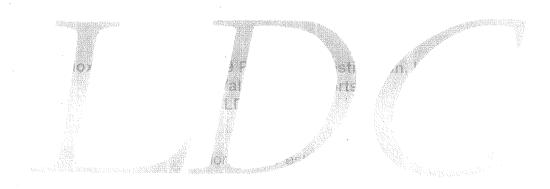
Tronox LLC Facility, 2009 Phase B Investigation, Henderson Data Validation Reports LDC #21495

Chlorinated Pesticides



Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

May 27 through June 4, 2009

LDC Report Date:

September 28, 2009

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 4

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903006

Sample Identification

MC-3B EB052709 M-127B

FB060409

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
MC-3B EB052709	Hexachlorobenzene	Continuing calibration was not performed for this compound.	Continuing calibration must be performed for each compound.	J (all detects) UJ (all non-detects)	Р

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/18/09	FA581	STX-CLP2	Heptachlor Endrin aldehyde	25.2 21.8	FB060409 89250MB	J+ (all detects) J+ (all detects)	А

Retention times (RT) of all compounds in the calibration standards were within QC limits.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample EB052709 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Sample FB060409 was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for MC-3B and M-127B. Since these samples were diluted out, no data were qualified.

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
88638LCS/D (MC-3B EB052709 M-127B 88638MB)	Endrin aldehyde	22 (50-130)	27 (50-130)	-	J- (all detects) UJ (all non-detects)	Р

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903006	All compounds reported below the PQL.	J (all detects)	А

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG R0903006

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903006	MC-3B EB052709	Hexachlorobenzene	J (all detects) UJ (all non-detects)	Р	Continuing calibration (c)
R0903006	FB060409	Heptachlor Endrin aldehyde	J+ (all detects) J+ (all detects)	А	Continuing calibration (%D) (c)
R0903006	MC-3B EB052709 M-127B	Endrin aldehyde	J- (all detects) UJ (all non-detects)	Р	Laboratory control samples (%R) (I)
R0903006	MC-3B EB052709 M-127B FB060409	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC	#:_	21495B3a
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Stage 4

SDG	#:	R0	90	3	0	06
		_				

Laboratory: Columbia Analytical Services

Reviewer: 3 2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 5/27-28/09 6/04/69
11.	GC/ECD Instrument Performance Check	A	, ,
III.	Initial calibration	A	RSD
IV.	Continuing calibration/ICV	SW	CON/ON = 20 Z
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	SW	LCS /b
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	
XII.	Compound quantitation and reported CRQLs	Α	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	MD	EB = 2 $FB = 4$

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank

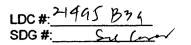
D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

	water					
1	MC-3B	11	88638 MB	21	31	
_ 2	EB052709	12	/89250 J	22	32	
2 + 3 - 4	M-127B	13		23	33	
ر 4	FB060409	14		24	34	
5		15		25	 35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
		19		29	39	
9 10		20		30	40	



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2nd Reviewer: _ \(\frac{1}{2} \)

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

Method: Pesticides/PCBs (EPA SW 846 Method 8081/808) Validation Area	Yes	No	NA	Findings/Comments
L Technical holding times				l
All technical holding times were met.				
Cooler temperature criteria was met.				
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?		_		
III. initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations $(\%RSD) \le 20\%$?	<i>y</i>	•		
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?				
Did the initial calibration meet the curve fit acceptance criteria?				
Were the RT windows property established?				
Were the required standard concentrations analyzed in the initial calibration?				
IV. Continuing calibration				Γ
What type of continuing calibration calculation was performed?%D or%R_				
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?				
Were endrin and 4,4'-DDT breakdowns ≤ 15%.0 for individual breakdown in the Evaluation mix standards?		-		
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) ≤36%.0 or percent recovieries 86-136%?				
Were all the retention times within the acceptance windows?				
V. Banks				
Was a method blank associated with every sample in this SDG?				
Was a method blank analyzed for each matrix and concentration?				
Were extract cleanup blanks analyzed with every batch requiring clean-up?				
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.				
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?				
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?				
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	
VII Matrix spike/Matrix spike duplicates				

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VALIDATION FINDINGS CHECKLIST

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Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		/		
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
VIII Laboratory control samples				
Was an LCS analyzed for this SDG?		<u> </u>		
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
IX Regional Guality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
X. Target compound identification				
Were the retention times of reported detects within the RT windows?				
XI Compound quantilation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?				,
XII. System performance				
System performance was found to be acceptable.				
XIII, Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XIV Field stuplicates	Z			
Field duplicate pairs were identified in this SDG.				
Target compounds were detected in the field duplicates.				
XV. Field blanks				
Field blanks were identified in this SDG.			/	
Target compounds were detected in the field blanks.				

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I, Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	66.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ŧ
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	1
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	П
G. Heptachlor epoxide	0.4,4'-DDT	W. Aroclor-1221	EE. Hexachlors pearene MM.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	Æ	NN.

Notes:

LDC# 21 415 839 SDG #: 22 (22.2

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: 2nd Reviewer:_ Reviewer:

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

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

What type or calibration verification calculation was performed? _____R or___R Were Evaluation mix standards run before initial calibration and before samples?

Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)?

Was at least one standard run daily to verify the working curve?

N/A

N N/A

Did the continuing calibration standards meet the percent difference (%D) /relative percent difference (RPB) oriteria of <15.0%?

V N N/A V N N/A Level IV/D Only

Were the retention times for all calibrated compounds within their respective acceptance windows? Y)N N/A

	T	T	T	T			Γ																
(J	,		Š	(4)																			3G. #.
+ dets /A	4			1/MJ /P											-								СС. DB 608 GG. DD. DB 1701 HH. EE H 174 Ch (ито вел преде
																							Y. Aroclor-1242 Z. Aroclor-1248 AA. Aroclor-1254 BB. Aroclor-1254
4			-	-)) () (())) () (())))) () ()	U. Toxaphene V. Aroclor-1016 W. Aroclor-1221
				ronded																			
)		<u> </u>	13	3))))))))))))))))	<u> </u>	Q. Endrin ketone R. Endrin aldehyde S. alpha-Chlordane
25.5	2),8			42																			M. 4,4'-DDD N. Endosulfan sulfate O. 4,4'-DDT D. Mathovichlor
E E	A (T)																						
7.2				enzene																			1. Dieldrin J. 4,4-DDE K. Endrin
KTY-CA				20075																			
FA58)	(M)		-	Hexa																			E. Heptachlor F. Aldrin G. Heptachlor epoxide H. Endosulfan I
6/18/04	-			6/0/9																			A. alpha-BHC B. beta-BHC C. delta-BHC
	(18/04 FA58) STYCUP2 E (+) 25.2 () 4,89250 MB 3+000/A ((18/64) FA58) STY-C42 E (4) 25.2 () 4,89250 MB 3+ACH A () () 1 L D D D D D D D D D D D D D D D D D D	(18/04 FA58) STY-CUP2 E (+) 25.2 () 4,89250 MD 3+002/A () () 1 L	(10) FA58) STR-C42 E (+) 25.2 () 4,89250 Mb 3+Acts A () 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(18/04 FA58) STYCUP2 E (+) 25.2 () 4,89250 Mb 3+00th A (1) 4 (104) (104) R (+) 21.8 () 1 1 1 1 (1) (1) (10/04) Hexalitorolegizene not performed on actionisms (1,2 5/115 /p (1)	[10] FA58 STYCUP2 E (+) 25.2	[10] FA581 STY-C4P2 E (+) 25.2 () 4,89250 MB 3+Acts A () 1 J J J A ()	[1458] STR-C42	FA58 STFC42	[14]	[104] STYCUP2 E (4) 25.2 () 4,89250 Wb 3+Acts Ab (104) HEXACTION NOT PETFORM OF () 1,2 HEXACTION NOT PETFORM OF () 1,2 () () () () () () () () () ([14] FASS STRUGZ E (3) 4, 89250 Wb 3+4cts. A (14) (14) R. (2) 21.8 (FA58 STACU2	FA58 STYCUP2 E (+) 25.2 (FA58 STICUP2	FA58 STYCUP2 E (4) 25.2 () 4, 89250 Wh	FA58) STICUP2 E (4) 25.2 () 4,89250 WID 3+ACHS. (A. 10)	FA58 STACUP2 E (4) 25.2 () 4,89250 MB 3+0th AP 4,89250 MB 4,89250 MB	FASS STYCUP2 E (4) 25.2 (FA58 STACUP2 E G)	FA58) STACUP2 E (s) 25.2 () 4,89250 WID 3+dets. () (104) (104) R. (2) 21.8 ()) 1.2 July () () () () () () () () () ()	FA58 STYCUP2 E (s) 25.2 (FA58 STYCU2 E (c) 4,8925 Wh 3+40th A (c)

LDC#: 21495 B39 SDG #: 12 (102)

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

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

Qualifications	STABL															
	20															
its)	4n-14n)						(ſ	(Î	((^	
%R (Limits)	0	-1)))))))		
Surrogate Compound	A B	ļ														
Column	100-X15-TEX	\														
Sample ID		(IWX)														
Sı		ž														
Date																
#																

