/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R2844902

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257J2a
SDG #: R2844902
Laboratory: Columbia Analytical Services

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

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/09-10/18
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r ✓
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS /D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	SW	
XVI.	Field duplicates	SW	D_1 = 4, 5 D_2 = 17, 18
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:

1	SA46-0.5B	11	RSAJ7-0.5B	21	SA48-35BMS	31	SBLK1
2	SA46-10B	12	RSAJ7-0.5BDL	22	SA48-35BMSD	32	SBLK1 RE
3	SA46-20B	13	RSAJ7-10B	23		33	
4	SA46-30B D_1	14	RSAJ7-20B	24		34	
5	SA46-30BD D_1	15	RSAK7-0.5B	25		35	
6	SA48-0.5B	16	RSAK7-0.5BDL	26		36	
7	SA48-10B	17	RSAK7-10B D_2 ✓	27		37	
8	SA48-20B	18	RSAK7-10BD D_2 ✓	28		38	
9	SA48-30B	19	RSAK7-20B	29		39	
10	SA48-35B	20	RSAK7-27B	30		40	

VALIDATION FINDINGS WORKSHEET

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

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

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

COMPNDL

LDC #: 21257J29
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

Blank extraction date: 7/17/08 **Blank analysis date:** 7/22/08 ; 7/25/08
Conc. units: ug/kg Associated Samples: All

	Compound	Blank ID	Sample Identification									
		SBLK1	SBLK1RE	1	2	3	4	5	6 (5x)	7	9	
14	AAA	2.8										
32	LL	6.4		7.5 /U	9.0/U	8.1 /U	15/U			4.7/U	7.1 /U	
3.2	UU	1.6	1.5	2.5/U	2.3/U	2.6 /U	3.2/U	2.1/U	(75)	1.8/U	2.0/U	

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

Compound	Blank ID	Sample Identification								
	SBLK1	SBLKRE	10	11 (10x)	14	17	18	19	20	
AAA	2.8									
LL	6.4		11/U		6.0/U		5.5/U	6.4/U		
UU	1.6	1.5	2.5/U	25/U	2.1/U	1.5/U	1.7/U	1.8/U	2.3/U	

5x Phthalates
2x all others

(SBLK1RE = analyzed on a different instrument)

LDC #: 21257J2a
SDG #: Sa Cmar

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: JV6
2nd Reviewer: Q

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

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?
(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
(Y) N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		12 (500x)	All	DO (45-135)	No qual
		16		( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21257 J2a
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

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

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		21/22	EEE	165 ( )	( )	44 (30)	10	No qual (MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	< 50%	27-123%	< 40%	II.	4-Nitrophenol	11-114%	< 50%	10-80%	< 50%
E.	1,4-Dichlorobenzene	28-104%	< 27%	36-97%	< 28%	KK.	2,4-Dinitrotoluene	28-89%	< 47%	24-96%	< 38%
J.	N-Nitroso-di-n-propylamine	41-126%	< 38%	41-116%	< 38%	TT.	Pentachlorophenol	17-109%	< 47%	9-103%	< 50%
R.	1,2,4-Trichlorobenzene	38-107%	< 23%	39-98%	< 28%	ZZ.	Pyrene	35-142%	< 36%	26-127%	< 31%
V.	4-Chloro-3-methylphenol	26-103%	< 33%	23-97%	< 42%						

LDC #: 21257 J2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: JVG
2nd Reviewer: Q

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

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

(Y) N N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D 1	XX	( )	128 (50-120)	( )	All + Blks	No qual (LCS in)
			UUU	44 (50-120)	47 (↓)	( )	↓	(MS/MSD in)
			EEE	135 (↓)	270 (↓)	67 (30)	↓	↓ (MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257 J2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

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

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

Y (N) N/A Were 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
		16	CRY	100763 (106904 - 427614)		J/UJ/A (i) (qual AAA, ZZ, EEE, CCC, DDD)

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 21257J2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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

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

Y N ~~N/A~~ Were 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	SS, TTT > cal range		J dets/A (e)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257 J2a
SDG #: Sq Cor ✓