Г	T	T	
Comments			
Recovery QC Limits (Water)			
Recovery QC Limits (Soil)			
Surrogate Compound	Tetrachloro-m-xylene	Decachlorobiphenyl	
Letter Designation	¥	æ	

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VALIDATION FINDINGS WORKSHEET

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Laboratory Control Samples

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

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

evel IV/D Only

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

	1	F						Γ				Γ					Ī									
Qualifications	J-/MJ/P/																									
Associated Samples	1-3 RK638MB	-																								
LCSD RPD (Limits) A	()	()	()	()		()	()	()		()	()	())	()		()	()	()	()	()	()	()	()	()	()	
LCSD %R (Limits)	27 (50-120)	()	()	()		()	()	()	()	()	()	()	()	()	()	()	()	(()	()	()	()	()	()	()	
	122 (58-190)	()	()	()	()	()		()	()		()	()	()	()		(()	()	()	()	(()	()	()	
Compound	8																									
LCS/LCSD ID Compound %R (Limits)	88638 USB																									
Date																										
*																										

LDC #: 21 495 B39 SDG#:

Initial Calibration Calculation Verification VALIDATION FINDINGS WORKSHEET

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Page:_ Reviewer:	

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

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C Average CF = sum of the CF/number of standards %RSD = 100 * (S/X)

Where:

A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

						Reported	Reported Recalculated	Reported	Recalcutated	Reported	Recalculated
*	Standard ID	Calibration Date		Compound		CF (le/iগু std)	CF (や/w std)			%RSD	%RSD
-	1471	1/2/7	Ħ	(81x-cup)	01 (10)	2,076 e7	7.0380.5	2.110 27	2.110 67	77.5	5.67
		60/10	a		(m)	1.004.	1,004	0.993 1	0 992	1.5	2,17
			I		7	7.292	7.292	260-2	7.092	3.35	3.35
			a		7	2.793 X	2.793	7 5698	260.6	4.78	4.99
2	1281	,	#	(STX-CLPI)	(14	2,0x e7	707507	2.117 07	2.16707	6,69	5 . 88
		by 21/0	4	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		1.0.1	1.01	0.999	0,999	2.56	2,58
			#		٨	7.081	7.08)	186.9	6,98)	2.40	2, 46
			A	₽	7	3,740 ←	2,740 }	1 150.2	7.651	2,61	5915
က											
									Marie de		
4											

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

LDC#: 21495 B39 SDG#: 520 (2007)

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

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Page:	Reviewer:	Reviewer
		20

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

The continuing calibration percent difference (%D) values were recalculated for _

Percent difference (%D) = 100 * (N - C)/N

Where: N = 1 Initial Calibration Factor or Nominal Amount (ng) C = 2 Calculated Amount (ng)

using the following calculation:

		*********			Reported	Receinisted	Reported	Recalculated
Standard ID	Calibration Date/Time	රී 	Compound	Average CF/ CCV Conc	CF/Cone CCV	CF/Cone CCV	σ%	σ%
1443	6/84/09	#	Stx-ch)	21098 es	22,697 26 22,087	22,082 66	4.7	4,7
		۵	_	9.926	9.834	1.834	6'0	6.9
		Ŧ	^	76.916	927.0r	20, 752	۷.0	6.0
		Ð	1 8	26.949 1	Z6.290 V	76,40	2.4	か.で
# A49>	``	#	STX-CUR 1	21.098 et	22, 2/3 eb	22.2/3 66	5,3	5,3
	60/01/5	q	_	92126	22 652.6	9-799	٤٠١	1.3
		#	^	716.07	71.455	71,455	80	٥ ٬ ٥
		٩	77	26.949	7.54 H	26.528	1,6	1.6
	6/8/69	#	STX-CLP)	21.666	23.175 e6	23.175 eg	2.7	7.0
	0/03/	d	(9.994	10.796	1 766.00	28	@ }
		Ħ	٨	818.69	22.900	25.67	9.11	9.11
		þ	LA	16.50€	P 58.82	18.87 V	8.8	8.8

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#: 21 495 B39 SDG#: Cur

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

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Reviewer:	Jί
2nd reviewer:	0
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METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

			•		
The percent recoveries	(%R) of surrogates were re	recalculated for the compound	ts identified below u	sing the following	calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: # 2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	STX-SLP /	رمه	47.89	48	48	0
Tetrachloro-m-xylene	1					
Decachlorobiphenyl			66.47	66	66	8
Decachlorobiphenyl						

Sample ID:

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

Sample ID:

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

Sample ID:

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

Notes:		

LDC #: 21 445B34 SDG #: 52, 1

VALIDATION FINDINGS WORKSHEET

<u>Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification</u>

ot	3/5	`
Page:	Reviewer:	

2nd Reviewer:

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

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

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

SC = Concentration

Where: SSC = Spiked sample concentration SA = Spike added

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

86988 LCS/LCSD samples:_

252

Percent Recovery Benefic	12.72		
Spike Spiked Sample LCS LCSD Added Concentration Percent Recovery Percent Recovery nd (\(\rangle \sigma \lambda \rangle \) Percent Recovery Recalc.	/LCSD	SPD	Recalc.
Spike Spike Sample Added Concentration (\(\lambda \gamma \lambda \lambda \lambda \lambda \gamma \lambda \gamma \lambda \gamma \lambda \gamma	SOT		Reported
Spike Spike Sample Added Concentration (\(\lambda \gamma \lambda \lambda \lambda \lambda \gamma \lambda \gamma \lambda \gamma \lambda \gamma	SD	Recovery	Recalc.
Spike Spike Sample Added Concentration (\(\lambda \gamma \lambda \lambda \lambda \lambda \gamma \lambda \gamma \lambda \gamma \lambda \gamma	רנ	Percent	Reported
Spike Spike Sample Added Concentration (\(\lambda \gamma \lambda \lambda \lambda \lambda \gamma \lambda \gamma \lambda \gamma \lambda \gamma	CS	Recovery	Recele
Spike Samp Added Concentratio (\(\(\(\(\(\(\(\(\(\(\(\(\		Percent	Detroned
Spike Added (1/9/L)	0.0		0801
P	Spiked		301
P	ike	ん)	090
Compound	dS PA	`	
		nd	

	ďS	ike	Spiked	Sample	SOT	S	CSDT	SD	TCS/ICSD	OS)
Compound	A &	Added ()/ 64)	Soco Soco	Concentration	Percent Recovery	Secovery	Percent Recovery	Recovery	RPD	٥
	SOT	CSD	SOT	dson	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	6,200	(Sec. 20)	0.17	0. (87	28	95	93	93	6	×
4,4'-DDT	-	7	0,181	0.19)	4)	4)	96	36	5	4
Aroclor 1260										
					,					

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results. LDC #: 21 495 \$36 SDG #: <u>Cu Corv</u>

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of_	<u></u>
Reviewer:	 SV	
2nd reviewer:	 'س	
	Γ	

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

/Y	N	N/A
X	N	N/A
	_	

Were all reported results recalculated and verified for all level IV samples?

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

Example:		37 X-CLP
Sample I.D.	B	:
Conc. = (417,5e6)		(10)
(1.192e7) = 33.3 us 1	(10tom1)	ŕ
30 . 7 · 5/L		

		·			
#	Sample ID	Compound	Reported Concentration ()	Calculated Concentration ()	Qualification
	Marking to Marking				

Note:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

July 1 through July 4, 2009

LDC Report Date:

September 25, 2009

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903051

Sample Identification

RSA12-0.5B

RSA12-0.5BDL

RSAI3-0.5B

RSAI3-0.5BDL

RSAJ5-0.5B

RSAJ5-0.5BDL

RSAK5-0.5B

RSAK5-0.5BDL

RSAL3-0.5B

RSAL3-0.5BDL

RSAM3-0.5B

RSAM2-0.5B

RSAJ2-0.5B

RSAJ2-0.5BDL

RSAJ3-0.5B

RSAI3-0.5BMS

RSAI3-0.5BMSD

RSAJ2-0.5BMS

RSAJ2-0.5BMSD

Introduction

This data review covers 19 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
88785MB	Not specified	Tetrachioro-m-xylene	8 (40-140)	All TCL compounds	J- (all detects) R (all non-detects)	Р

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 and MSD percent recoveries (%R) were not within QC limits for all compounds and the MS/MSD relative percent differences (RPD) were not within QC limits for some compounds, the LCSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recoveries (%R) and LCS/LCSD relative percent differences (RPD) were not within QC limits for some compounds, the LCSD percent recoveries (%R) were within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B RSAJ2-0.5B	Hexachlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	А
RSAL3-0.5B	4,4'-DDE	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903051	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B RSAJ2-0.5B	Hexachlorobenzene	x	А
RSA12-0.5BDL RSAI3-0.5BDL RSAJ5-0.5BDL RSAK5-0.5BDL RSAJ2-0.5BDL	All TCL compounds except Hexachlorobenzene	×	А
RSAL3-0.5B	4,4'-DDE	x	А
RSAL3-0.5BDL	All TCL compounds except 4,4'-DDE	×	А

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B RSAJ2-0.5B	Hexachlorobenzene	J (all detects)	А	Project Quantitation Limit (e)
R0903051	RSAL3-0.5B	4,4'-DDE	J (all detects)	A	Project Quantitation Limit (e)
R0903051	RSA12-0.5B RSA12-0.5BDL RSAI3-0.5B RSAJ5-0.5BDL RSAJ5-0.5BDL RSAK5-0.5BDL RSAK5-0.5BDL RSAL3-0.5B RSAL3-0.5BDL RSAM3-0.5B RSAM2-0.5B RSAM2-0.5B RSAJ2-0.5B RSAJ2-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903051	RSA12-0.5B RSAI3-0.5B RSAJ5-0.5B RSAK5-0.5B RSAJ2-0.5B	Hexachlorobenzene	х	A	Overall assessment of data (o)
R0903051	RSA12-0.5BDL RSAI3-0.5BDL RSAJ5-0.5BDL RSAK5-0.5BDL RSAJ2-0.5BDL	All TCL compounds except Hexachlorobenzene	Х	A	Overall assessment of data (o)
R0903051	RSAL3-0.5B	4,4'-DDE	Х	A	Overall assessment of data (o)
R0903051	RSAL3-0.5BDL	All TCL compounds except 4,4'-DDE	Х	A	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903051

No Sample Data Qualified in this SDG

Tronox Northgate Henderson

LDC #: 21495C3a	VALIDATION COMPLETENESS WORKSHEET
SDG #:R0903051	Stage 2B
Laboratory: Columbia Analytic	al Services

Date: 9/16/09 Page: of Reviewer: 3V6 2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/01 - 04 /09
11.	GC/ECD Instrument Performance Check	A	,
III.	Initial calibration	A	·
IV.	Continuing calibration/ICV	SWA	$\frac{C\alpha}{100} = \frac{20}{3}$
V.	Blanks	A	
VI.	Surrogate spikes	SW)	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LES /D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	SW	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB=16 FB=FB072109-S0 from 20904

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:

5011 Action 21-7 15 8356 MB RSA12-0.5B RSAM3-0.5B 31 11 88785_ 22 > RSA12-0.5BDL 12 RSAM2-0.5B MB 32 13 3 23 **3** 88986 RSAI3-0.5B RSAJ2-0.5B MB 33 14 3 4 RSAI3-0.5BDL RSAJ2-0.5BDL 24 34 RSAJ5-0.5B 15 RSAJ3-0.5B 25 35 RSAJ5-0.5BDL 16 6 FB080409-26 36 RSAK5-0.5B RSAI3-0.5BMS 27 37 RSAK5-0.5BDL 18 RSAI3-0.5BMSD 28 38 19 **%** RSAJ2-0.5BMS 9 RSAL3-0.5B 29 39 20 3 RSAJ2-0.5BMSD 10 RSAL3-0.5BDL 30 40

16 reported on RO 90 3006)

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	.00
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Arocior-1248	H.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	:
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ,
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	11
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. Hexachlorobenzene	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF.	NN.

Notes:

LDC#: 21 495 (34 SDG #: 54 Car

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: \ of 2 Reviewer:_ 2nd Reviewer:

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

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

Were surrogates spiked into all samples, standards and blanks?

Y(N)N/A

Did all surrogate percent recoveries (%R) meet the QC limits? Y N N/A

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	shommo
				Silling
A	Tetrachloro-m-xylene			
В	Decachlorobiphenyl			

LDC#: 21495 (34 SDG#: Ly Coney

VALIDATION FINDINGS WORKSHEET

Surrogate Spikes

Page: Yof Reviewer. 2nd Reviewer:_

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

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

| N N/A | Were surrogates spiked into all samples, standards and blanks?
| N N/A | Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate		
\parallel		2 2	1	Compound		Qualifications
\dagger		(XW) (0)	Not Spec	Ŋ	1060 (40-14n)	No shall
			-)	
		14 (100x)		#		
				A	1000	
		15 (20x)		w	198	
H						
		\$8 785 MB	>	*	8	() x
\dashv						
1						
\dashv						
╫					()	
+					·)	
╁					()	
\top	-				()	
╢						

Letter Designation	Surrogate Compound	Recovery QC Limits (Soll)	Recovery OC Limits (Water)	7
				Comments
A	Tetrachloro-m-xylene			
c				
٥	Decachlorobiphenyl			

LDC # 21495 C 34 SDG # Ed Cony

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Of L Reviewer: IN 2nd Reviewer:

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

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? N/N N/A

ı		<u>;</u>	\ \									1															
	Qualifications	No gue (166/0						A																			
med? its?	Associated Samples	4. 6	-			13 14	, 																				
Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	RPD (Limits)	()	35 (30)	()	()	()	37 (30)	()	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
alialyzed for each file cor whenever a sample percent differences (MSD %R (Limits)	de Units	()		•	te l'mits	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
mples for each matrix (%R) and the relative	MS %R (Limits)	% R outs			· · ·	% R ontain	()	()	()	()	()	()	()	()	()	()	()	()	()	(,)	()	()	()	()	())	()
ino) and manks /zed every 20 sal rcent recoveries	Compound	A11 TCL	EE		***************************************	All TdL	0																				
Were a matrix spine (Was a MS/MSD analy Were the MS/MSD pe	OI OSW/SW	17 /18				19/20	_																				
Y N N/A	# Date																										

See and LDC #: 2/495C3A SDG#:

VALIDATION FINDINGS WORKSHEET

Page: __lof_

Reviewer:__ 2nd Reviewer:_

Laboratory Control Samples

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

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

Y N/A

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? Level IVID Only

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Y N N/A

	<u>, ž</u>				2	<u> </u>	ځـ		5																	
Qualifications	R				(1000		(1csp)	(10/57)	/																	
Associated Samples	1-12, 88785 MB				13-15 88 986 MB																					
RPD (Limits)	95 (20)	()	()	()	32 (30)	7 76	38 ()	() SE	33 ()) /e	43 ()	· 1 · %	()	()	()	()	()	()	()	()	()	()	()	()	()	
LCSD %R (Limits))	()	()	()	()		•	()	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	
AR (194 (50-130))	()	()		()	47 (50-130	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()
Compound	E E				#	N	R	8	3	8	Ü	٩														
TCS/TCSD ID	88785 Ks/b				88786 UCS B																					
# Date																	_									

LDC #: 21495 (34 SDG#: Fra Cary

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

2nd Reviewer: Reviewer: _ Page:

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

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

Level JV(D Only Y N N/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.? Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

tions	(4)	~						
Qualifications	J dets/A	->						
								-
Samples	8 57 13							
Associated Samples	8	6						
						-		
Finding	, and	 →						
L L	V							
ame								
Compound Name	#	J						
)								
#								

Comments: See sample calculation verification worksheet for recalculations

LDC #: 2/445 (34 SDG #: 54 Con

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Reviewer: 2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

CY N NA

Was the overall quality and usability of the data acceptable?

*	Date	Sample ID	Finding	Associated Samples	Qualifications	
		1 3 5 7 13	EE > cal rang		(0)	
		, , ,				
		2 4 6 8 14	All except EE di)		1	
			1			
		Ь	J > ca rang			
			b			
		0)	All except J di)			
Com	Comments:					

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 9 through June 16, 2009

LDC Report Date:

September 22, 2009

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903243

Sample Identification

H-28AB

AW-BW-02B

M-142B

M-130B

M-29B

M-29BRE

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

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Field duplicates are summarized in Section XIV.

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- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/23/09	FA672	STX-CLP1	Hexachlorobenzene	31.5	M-130B M-29B	J+ (all detects)	А

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	AorP
6/18/09	FA581	STX-CLP2	Heptachlor Endrin aldehyde	25.2 21.8	H-28AB AW-BW-02B M-142B M-130B M-29B 89250MB 89410MB 89788MB	J+ (all detects) J+ (all detects)	А

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample FB060409 (from SDG R0903006) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
M-29B	Not specified	Decachlorobiphenyl	28 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	А

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903243	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
M-29B	All TCL compounds	Х	А

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG R0903243

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903243	M-130B M-29B	Hexachlorobenzene	J+ (all detects)	А	Continuing calibration (%D) (c)
R0903243	H-28AB AW-BW-02B M-142B M-130B M-29B	Heptachlor Endrin aldehyde	J+ (all detects) J+ (all detects)	А	Continuing calibration (ICV %D) (c)
R0903243	M-29B	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0903243	H-28AB AW-BW-02B M-142B M-130B M-29B M-29BRE	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)
R0903243	M-29B	All TCL compounds	Х	A	Overall assessment of data (o)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495D3a

Stage 2B

SDG #: R0903243

Laboratory: Columbia Analytical Services

Page: \ of Reviewer: 316 2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/09/09 - 6/16/09
11.	GC/ECD Instrument Performance Check	À	
111.	Initial calibration	A	
IV.	Continuing calibration/ICV	5W	COV/101 = 203
V.	Blanks	4	
VI.	Surrogate spikes	SA	
VII.	Matrix spike/Matrix spike duplicates	Ń	Client spec
VIII.	Laboratory control samples	A	ics/p
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	SW)	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB060409 from R0903006

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water

,	77 - 11 - 07				
1]	H-28AB	11	89250 MB	21	31
2 7	AW-BW-02B	12 7	89410 MB	22	32
3 7	M-142B	13.3	89788 MB	23	33
4 3	M-130B	14 4	89964 MB	24	34
5 3	M-29B	15		25	35
6 4	M-29BRE	16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

LDC# 21495 D39 SDG# Ja Con

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: of of orienter NC 2nd Reviewer: Reviewer:

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

Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)?