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: VV
2nd Reviewer: ✓

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

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

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	SS, TTT > cal range		X / A (o)
		12, 16	All except SS, TTT dil		

Comments: _____

LDC #: 21257J24
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg) 4	5	Diff ~~RPD~~
LL	15	250 U	235 (≤250)
EEE	200	220	20 ↓
UU	3.2	2.1	1.1 (≤9.9)

Compound	Concentration (ug/kg) 17	18	Diff ~~RPD~~
LL	190 U	5.5	184.5 (≤190)
SS	5.6	12	6.4 (≤7.2)
UU	1.5	1.7	0.2 ↓

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 25, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2844922

Sample Identification

RSAJ8-0.5B
RSAJ8-0.5BDL
RSAJ8-10B
RSAJ8-20B
RSAJ8-30B
RSAJ8-33B
RSAI7-0.5B
RSAI7-10B
RSAI7-20B
RSAI7-30B
RSAL2-0.5B
RSAL2-0.5BDL
RSAL2-10B
RSAL2-10BDL
RSAL2-20B
RSAL2-20BD
RSAL2-20BDDL
RSAL2-30B
RSAL2-37B
RSAL2-40B
RSAK2-0.5B
RSAK2-10B
RSAK2-20B
RSAK2-20BD
RSAK2-20BDDL
RSAK2-30B
RSAK2-35B
RSA17-32B
RSAL2-0.5BMS
RSAL2-0.5BMSD

Introduction

This data review covers 30 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met.

All samples were received in good condition with the following exceptions:

Sample	Compound	Finding	Flag	A or P
RSAJ8-0.5B RSAJ8-0.5BDL RSAJ8-30B	All TCL compounds	All jars possibly contaminated from water in the cooler. Water present in jars.	J (all detects) UJ (all non-detects)	A

One out of 3 jars possibly contaminated from water in the cooler. Water present in jars for samples RSAJ8-33B and RSAK2-0.5B .

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

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

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Extraction Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/18/08	Phenanthrene	1.4 ug/Kg	RSAJ8-0.5B RSAJ8-0.5BDL RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-0.5BDL RSAL2-10B RSAL2-10BDL RSAL2-20B RSAL2-20BD RSAL2-20BDDL RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-20BDDL

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
RSAJ8-10B	Phenanthrene	1.6 ug/Kg	1.6U ug/Kg

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
RSAJ8-20B	Phenanthrene	1.9 ug/Kg	1.9U ug/Kg
RSAJ8-30B	Phenanthrene	2.0 ug/Kg	2.0U ug/Kg
RSAJ8-33B	Phenanthrene	1.5 ug/Kg	1.5U ug/Kg
RSAI7-0.5B	Phenanthrene	1.4 ug/Kg	1.4U ug/Kg
RSAI7-10B	Phenanthrene	2.1 ug/Kg	2.1U ug/Kg
RSAL2-0.5B (5x)	Phenanthrene	7.7 ug/Kg	7.7U ug/Kg
RSAL2-20BDDL (6x)	Phenanthrene	12 ug/Kg	12U ug/Kg
RSAL2-37B (6x)	Phenanthrene	16 ug/Kg	16U ug/Kg
RSAK2-0.5B (5x)	Phenanthrene	8.7 ug/Kg	8.7U ug/Kg
RSAK2-20B (5x)	Phenanthrene	10 ug/Kg	10U ug/Kg

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for samples RSAJ8-0.5BDL and RSAL2-0.5BDL. Since these samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS/MSD percent recoveries (%R) and relative percent difference (RPD) 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 recovery (%R) was not within QC limits for one compound, the MS and 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
RSAJ8-0.5B RSAL2-0.5B	Hexachlorobenzene Octachlorostyrene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
RSAL2-10B RSAL2-20BD RSAK2-20BD	Di-n-butylphthalate	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 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