Was at least one standard run daily to verify the working curve?

N N/A N N/A

Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of <15.9%?

Were the retention times for all calibrated compounds within their respective acceptance windows? Level IV/D Only
Y N/N/A

CC. DB 608 GG.	Y. Aroclor-1242	one U. Toxaphene	Q. Endrin ketone	M. 4,4'-DDD	l. Dieldrin	E. Heptachlor	A. alpha-BHC
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		()					
		()					
		(")					
	except 89964 MB	()	.8	R (+) >1.8		CMI	
J+ 10ts/A (c)	-5. + All 21/kg	1 ()	۲.	E (+) 25.2		185 FF	6/18/04
Qualifications	Associated Samples	RT (Limits)	15.05 70.2	%D %D Compound (Limit ≤	Column	Standard ID	# Date

LDC#: 21495 D34 SDG #: 200 Con

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: Reviewer._ 2nd Reviewer:

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

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

| Y N | N/A | Were surrogates spiked into all samples, standards and blanks?
| Y D | N/A | Did all surrogate percent recoveries (%R) meet the QC limits?

%R (Limits) Qualifications	(40-140) J-/UJ/) [()	()		()			()	()	
Surrogate Compound %	7	-										
Column	Not spec	į										
Sample ID	Ŋ											
Date											-	
#												

Letter Designation Surrogate Compound Recovery QC Limits (Soil) Recovery QC Limits (Water) Comments A Tetrachloro-m-xylene A Decachlorobiphenyl A					
	Letter Designation	Surrogate Compound	Recovery QC Limits (Soll)	Recovery QC Limits (Water)	Comments
	V	Tetacolles			
		reu acmoro-rri-xyrene			
	В	Decachlorobiphenyl			

SDG #: 2445 D34

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: of the Reviewer: 2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

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

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 17 through June 24, 2009

LDC Report Date:

September 22, 2009

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-78B

M-128B

H-38B

M-19B

M-34B

M-125B

M-22AB

M-17AB

M-125BMS

M-125BMSD

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/23/09	FA672	STX-CLP1	Hexachlorobenzene	31.5	M-78B M-128B H-38B 89788MB	J+ (all detects)	А

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/18/09	FA581	STX-CLP2	Heptachlor Endrin aldehyde	25.2 21.8	M-78B M-128B H-38B 89788MB	J+ (all detects) J+ (all detects)	А

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample FB060409 (from SDG R0903006) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903404	All compounds reported below the PQL.	J (all detects)	Α

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG R0903404

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903404	M-78B M-128B H-38B	Hexachlorobenzene	J+ (all detects)	A	Continuing calibration (%D) (c)
R0903404	M-78B M-128B H-38B	Heptachlor Endrin aldehyde	J+ (all detects) J+ (all detects)	А	Continuing calibration (ICV %D) (c)
R0903404	M-78B M-128B H-38B M-19B M-34B M-125B M-22AB M-17AB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

SDG #: R0903404 Laboratory: Columbia Analytical Services

LDC #: 21495E3a

Stage 2B

Reviewer: IV

2nd Reviewer:_

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6 /17 - 24 /89
11	GC/ECD Instrument Performance Check	A	<u> </u>
III.	Initial calibration	NEWA	
IV.	Continuing calibration/ICV	SW	COV/101 = 20 Z
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	ics /b
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	FB = FB080409 from R0903006

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Water/

	www.					
1	M-78B	111 89	788 MB	21	31	
2	M-128B	12 2 89	964 MB	22	32	
3 1	H-38B	13 7 90 2	-20 MB	23	33	
4 >	M-19B	14		24	34	
5	M-34B	15		25	35	
6 7	M-125B	16		26	36	
7 3	M-22AB	17		27	37	
8 7	M-17AB	18		28	38	
9	M-125BMS	19		29	39	
10	M-125BMSD	20		30	40	

LDC# 21495 F3A

VALIDATION FINDINGS WORKSHEET Continuing Calibration

Page: Reviewer: 2nd Reviewer._

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

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

What type or calibration verification calculation was performed? _____%D or ____ RPD

Were Evaluation mix standards run before initial calibration and before samples?

Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)? Was at least one standard run daily to verify the working curve?

> N N/A ANZ X

Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≨45.0%?

Were the retention times for all calibrated compounds within their respective acceptance windows? evel JW/D Only N(N/A

				T																				
ns	2) V				70																			GG. HH. TrapeAzene
Qualit	J+4015/A				7																			CC. DB 608 GG. DD. DB 1701 EE. HXXAChilmoben 2 dr. FF. JJ.
Associated Samples	89788 MB																							Y. Aroclor-1242 Z. Aroclor-1248 AA. Aroclor-1254 BB. Aroclor-1260
Assoc	1-3																							hene rr-1016 or-1221 rr-1232
							())))	(^	(((()))	()		U. Toxaphene V. Aroclor-1016 W. Aroclor-1221 X. Aroclor-1232
RT (Limits)	J			J))))	\	J	_	J)))))))	J	\downarrow	tone dehyde ordane hiordane
				,																				Q. Endrin ketone R. Endrin aldehyde S. alpha-Chlordane T. gamma-Chlordane
(Limit < 15.8) (20 2	25.7	21.8			シ, ど																			ı sulfate or
	લ) ક	€			· ()																			M. 4,4'-DDD N. Endosulfan sulfate O. 4,4'-DDT P. Methoxychlor
Compound	T	R			EE C																			
	STY-CUPY				57x-CUP1	-																		I. Dieldrin J. 4,4'-DDE K. Endrin L. Endosulfan II
රි	XIS				\$7,5																			ooxide
Standard ID	FA 581	(MI)	\		FA 672	(co)	/																	E. Heptachlor F. Aldrin G. Heptachlor epoxide H. Endosulfan I
Date	6/8/9				6/22/0																			A. alpha-BHC B. beta-BHC C. delta-BHC D. gamma-BHC
#																						<u> </u>		A RO CO CO

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 5 through June 11, 2009

LDC Report Date:

September 22, 2009

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903184

Sample Identification

RSAJ6-0.5B

RSAJ6-0.5BDL

RSAK6-0.5B

RSAK8-0.5B

RSAL7-0.5B

RSAL8-0.5B

SA35-0.5B

SA176-0.5B

RSA03-0.5B

SA182-0.5B

SA166-0.5B

RSAK4-0.5B

RSAK4009-0.5B

70,0,000,000

RSAJ6-0.5BMS

RSAJ6-0.5BMSD

SA35-0.5BMS

SA35-0.5BMSD

SA182-0.5BMS

SA182-0.5BMSD

Introduction

This data review covers 19 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
6/18/09	FA581	STX-CLP2	Heptachlor Endrin aldehyde	25.2 21.8	RSAJ6-0.5BDL RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B SA35-0.5B SA176-0.5B RSA03-0.5B SA182-0.5B SA166-0.5B RSAK4-0.5B RSAK4-0.5BMS RSAJ6-0.5BMS RSAJ6-0.5BMSD SA35-0.5BMSD SA35-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD	J+ (all detects) J+ (all detects)	A

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
89047MB	6/9/09	Hexachlorobenzene	2.0 ug/Kg	RSAJ6-0.5B RSAJ6-0.5BDL RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B

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

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. Since the 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. 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
SA182-0.5BMS/MSD (SA182-0.5B)	Endrin aldehyde	0 (18-135)	0 (18-135)	•	J- (all detects) R (all non-detects)	Α

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
89401LCS/D (SA182-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B 89401MB)	Endrin aldehyde	35 (50-130)	49 (50-130)	34 (≤30)	J (all detects) UJ (all non-detects)	Р

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSAJ6-0.5B	Hexachlorobenzene beta-BHC	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903184	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
RSAJ6-0.5B	Hexachlorobenzene beta-BHC	X X	А
RSAJ6-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	А

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

XIV. Field Duplicates

Samples RSAK4-0.5B and RSAK4009-0.5B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentrat	ion (ug/Kg)	555	D		
Compound	RSAK4-0.5B	RSAK4009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	170	250	38 (≤50)	-	-	-
beta-BHC	330	570	53 (≤50)	-	J (all detects)	Α

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903184	RSAJ6-0.5BDL RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B SA35-0.5B SA176-0.5B RSA03-0.5B SA182-0.5B SA166-0.5B RSAK4-0.5B RSAK4-0.5B	Heptachlor Endrin aldehyde	J+ (all detects) J+ (all detects)	А	Continuing calibration (ICV %D) (c)
R0903184	SA182-0.5B	Endrin aldehyde	J- (all detects) R (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R) (m)
R0903184	SA182-0.5B SA166-0.5B RSAK4-0.5B RSAK4009-0.5B	Endrin aldehyde	J (all detects) UJ (all non-detects)	P	Laboratory control samples (%R)(RPD) (I,ld)
R0903184	RSAJ6-0.5B	Hexachlorobenzene beta-BHC	J (all detects) J (all detects)	А	Project Quantitation Limit (e)
R0903184	RSAJ6-0.5B RSAJ6-0.5BDL RSAK6-0.5B RSAK8-0.5B RSAL7-0.5B RSAL8-0.5B SA35-0.5B SA176-0.5B RSA03-0.5B SA182-0.5B SA166-0.5B RSAK4-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903184	RSAJ6-0.5B	Hexachlorobenzene beta-BHC	X X	А	Overall assessment of data (o)
R0903184	RSAJ6-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	х	А	Overall assessment of data (o)
R0903184	RSAK4-0.5B RSAK4009-0.5B	beta-BHC	J (all detects)	A	Field duplicates (RPD) (fd)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903184

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495F3a SDG #: R0903184

Stage 2B

Laboratory: Columbia Analytical Services

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

Date: 9/17/09
Page: 1 of 1
Reviewer: 5VZ
2nd Reviewer: ____

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
1.	Technical holding times	A	Sampling dates: 6 / 05 - 11 /0 9
II.	GC/ECD Instrument Performance Check	<u> </u>	'
111.	Initial calibration	Ā	
IV.	Continuing calibration/ICV	ZM.	Car/101 € 202
V.	Blanks	SW)	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	VCS /p
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	SW	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	SW	p = 12, 13
XV.	Field blanks	NÞ	FB = FB072109-50 from R0904016

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

Soil

	301		
1	RSAJ6-0.5B	1 3 SA166-0.5B 21) 89047 MB 31	
2	RSAJ6-0.5BDL	2 3 RSAK4-0.5B D 22 7 89340 MB 32	
3	RSAK6-0.5B	3 3 RSAK4009-0.5B p 23 3 89 401 MB 33	
4 (RSAK8-0.5B	4 ¹ RSAJ6-0.5BMS 24 34	
5 1	RSAL7-0.5B	5 1 RSAJ6-0.5BMSD 25 35	
6 1	RSAL8-0.5B	6 Σ SA35-0.5BMS 26 36	
7 2	SA35-0.5B	7 1 SA35-0.5BMSD 27 37	
8 }	SA176-0.5B	8 > SA182-0.5BMS 28 38	
9 7	RSA03-0.5B	9 ³ SA182-0.5BMSD 29 39	
10 3	SA182-0.5B	0 30 40	

LDC# 21495 F3C See Low-SDG#:

VALIDATION FINDINGS WORKSHEET

Continuing Calibration

2nd Reviewer:

Page: Reviewer.

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

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

What type or calibration verification calculation was performed? ____ RD or ___ RPD Were Evaluation mix standards run before initial calibration and before samples?

X-N N/A N/A A'N N'A

Y N NA

Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of <15.0%? Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<15.0% for individual breakdowns)? Was at least one standard run daily to verify the working curve?

Were the retention times for all calibrated compounds within their respective acceptance windows? Y N N/A Level W/D Only

	(2)	1																						
tions)																							66. HH.
Qualifications	J+dets/A		۷																					CC. DB 608 GG. DD. DB 1701 HH.
Associated Samples		89401mB																						Y. Aroclor-1242 2. Aroclor-1248 AA Aroclor-1254
Associa	9-57-19	89340MB.																						iene -1016 -1221
	()	() ()	((((((((()	(()	(((((U. Toxaphene V. Aroclor-1016 W. Aroclor-1021
RT (Limits))))))	Ú)))	J))))))))))))	Q. Endrin ketone R. Endrin aldehyde S. alnha-Chlordane
%D (Limit ≤ 15.0)	25,2	21.8																						M. 4,4'-DDD N. Endosulfan sulfate O. 4.4'-DDT
Compound	(+) =	R (+)																						
Column																								I. Dieldrin J. 4,4'-DDE K. Fndrin
	5																							e pixod
Standard ID	FA581	(w)	J		:																			E. Heptachlor F. Aldrin G. Hantachlor anoxida
Date	26/81/9																							A. alpha-BHC B. beta-BHC C. delta-BHC
#															<u> </u>									A GO C

LDC#: 21495 F3A SDG#: Sre Cory

VALIDATION FINDINGS WORKSHEET

Blanks

Page: of Reviewer: 2nd Reviewe

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

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

ed? sies?												
was perform oper frequences below.	Sample Identification							Sample Identification				
ole extraction zed at the pro qualification	Samp						ples:	Samp				
od blank? matrix and whenever a sample extraction was per xtract clean-up blanks analyzed at the proper fred lanks? If yes, please see the qualifications below. Associated samples:			MB				Associated samples:					
blank? itrix and wheract clean-up iks? If yes, pl			Al >	,			,					
ith a method d for each me ed, were extr method blar				1								
Y N N/A Were all samples associated with a method blank? Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed? Y N N/A If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies? X N N/A Was there contamination in the method blanks? If yes, please see the qualifications below. Bigink extraction date: 6/04/04 Blank analysis date: 6/12/05 Conc. units: N A/A	Blank ID	89047 MB	2.0				Blank analysis date:	Blank ID				
Were all sar Was a meth If extract cle Was there o	Compound		EF					Compound				
Y N N/A Y N N/A Y N N/A X N N/A Bignk extractic	<u> </u>		0,0				Blank extraction date: Conc. units:	Çō				
			D									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC# 2/4 \$15 F34 SDG #: 120 CS

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: Reviewer:_ 2nd Reviewer:_

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

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

N/A N/A Were surrogates spiked into all samples, standards and blanks?

Y(N)N/A Did all surrogate percent recoveries (%R) meet the QC limits?

Surrogate Column Compound	9667 (40-140) No just	()) A ()) A () () () () () ()	2 (500X)	4 (26x) B 463 ()	9 (LOX) B 2.5 ()		10 (100m) B 4920 ()	Α () ()	(2 (16x) B 27y ()	3 (50x) y P F6D ()			
# Date			* 0		3	2						-	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Commonte
¥	I etrachloro-m-xylene			
<u> </u>				
0	Decacnioropipneny			

LDC#: 21495 F3a SDG #: Jee Cone

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1 Reviewer:_ 2nd Reviewer:

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

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

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	All C	compounds have	d e)	limit ()	1,2	No may (LCSD)
			()	()	()		
			()	()	()		
	16/17	Several	7	hove (3R and	d RPD's)	7	
		antrio	de librit		ll		
			()	()	•		
			()	()	()		
	18/19	A11 CO	All compounds except	R have 3R	4.1 mg spistre	61	<u></u>
		ank	000	no	outside himits		
			(,)	()			
		R	(58-135)	(24-195)	()	\	J-/R/A (m)
			()	()	()		
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SDG#:

VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples

Page: 1 of 1 Reviewer: 3/6

2nd Reviewer:

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

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

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? __ Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

V N N/A W

Was a I CS analyzed eveny 20 samples for each matrix

∀/N N	N/N	was a Los allalyzed evely zo salliples lot each marrix	6VEI y 20 30	101 6510111	במכנו וומווצ		יעכו ש אמוווטו	or wrieriever a sample extraction was penormed?	аѕ репо	rmed:/		
*	Date	TCS/FCSD ID	Compound	%R	LCS %R (Limits)		LCSD %R (Limits)	RPD (Limits)	s)	Associated Samples	Qualifications	
		89047 115/2	X			45	(061-05)	38 (>	1 06	1-6 89047 MB)	(1.5)
					()		())	(<u> </u>
					()		())	(
		89340 LCS /B	R	40	(26/195)		()	`	(7-9 893 40 MB	7)	(46504)
			33				,	58 3	30	7	(5n)	1000
					()		())	^			`
							(4	7			
		89401 45/0	R	35	(261-05)	40	(26-130)	34 3	1 06	10-13 89 to 1 mb	J/45/P(L	
							()	,				\
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LDC#. 21495 F32 SDG#: [4 (are)

VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: of L Reviewer: Mc

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

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

Level IV/D Only

Y N M/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

Cample (D) Compound Name	Finding EE B > Cal Farget	Associated Samples	JACD (C)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495 F39 SDG #: 52 Gmy

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: lof L Reviewer: WE 2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

Was the overall quality and usability of the data acceptable?

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The state of the s	ons	(0)	\-								
manuschild Michigan (Manuschild Communication Communicatio	Qualifications	X/A		\rightarrow							
	Associated Samples	£6	9	$ \mathcal{A}_i $							
	Finding	FE B > cal range		All except FE B	,						
	Sample ID			2							
	Date										
	#										

Comments:

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	
Reviewer:	SVC
2nd reviewer:	<u> </u>

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

/	١ ١	١	
	Υ,	N	N/A
	Y /	N	N/A
∕.			