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
RSAJ8-0.5B RSAL2-0.5B	Hexachlorobenzene Octachlorostyrene	X X	A
RSAJ8-0.5BDL RSAL2-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	X	A
RSAL2-10B RSAL2-20BD RSAK2-20BD	Di-n-butylphthalate	X	A
RSAL2-10BDL RSAL2-20BDDL RSAK2-20BDDL	All TCL compounds except Di-n-butylphthalate	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, samples RSAL2-20B and RSAL2-20BDDL, samples RSAK2-20B and RSAK2-20BD, and samples RSAK2-20B and RSAK2-20BDDL were identified as field duplicates. No semivolatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL2-20B	RSAL2-20BD				
Di-n-butylphthalate	560	660	-	100 (≤390)	-	-
Butylbenzylphthalate	390U	30	-	360 (≤390)	-	-
Diethylphthalate	49	54	-	5 (≤390)	-	-
Dimethylphthalate	4.0	4.8	-	0.8 (≤390)	-	-
Fluoranthene	3.9	4.6	-	0.7 (≤15)	-	-
Phenanthrene	15U	12	-	3 (≤15)	-	-
Pyrene	15U	1.9	-	13.1 (≤15)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAL2-20B	RSAL2-20BDDL				
Butylbenzylphthalate	390U	70	-	320 (≤390)	-	-
Di-n-butylphthalate	560	1800	-	1240 (≤1100)	J (all detects)	A
Diethylphthalate	49	1100U	-	1051 (≤1100)	-	-
Dimethylphthalate	4.0	1100U	-	1096 (≤1100)	-	-
Fluoranthene	3.9	43U	-	39.1 (≤43)	-	-
Phenanthrene	15U	12	-	3 (≤15)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK2-20B	RSAK2-20BD				
Butylbenzylphthalate	64	62	-	2 (≤920)	-	-
Di-n-butylphthalate	1500	1000	-	500 (≤920)	-	-
Diethylphthalate	49	36	-	13 (≤920)	-	-
Dimethylphthalate	920U	3.4	-	916.6 (≤920)	-	-
Fluoranthene	36U	4.5	-	31.5 (≤36)	-	-
Phenanthrene	10	9.2	-	0.8 (≤36)	-	-

Compound	Concentration (ug/Kg)		RPD (Limits)	Difference (Limits)	Flags	A or P
	RSAK2-20B	RSAK2-20BDDL				
Butylbenzylphthalate	64	130	-	66 (≤1800)	-	-
Di-n-butylphthalate	1500	3200	-	1700 (≤1800)	-	-
Diethylphthalate	49	1800U	-	1751 (≤1800)	-	-
Phenanthrene	10	71U	-	61 (≤71)	-	-

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - Data Qualification Summary - SDG R2844922

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	RSAJ8-0.5B RSAJ8-0.5BDL RSAJ8-30B	All TCL compounds	J (all detects) UJ (all non-detects)	A	Sample condition (p)
R2844922	RSAJ8-0.5B RSAL2-0.5B	Hexachlorobenzene Octachlorostyrene	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R2844922	RSAL2-10B RSAL2-20BD RSAK2-20BD	Di-n-butylphthalate	J (all detects)	A	Project Quantitation Limit (e)
R2844922	RSAJ8-0.5B RSAJ8-0.5BDL RSAJ8-10B RSAJ8-20B RSAJ8-30B RSAJ8-33B RSAI7-0.5B RSAI7-10B RSAI7-20B RSAI7-30B RSAL2-0.5B RSAL2-0.5BDL RSAL2-10B RSAL2-10BDL RSAL2-20B RSAL2-20BD RSAL2-20BDDL RSAL2-30B RSAL2-37B RSAL2-40B RSAK2-0.5B RSAK2-10B RSAK2-20B RSAK2-20BD RSAK2-20BDDL RSAK2-30B RSAK2-35B RSA17-32B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R2844922	RSAJ8-0.5B RSAL2-0.5B	Hexachlorobenzene Octachlorostyrene	X X	A	Overall assessment of data (o)
R2844922	RSAJ8-0.5BDL RSAL2-0.5BDL	All TCL compounds except Hexachlorobenzene Octachlorostyrene	X	A	Overall assessment of data (o)
R2844922	RSAL2-10B RSAL2-20BD RSAK2-20BD	Di-n-butylphthalate	X	A	Overall assessment of data (o)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2844922	RSAL2-10BDL RSAL2-20BDDL RSAK2-20BDDL	All TCL compounds except Di-n-butylphthalate	X	A	Overall assessment of data (o)
R2844922	RSAL2-20B RSAL2-20BDDL	Di-n-butylphthalate	J (all detects)	A	Field duplicates (Difference) (fd)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R2844922

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2844922	RSAJ8-10B	Phenanthrene	1.6U ug/Kg	A	bl
R2844922	RSAJ8-20B	Phenanthrene	1.9U ug/Kg	A	bl
R2844922	RSAJ8-30B	Phenanthrene	2.0U ug/Kg	A	bl
R2844922	RSAJ8-33B	Phenanthrene	1.5U ug/Kg	A	bl
R2844922	RSAI7-0.5B	Phenanthrene	1.4U ug/Kg	A	bl
R2844922	RSAI7-10B	Phenanthrene	2.1U ug/Kg	A	bl
R2844922	RSAL2-0.5B (5x)	Phenanthrene	7.7U ug/Kg	A	bl
R2844922	RSAL2-20BDDL (6x)	Phenanthrene	12U ug/Kg	A	bl
R2844922	RSAL2-37B (6x)	Phenanthrene	16U ug/Kg	A	bl
R2844922	RSAK2-0.5B (5x)	Phenanthrene	8.7U ug/Kg	A	bl
R2844922	RSAK2-20B (5x)	Phenanthrene	10U ug/Kg	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R2844922

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257K2a
SDG #: R2844922
Laboratory: Columbia Analytical Services

Date: 8/17/09
Page: 1 of 1
Reviewer: SVG
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/10 - 11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2 RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25 2
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	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 = 15/16 ; 15/17 ; 23/24 ; 23/25
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	RSAJ8-0.5B	11	RSAL2-0.5B	21	RSAK2-0.5B	31	SBLK1
2	RSAJ8-0.5BDL	12	RSAL2-0.5BDL	22	RSAK2-10B	32	SBLK2
3	RSAJ8-10B	13	RSAL2-10B	23	RSAK2-20B D3, D4	33	
4	RSAJ8-20B	14	RSAL2-10BDL	24	RSAK2-20BD D3	34	
5	RSAJ8-30B	15	RSAL2-20B D1, D2	25	RSAK2-20BDDL D4	35	
6	RSAJ8-33B	16	RSAL2-20BD D1	26	RSAK2-30B	36	
7	RSAI7-0.5B	17	RSAL2-20BDDL D2	27	RSAK2-35B	37	
8	RSAI7-10B	18	RSAL2-30B	28	RSA17-32B	38	
9	RSAI7-20B	19	RSAL2-37B	29	RSAL2-0.5BMS	39	
10	RSAI7-30B	20	RSAL2-40B	30	RSAL2-0.5BMSD	40	

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257k2a
SDG #: Gu Creek

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: VC
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 BNA (EPA SW 846 Method 8270)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1, 2, 5	All jars possibly contaminated from water in the cooler. Water present in jars						J/UJ/A (P)
6, 21	one out of 3 jars possibly contaminated from water in the cooler. Water present in jars.						TOXT

TECHNICAL HOLDING TIME CRITERIA

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

LDC #: 21257k2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

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

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

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

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

(bl)

Blank extraction date: 7/18/08 **Blank analysis date:** 7/23/08
Conc. units: ug/kg Associated Samples: 1-25

Compound	Blank ID	Sample Identification								
	SBLK1	3	4	5	6	7	8	9	10	11 (5x)
UU	1.4	1.6/U	1.9/U	2.0/U	1.5/U	1.4/U	2.1/U	(9.8)	(13)	7.7/U

Same as above

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

(bl)

Compound	Blank ID	Sample Identification									
	SBLK1	13	16	17 (6x)	18	19 (6x)	20 (2x)	21 (5x)	22 (2x)	23 (5x)	24 (2x)
UU	1.4	(9.5)	(12)	12/U	(18)	16/U	(13)	8.7/U	(7.3)	10/U	(9.2)