Were field duplicate pairs identified in this SDG2

Y N N/A Were field duplicate pairs identificate N/A Were target compounds detected with the second s	ed in this SDG? d in thie field duplicate p	airs?		
- Compound	Concentration 12	13	≤502 _{RPD}	Párent only
EE	170	250	38	
В	330	570	53	JACK A ()
1				
	Concentratio	n ()		
Compound			RPD	

	Concentration (
Compound		RPD		
·				

	Concentration (
Compound		RPD
		·

	Concentration ()	
Compound		RPD
·		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 19 through June 24, 2009

LDC Report Date:

September 22, 2009

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903443

Sample Identification

SA129-0.5B RSAN5-0.5B

RSAO6-0.5B

RSAN5-0.5BMS

RSAN5-0.5BMSD

Introduction

This data review covers 5 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

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 SA129-0.5B. 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. Although the MS and MSD percent recoveries (%R) and relative percent differences (RPD) were not within QC limits for some compounds, the MS or LCSD percent recoveries (%R) were within QC limits and no data were qualified.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recovery (%R) and LCS/LCSD relative percent difference (RPD) were not within QC limits for one compound, the LCSD percent recovery (%R) was within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903443	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Sample Compound Flag		A or P	Reason (Code)
R0903443	SA129-0.5B RSAN5-0.5B RSAO6-0.5B	RSAN5-0.5B the PQL.		А	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903443

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495G3a	VALIDATION COMPLETEN
SDG #: R0903443	Stage 2B

Laboratory: Columbia Analytical Services

Page: \[
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METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/19 - 24/09
II.	GC/ECD Instrument Performance Check		ſ
111.	Initial calibration	/	
IV.	Continuing calibration/ICV	A	COV/ON = 20 Z
V.	Blanks	A	
VI.	Surrogate spikes	SW)	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	ics/p
IX.	Regional quality assurance and quality control	N	·
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	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:

501

	201				
1	SA129-0.5B	11	90255 MB	21	31
2	RSAN5-0.5B	12		22	32
3	RSAO6-0.5B	13	(23	33
4	RSAN5-0.5BMS	14		24	34
5	RSAN5-0.5BMSD	15		25	35
6		16		26	36
7		17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

(non-treal)

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A siphs-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	90.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroslor-1248	HH.
C. detta SHC	K. Endrin	S. alpha-Chlordane	AA Arceior-1254	'n
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Arcelor-1260	JJ.
E. Haptachior	M. 4,4'-DDD	U. Toxaphene	CC, DB 608	KK.
F. Adrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	т.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroelor-1221	EE. Hxxch unbenzene	MM.
H. Endosulfan I	P. Methoxychior	X. Arctor-1232	ŧĖ	NN.

LDC#: 21495 G34 SDG #: 42 Coo

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: Reviewer: 2nd Reviewer.

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

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

Were surrogates spiked into all samples, standards and blanks?

Y(N)N/A

Did all surrogate percent recoveries (%R) meet the QC limits?

	-	_	7	_	_	_	7	_	_	$\overline{}$	1	_	_	_	,	_
Qualifications	No sunt															
nits)	(40-140)	()	()	((((((()	()	(()	()	()	()
%R (Limits)	6															
Surrogate Compound	A. B															
Column	Not spec	,														
Sample ID	(1000x)															
Date																
#																

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachioro-m-xylene			
α	Decachlorobiohony			
	Decaring colplicity			

LDC #: 21495 634 SDG# La Cre

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: Reviewer: 2nd Reviewer:

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

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

No. N/A

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? X N N/A Y N N/A

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

				ш				
#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		5/4	7	()	(44 (65-127)	(%) 25	2	No quae (Ash)
		,	N	()		() <9		
			R	()		46 ()		
			Ø)	47 (57-/23)	() \(\) \(\) \(\)		
			۵		33 (38-141)	69		>
			B	M1.25 (201	(25-142)	32 ()	*	1 (105/pin)
					()	()		
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VALIDATION FINDINGS WORKSHEET

Page: of

Reviewer:_ 2nd Reviewer:

Laboratory Control Samples

SDG #: Le Cmy METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? __

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

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Level JW/D Only Y N(N/A

	- 5	'																								
Qualifications	No our (LLCD i																									
Associated Samples	411 + BTK																									
RPD (Limits)	(26) 19	()	()	()	,	()		()		()	()	()	()	()	()	()	())	()	()	()	()	()	()	()	
LCSD %R (Limits)	()	()	()	()	(()	()	()	()	()	()	()	()	()	()	()	()	()	()	(()	()	()	()	()	
LCS %R (Limits)	154 (50-130)	()	()	()		()	()	()	(()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	
Compound	0																									
TCS/FCSD ID	10255 KS/b																									
# Date																										

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 29 through June 30, 2009

LDC Report Date:

September 22, 2009

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903615

Sample Identification

RSAO5-0.5B SA106-0.5B SA106-0.5BDL

Introduction

This data review covers 3 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

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 SA106-0.5B and SA106-0.5BDL. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA106-0.5B	Hexachlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903615	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
SA106-0.5B	Hexachlorobenzene	x	А
SA106-0.5BDL	All TCL compounds except Hexachlorobenzene	х	А

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903615	SA106-0.5B	Hexachlorobenzene	J- (all detects) UJ (all non-detects)	А	Project Quantitation Limit (e)
R0903615	RSAO5-0.5B SA106-0.5B SA106-0.5BDL	All compounds reported below the PQL.	J (all detects)	Α	Project Quantitation Limit (sp)
R0903615	SA106-0.5B	Hexachlorobenzene	х	A	Overall assessment of data (o)
R0903615	SA106-0.5BDL	All TCL compounds except Hexachlorobenzene	Х	А	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903615

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495H3a

Stage 2B

Laboratory: Columbia Analytical Services

2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
<u> </u>	Technical holding times	A	Sampling dates: 6/29 - 29/09
11.	GC/ECD Instrument Performance Check	A	' '
111.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/100 200
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	client spec
VIII.	Laboratory control samples	A	Client Spec LCS/D
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	7M	
XIII.	Overall assessment of data	SM)	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank

EB = Equipment blank

Validated Samples:

		<u>n</u>				
1	RSAO5-0.5B	11	90767 MB	21	31	
2	SA106-0.5B	12		22	32	
3	SA106-0.5BDL	13		23	33	
4		14		24	34	
5		15		25	35	
6		16		26	36	
7		17		27	37	
8		18		28	38	
9		19		29	39	
10		20		30	40	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	1. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	.00.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ŧ
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	
D. gamma-BHC	L. Endosulfan II	T. gamma-Chiordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	L.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. Hexachlorobenzere MM.	WM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	#	NN.

Notes:

LDC#: 31405 H34 SDG#:

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: of 2nd Reviewer:__ Reviewer:

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

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

**Content of the content of

							-		-								_			-	_	
Ottallsheelone	wannicatoria	There																				Comments
	77		1			•		(((Recovery OC Limits (Water)
%R (Limits)	0 (for 140))))))))))		J))	Ú)	_		Recovery O
Surrogate Compound	11	7																				Recovery QC Limits (Soil)
Column	Nat shec																					
Sample ID	(10x)	3 (500x)	7																			Surrogate Compound
Date	-																					Letter Designation
#																						Lett

Comments

Recovery QC Limits (Water)

Tetrachloro-m-xylene Decachlorobiphenyl

SDG # 54 Cm

VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

Page: of 1 Reviewer: 3/6 2nd Reviewer:

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

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

Level W/B Only
Y N N/A
Y N N/A
D

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.? Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

	Qualifications	Jacks/A (e)								
	Associated Samples	7								
	Finding	> cal mag	0							
	Compound Name	EE								
] (]	#									

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495 H3x SDG #: 54 Cm

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: 1 of Reviewer: __ 2nd Reviewer: _

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

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

		T									
suc	(0)		-								
Qualifications	XX		_ \								
Associated Samples											
Ass											
	> cal ray	9	FE dil								
Finding	rs c		exunt EE	•							
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Sample ID											
San	ಗ		3								
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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

July 1 through July 2, 2009

LDC Report Date:

September 22, 2009

Matrix:

Soil/Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903678

Sample Identification

EB070109-SO1

EB070109-SO1RE

RSAN6-0.5B

SA82-0.5B

SA82-0.5BDL

SA82-10B

SA82-29B

RSAL3-10B

RSAL3-30B

RSAK3-0.5B

RSAK3-0.5BDL

RSAK3-10B

RSAK3-20B

RSAK3-31B

SA82-0.5BMS

SA82-0.5BMSD

RSAK3-31BMS

HOMIO-O IDIVIO

RSAK3-31BMSD

Introduction

This data review covers 16 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
EB070109-SO1RE	All TCL compounds	15	7	J- (all detects) R (all non-detects)	А

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Samples EB070109-SO1 and EB070109-SO1RE were identified as equipment blanks. No chlorinated pesticide contaminants were found in these blanks.