5x Phthalates
2x all others

LDC #: 21257 K2a
SDG #: La Cruz

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

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

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

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?
(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
(Y) N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
		2 (90X)	All	DO (45-135)	NO qual
			↓	( )	↓
		12 (100X)	↓	( )	↓
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	

* QC limits are advisory	QC Limits (Soil)	QC Limits (Water)		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114	S5 (2FP)= 2-Fluorophenol	25-121	21-100
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116	S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S3 (TPH) = Terphenyl-d14	18-137	33-141	S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S4 (PHL) = Phenol-d5	24-113	10-94	S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 21257K2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: JVG
2nd Reviewer: Q

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

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

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

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

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

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		29/30	AAA	44 (50-150)	44 (50-150)	( )	11	No qual (LCS in)
			XX	452 ( )	230 ( )	( )		
			SS	896 ( )	( )	( )		(MSD in)
			TTT	378 ( )	378 ( )	( )		(LCS in)
			RRR	41 ( )	20 ( )	67 (30)		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	GG	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
C.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	II.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
E.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	KK.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
J.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	TT.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
R.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	ZZ.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
V.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 21257R2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

Y N N/A Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS1	EEE	158 (50-120)	( )	( )	1-25, SBLK1	No qual (MS/MSD in)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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				( )	( )	( )		
				( )	( )	( )		

LDC #: 21257k2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: SVG
2nd Reviewer: [signature]

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

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

Y N N/A 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, 11	SS, TTT > cal range		J dets/A (e)
		13, 16, 24	XX		

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21257k2a
SDG #: Eu Cmpx

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JVG
2nd Reviewer: [illegible]

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

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

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, 11	SS, TTT > cal range		X/A (o)
		2, 12	All except SS, TTT dil		
		13, 16, 24	XX > cal range		
		14, 17, 25	All except XX dil		

Comments: _____

LDC #: 21257 K29
SDG #: Su Cory

VALIDATION FINDINGS WORKSHEET
Field Duplicates

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

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

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

Compound	Concentration (ug/kg)		Diff RPD
	15	16	
XX	560	660	100 (≤390)
AAA	390 U	30	360
LL	49	54	5
CC	4.0	4.8	0.8
YY	3.9	4.6	0.7 (≤15)
UU	15 U	12	3

Compound	Concentration ( )		RPD
ZZ	15 U	1.9	13.1

Compound	Concentration (ug/kg)		Diff RPD	Parent only
	15	17		
AAA	390 U	70	320 (≤390)	
XX	560	1800	1240 (≤1100)	J dets/A (fd)
LL	49	1100 U	1051	
CC	4.0	↓	1096	
YY	3.9	43 U	39.1 (≤43)	
UU	15 U	12	3 (≤15)	

Compound	Concentration ( )		RPD

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd reviewer: [illegible]

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

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

Compound	Concentration (ug/kg)		~~RPD~~ Diff
	23	24	
AAA	64	62	2 (≤920)
XX	1500	1000	500 ↓
LL	49	36	13 ↓
CC	920 U	3.4	916.6 ↓
YY	36 U	4.5	31.5 (≤36)
UU	10	9.2	0.8 ↓

Compound	Concentration (ug/kg)		RPD
	23	25	
AAA	64	130	66 (≤1800)
XX	1500	3200	1700 (≤1800)
LL	49	1800 U	1751 ↓
UU	10	71 U	61 (≤71)

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 11, 2008

LDC Report Date: August 27, 2009

Matrix: Soil

Parameters: Semivolatiles

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R2845025

Sample Identification

RSAI7-10B(119156)
RSAI7-10B(119157)

Samples in this SDG underwent SPLP extraction.

Introduction

This data review covers 2 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

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

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

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

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

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

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

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

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

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

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

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

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

A Indicates the finding is based upon technical validation criteria.

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

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

I. Technical Holding Times

All technical holding time requirements were met 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).