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
EB070109-SO1	Not specified	Decachlorobiphenyl	26 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	А
EB070109-SO1RE	Not specified	Decachlorobiphenyl	36 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	А

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Although the LCS percent recovery (%R) and LCS/LCSD relative percent difference (RPD) were not within QC limits for one compound, the LCSD percent recovery (%R) was within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSAK3-0.5B	Hexachlorobenzene beta-BHC	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	А
SA82-0.5B	Hexachlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	A

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903678	All compounds reported below the PQL.	J (all detects)	A

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
EB070109-SO1RE	All TCL compounds	Х	А
RSAK3-0.5B	Hexachlorobenzene beta-BHC	× ×	A
RSAK3-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	А
SA82-0.5B	Hexachlorobenzene	x	А
SA82-0.5BDL	All TCL compounds except Hexachlorobenzene	×	А

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

XIV. Field Duplicates

No field duplicates were identified in this SDG.

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903678	EB070109-SO1RE	All TCL compounds	J- (all detects) R (all non-detects)	А	Technical holding times (h)
R0903678	EB070109-SO1 EB070109-SO1RE	All TCL compounds	J- (all detects) UJ (all non-detects)	А	Surrogate spikes (%R) (s)
R0903678	RSAK3-0.5B	Hexachlorobenzene beta-BHC	J (all detects) J (all detects)	А	Project Quantitation Limit (e)
R0903678	SA82-0.5B	Hexachlorobenzene	J (all detects)	А	Project Quantitation Limit (e)
R0903678	EB070109-SO1 EB070109-SO1RE RSAN6-0.5B SA82-0.5B SA82-0.5BDL SA82-10B SA82-29B RSAL3-10B RSAL3-30B RSAK3-0.5B RSAK3-0.5BDL RSAK3-0.5BDL RSAK3-10B RSAK3-20B RSAK3-31B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903678	EB070109-SO1RE	All TCL compounds	Х	A	Overall assessment of data (o)
R0903678	RSAK3-0.5B	Hexachlorobenzene beta-BHC	X X	A	Overall assessment of data (o)
R0903678	RSAK3-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	х	А	Overall assessment of data (o)
R0903678	SA82-0.5B	Hexachlorobenzene	Х	А	Overall assessment of data (o)
R0903678	SA82-0.5BDL	All TCL compounds except Hexachlorobenzene	х	А	Overall assessment of data (o)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903678

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #:_	21495l3a	
SDG #	R0903678	

Stage 2B

Laboratory: Columbia Analytical Services

Page: of / Reviewer: v/c 2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments				
l.	Technical holding times	SW	Sampling dates: 7/01~ 00/09				
11,	GC/ECD Instrument Performance Check	A	, , , , , , , , , , , , , , , , , , ,				
111.	Initial calibration	A					
IV.	Continuing calibration/ICV	A	COV/IN = 26 3				
V.	Blanks	A					
VI.	Surrogate spikes	SM					
VII.	Matrix spike/Matrix spike duplicates	SW					
VIII.	Laboratory control samples	SW	L(S /D				
IX.	Regional quality assurance and quality control	N					
Xa.	Florisil cartridge check	N					
Xb.	GPC Calibration	N					
XI.	Target compound identification	N					
XII.	Compound quantitation and reported CRQLs	SW					
XIII.	Overall assessment of data	SW					
XIV.	Field duplicates	N					
XV.	Field blanks	ND	EB = 1, x FB = FB072109-50 from R09041				

Note:

Validated Samples:

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

water + Stil

	Wate	Υ	7 361			
1	EB070109-SO1 4	11 4	RSAK3-0.5BDL	21 /	90 782 MB	31
2	EB070109-SO1RE	12 4	RSAK3-10B	22 🖈	914 94 MB	32
3 }	RSAN6-0.5B S	13 4	RSAK3-20B	23 3	90767 MB	33
4 3	SA82-0.5B	14 9	RSAK3-31B	24 4	91091 MB	34
5 }	SA82-0.5BDL	15 3	SA82-0.5BMS	25	91494 MB	35
6 }	SA82-10B	16 >	SA82-0.5BMSD	26		36
7 }	SA82-29B	17 9	RSAK3-31BMS	27		37
8 3	RSAL3-10B	18 7	RSAK3-31BMSD	28		38
9 7	RSAL3-30B	19		29		39
10	RSAK3-0.5B	20		30		40

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	66.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ŧ
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	-
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. Hexachimobunan	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	±	NN.

Notes:

LDC #:	214	95	I	34
SDG #:	Sa		in	~ /

VALIDATION FINDINGS WORKSHEET Technical Holding Times

Page: _ of \/
Reviewer: _ \text{OV (a)}
2nd Reviewer: _ \text{Q}

All circled dates have exceeded the technical holding times.

Y N/A Were all cooler temperatures within validation criteria?

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifie
2	W	2	7/01/09	Extraction date 7/14/09	7/27/09		J-/R/
			7.15				
(* 			***************************************				
					77 - WHITE - 17 - 17 - 17 - 17 - 17 - 17 - 17 - 1		
				77 78 70 80 70 70 70 70 70 70 70 70 70 70 70 70 70			
			***************************************	[

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TECHNICAL HOLDING TIME CRITERIA

Water:

Extracted within 7 days, analyzed within 40 days.

Soil:

Extracted within 14 days, analyzed within 40 days.

LDC#: 21495 I34 SDG #:

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: 1 of 1 Reviewer:__ 2nd Reviewer:_

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

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

Were surrogates spiked into all samples, standards and blanks?

YN/N/A

Did all surrogate percent recoveries (%R) meet the QC limits?

Were surrogates spiked into all samples, standards and blanks? Did all surrogate percent recoveries (%R) meet the QC limits?

840	(3)							- many												
Olishina	T- MT /A	-			No rue	ı														
	16-140)			-			Ĺ.			-	7		,	((_	_	<u> </u>	-	7
%R (Limits)	~	~	_	_	~))	J)	_	ر ر	9		J)	•))		
%	36		36		176		178		٥		3743	246	0							
Surrogate Compound	, ,						/		A . B	-	B	A	A, B							
Column	Not spect												7							
0	A)e-												X	,						
Sample ID					(10)		(107)	,	(50x)		(POX)		(SODOS)							
San	-		دم		~		4		ر ک		o ₁		4							
Date																		·		
*																				

Comments

Recovery QC Limits (Water)

Recovery QC Limits (Soil)

Surrogate Compound

Letter Designation

മ

Tetrachloro-m-xylene Decachlorobiphenyl

LDC # 21495 I 34 SDG #: St. Corx

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: _of__ Reviewer: 31/6 2nd Reviewer:

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

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

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

	(16/2)																									
Qualifications																										
Qui	No mad	0															:									
Associated Samples	45	-																								
imits)	((•	_	(((^	^		(^	^			_	•	•	((•	•	(•	_
RPD (Limits)	H ()			J))))))))))))))))))
nits)	de limits)	((()	()	ſ	(Û	((ſ	(((^	<u> </u>	((((^
MSD s) %R (Limits)	. R owter	Harry) ())))))	<u> </u>	_)))))))))))))))	_
nits)	hone) R	ير بو		(7	(î))	^	,	(r	(((((((((()	((
MS %R (Limits)	All compounds (has	atochil	1))))))	_))))))))))))))	_
Compound	411 Con) See																								
OI OSW/SW	91/51																									
Date												-														
*																										

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0903678

Date Collected: 7/1/09 Date Received: 7/2/09 Date Analyzed: 7/10/09

Matrix Spike Summary Organochlorine Pesticides by Gas Chromatography

Sample Name: Lab Code:

SA82-0.5B R0903678-007 Units: µg/Kg

Basis: Dry

Analytical Method: 8081A Prep Method:

EPA 3541

	Sample		Aatrix Spike Q0905448-0				ate Matrix Q0905448-0	7	% Rec		RPD
Analyte Name	Result	Result	Amount	% Rec	:	Result	Amount	% Rec	Limits	RPD	Limit
4,4'-DDD	ND	ND	6.85	0	*	ND	6.85	0	* 58 - 121	0	30
4,4'-DDE	ND	67.0	6.85	978	#	63.9	6.85	933	# 56 - 125	5	30
	ND	ND	6.85	0	*	ND	6.85	0	* 9 - 149	0	30
4,4'-DDT	ND	ND	6.85	0	*	ND	6.85	0	* 15 - 135	0	30
Aldrin	ND	ND	6.85	0	*	ND	6.85	0	* 25 - 150	0	30
Dieldrin	ND	ND	6.85	0	*	ND	6.85	0	* 56 - 119	0	30
Endosulfan I	ND	ND	6.85	0	*	ND	6.85	0	* 65 - 127	0	30
Endosulfan II	ND	ND	6.85	0	*	ND	6.85	0	* 37 - 122	0	30
Endosulfan Sulfate	ND	ND	6.85	0	*	ND	6.85	0	* 28 - 143	0	30
Endrin	ND	ND	6.85	Ö	*	ND	6.85	0	* 18 - 135	0	30
Endrin Aldehyde	ND	ND	6.85	ŏ	*	ND	6.85	0	* 57 - 123	0	30
Endrin Ketone	ND	ND	6.85	Ö	*	ND	6.85	0	* 35 - 127	0	30
Heptachlor		ND	6.85	0	*	ND	6.85	0	* 61 - 120	0	30
Heptachlor Epoxide	ND	686	17.1	825	#	666	17.1	712	# 20 - 150	3	30
Hexachlorobenzene	540		34.3	0	*	ND	34.3	0	* 38 - 149	0	30
Methoxychlor	ND	ND	6.85	0	*	ND	6.85	0	* 53 - 130	0	30
alpha-BHC	ND	ND	6.85	0	*	ND	6.85	0	* 27 - 130	0	30
alpha-Chlordane	ND	ND	6.85	693	#		6.85	548	# 35 - 142	10	30
beta-BHC	57	105		093	<i>™</i>	ND	6.85	0	* 44 - 119	0	30
delta-BHC	ND	ND	6.85		*	ND	6.85	Õ	* 37 - 124	0	30
gamma-BHC (Lindane)	ND	ND	6.85	0	*		6.85	ő	* 38 - 127	0	30
gamma-Chlordane	ND	ND	6.85	0	7	ND	0.03	v	·	_	

Comments:	

LDC # 21495 IN

VALIDATION FINDINGS WORKSHEET

Page: 1 of

Reviewer:_ 2nd Reviewer:

Laboratory Control Samples

SDG #: SCC Covery LE METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

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

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits?