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

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

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

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

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

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

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

V. Blanks

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

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
SBLK1	7/31/08	Butylbenzylphthalate	0.28 ug/L	All samples in SDG R2845025
EQBLK1	7/31/08	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.35 ug/L 0.15 ug/L 0.28 ug/L 0.060 ug/L	All samples in SDG R2845025
EQBLK2	7/31/08	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate	0.34 ug/L 0.14 ug/L 0.85 ug/L	All samples in SDG R2845025

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(119156)	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.30 ug/L 0.33 ug/L 0.98 ug/L 0.051 ug/L	0.30U ug/L 0.33U ug/L 0.98U ug/L 0.051U ug/L
RSAI7-10B(119157)	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.33 ug/L 0.39 ug/L 3.0 ug/L 0.053 ug/L	0.33U ug/L 0.39U ug/L 3.0U ug/L 0.053U ug/L

No field blanks were identified in this SDG.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
LCS/D1 (All samples in SDG R2845025)	Pyridine	40 (50-120)	15 (50-120)	91 (≤30)	J (all detects) UJ (all non-detects)	P

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

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

XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 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

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
Semivolatiles - Data Qualification Summary - SDG R2845025

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R2845025	RSAI7-10B(119156) RSAI7-10B(119157)	All TCL compounds	J- (all detects) UJ (all non-detects)	P	Technical holding times (h)
R2845025	RSAI7-10B(119156) RSAI7-10B(119157)	Pyridine	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (l, ld)
R2845025	RSAI7-10B(119156) RSAI7-10B(119157)	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles - Laboratory Blank Data Qualification Summary - SDG R2845025

SDG	Sample	Compound TIC (RT in minutes)	Modified Final Concentration	A or P	Code
R2845025	RSAI7-10B(119156)	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.30U ug/L 0.33U ug/L 0.98U ug/L 0.051U ug/L	A	bl
R2845025	RSAI7-10B(119157)	Butylbenzylphthalate Diethylphthalate Bis(2-ethylhexyl)phthalate Naphthalene	0.33U ug/L 0.39U ug/L 3.0U ug/L 0.053U ug/L	A	bl

Tronox LLC Facility, 2008 Phase B Investigation, Henderson, Nevada
Semivolatiles- Field Blank Data Qualification Summary - SDG R2845025

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21257L2a
SDG #: R2845025
Laboratory: Columbia Analytical Services

Date: 8/13/09
Page: 1 of 1
Reviewer: JVC
2nd Reviewer: [signature]

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

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

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 7/11/08
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	2nd RSD r²
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 25%
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	SW	LCS/D
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

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

Validated Samples: Soil

1	RSAI7-10B(119156)	11		21		31	
2	RSAI7-10B(119157)	12		22		32	
3	SBLK1 (7/11)	13		23		33	
4	EQBLK1	14		24		34	
5	EQBLK2	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

SPLP

VALIDATION FINDINGS WORKSHEET

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

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

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

LDC #: 21257L2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: JVL
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 BNA (EPA SW 846 Method 8270)

Sample ID	Matrix	Preserved	Sampling Date	SPLP Extraction date	Analysis date	Total # of Days	Qualifier
1, 2	S	N	7/11/08	7/28/08	7/31/08	17	J-/UJ/P (h)

TECHNICAL HOLDING TIME CRITERIA

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

LDC #: 21257L2a
SDG #: Su Cuv

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: SVL
2nd Reviewer:

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

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

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

Blank extraction date: 7/31/08 **Blank analysis date:** 7/31/08

Conc. units: ug/L Associated Samples: All (bl)

Compound	Blank ID			Sample Identification						
	SBLK1	EQBLK1	EQBLK2	1	2					
AAA	0.28	0.35	0.34	0.30/U	0.33/U					
LL		0.15	0.14	0.33/U	0.39/U					
EEE		0.28	0.85	0.98/U	3.0/U					
S		0.060		0.057/U	0.053/U					

Blank extraction date: _____ **Blank analysis date:** _____

Conc. units: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above 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 #: 21257L2a
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

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

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

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

Y N N/A (Y circled) Was a LCS required?

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

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		LCS/D1	XX	125 (50-120)	( )	( )	All + Blks	No qual (LCSD in)
			RKR	40 (↓)	15 (50-120)	91 (30)	↓	J/UJ/P (L, ld)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
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