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Level IV/D Only

#	Date	CS/FCSD ID	Compound	LCS %R (LImits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		91494 LCS (D	1 1	149) (52 (30)	2. 91494 MR	No This (LCSD)
				•	()	()	1	
				J	())		
				·	()	()	-	
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					()	()		

LDC# 7 495 136 SDG#: Su Gny

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

of t Page: Reviewer: 2nd Reviewer:

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

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

Y N N/A

Were CRQLs adjusted for sample dilutions, dry weight factors, etc.? Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

Qualifications	J dets (e)		→						
Associated Samples	01								
Finding	> cal range		*						
Compound Name	BE B	1	t.E						
#									

Comments: See sample calculation verification worksheet for recalculations

LDC#: 21495 139 SDG#: Su Com

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Reviewer: 10f 1 Reviewer: 2nd Reviewer: 2nd

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

(X/N N/A Was

Was the overall quality and usability of the data acceptable?

	(b)	\												
Qualifications	4	,												
Qual	X													
ş	_ #													
Associated Samples	sur outies in #													
Associat	1 tro													
			426	0	4.									
	run for		> cay range		B	+	range	0	EE di					
			7		(CE									
Finding	confirmetion		2		except EB		> Cal		crant	1				
	confi		柜	_	All R		田田		AII					
			441											
Sample ID														
Sam														
	2		0		=		4		p					
Date														#s.
#														Comments:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 25 through July 1, 2009

LDC Report Date:

September 24, 2009

Matrix:

Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903561

Sample Identification

M-75B

M-13AB

M-13009AB

M-64B

M-111AB

EB062909-GW1

M-25B

M-12AB

M-110B

I-ARB

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample EB062909-GW1 was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

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

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903561	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples M-13AB and M-13009AB were identified as field duplicates. No volatiles were detected in any of the samples.

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

SDG	Sample	Compound	Flag .	A or P	Reason (Code)
R0903561	M-75B M-13AB M-13009AB M-64B M-111AB EB062909-GW1 M-25B M-12AB M-110B I-ARB	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ET

LDC #: 21495J3a	VALIDATION COMPLETENESS WORKSHE
SDG #: R0903561	Stage 2B

Laboratory: Columbia Analytical Services

Stage 2B

Date	9/23/09
Page:	of
Reviewer	
2nd Reviewer:	
	7

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
<u> </u>	Technical holding times	A	Sampling dates: 6 /25 - 7/01/09
II.	GC/ECD Instrument Performance Check	À	,
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	car/100 = 20 3
V.	Blanks	/	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec
VIII.	Laboratory control samples	A	ice /p
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	ND	D = 2,3
XV.	Field blanks	VD	EB = 6

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

D = Duplicate TB = Trip blank

FB = Field blank

EB = Equipment blank

Validated Samples:

141 -40

	Water			
1	M-75B	11 / 90 395 MB	21	31
2 1	м-13АВ 🗦	12 7 90700	22	32
3 1	м-13009AB Д	13 3 90782	23	33
4-1	M-64B	14	24	34
5 1	M-111AB	15	25	35
6 (EB062909-GW1	16	26	36
7-2	M-25B	17	27	37
8	M-12AB	18	28	38
9-3	M-110B	19	29	39
10-3	I-ARB	20	30	40

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

June 26, 2009

LDC Report Date:

September 25, 2009

Matrix:

Soil/Water

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903584

Sample Identification

RSAI3-10B

RSAI3-10BDL

RSAI3-20B

RSAI3-32B

RSAI2-10B

RSAI2-10BDL

RSAI2009-10B

RSAI2009-10BDL

RSAI2-20B

RSAI2-31B

RSAJ2-10B

RSAJ2-20B

RSAJ2-33B

RSAJ2009-33B

EB062609-SO

RSAI3-10BMS

RSAI3-10BMSD

RSAI2-10BMS

RSAI2-10BMSD

Introduction

This data review covers 18 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
90348MB	6/26/09	Hexachlorobenzene	0.89 ug/kg	RSAI3-10B RSAI3-10BDL RSAI3-20B RSAI3-32B

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

Sample EB062609-SO was identified as an equipment blank. No chlorinated pesticide contaminants were found in this blank.

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. Since the 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 and MSD percent recoveries (%R) were not within QC limits for all compounds and the relative percent differences (RPD) was not within QC limits for one compound, the LCS 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. Although the LCS percent recovery (%R) and LCS/LCSD relative percent difference (RPD) were not within QC limits for one compound, the LCSD percent recovery (%R) was within QC limits and no data were qualified.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
RSAI3-10B RSAI2-10B RSAI2009-10B	Hexachlorobenzene	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	А

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903584	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

Sample	Compound	Flag	A or P
RSAI3-10B RSAI2-10B RSAI2009-10B	Hexachlorobenzene	x	А
RSAI3-10BDL RSAI2-10BDL RSAI2009-10BDL	All TCL compounds except Hexachlorobenzene	×	А

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

XIV. Field Duplicates

Samples RSAI2-10B and RSAI2009-10B, samples RSAI2-10BDL and RSAI2009-10BDL, and samples RSAJ2-33B and RSAJ2009-33B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentra	ation (ug/Kg)		D:#	Flags	
Compound	RSAI2-10B	RSAI2009-10B	RPD (Limits)	Difference (Limits)		A or P
4,4'-DDE	47	48	_	1 (≤36)	-	-

	Concentration (ug/Kg)			P.M.		
Compound	RSAI2-10B	RSAI2009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDT	71	66	-	5 (≤36)	-	-
Hexachlorobenzene	2100	2100	0 (≤50)		-	-
beta-BHC	120	100	18 (≤50)	-	-	-

	Concentration (ug/Kg)		DDD			
Compound	RSAI2-10BDL	RSAI2009-10BDL	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	6700	7000	-	300 (≤1900)	•	-

Concentration (ug/Kg)			5 :4			
Compound	RSAJ2-33B	RSAJ2009-33B	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	2.3	3.0U	-	0.7 (≤3.0)	-	-

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

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903584	RSAI3-10B RSAI2-10B RSAI2009-10B	Hexachlorobenzene	J (all detects)	А	Project Quantitation Limit (e)
R0903584	RSAI3-10B RSAI3-10BDL RSAI3-20B RSAI3-32B RSAI2-10B RSAI2-10BDL RSAI2-009-10BDL RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-10B RSAJ2-20B RSAJ2-33B RSAJ2-33B RSAJ2-009-33B EB062609-SO	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)
R0903584	RSAI3-10B RSAI2-10B RSAI2009-10B	Hexachlorobenzene	х	А	Overall assessment of data (o)
R0903584	RSAI3-10BDL RSAI2-10BDL RSAI2009-10BDL	All TCL compounds except Hexachlorobenzene	х	А	Overall assessment of data (o)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northqate Henderson T

LDC #: 21495K3a	VALIDATION COMPLETENESS WORKSHEE
SDG #:R0903584	Stage 2B

Laboratory: Columbia Analytical Services

Date: <u>4/21/6</u> 4
Page: _of
Reviewer: NC
2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6 /26 /6 9
II.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	•
IV.	Continuing calibration/ICV	A	ca/10 6202
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	us/p
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	SIM	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	SW	$D_1 = 5,7$ $D_2 = 6.8$ $D_3 = 13,14$ EB = 15 $FB = FB 07 = 109 - S0$ from R09040
XV.	Field blanks	ND	EB = 15 FB = FB 07 21 09 - So from R090 40

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate FB = Field blank D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

Water + Soil

		wwar							
1	١	RSAI3-10B	,	11 >	RSAJ2-10B	ک	21	90348 MB	31
2	١	RSAI3-10BDL		127	RSAJ2-20B		22 1	90455 MB	32
3	1	RSAI3-20B	-	t 13 ~∕	RSAJ2-33B	,	23 3	90581 MB	33
4	1	RSAI3-32B		آ4 ک	RSAJ2009-33B D) ₃ \	24		34
5	2	RSAI2-10B 0,	ŀ	15 3	EB062609-SO	N	25		35
6	1	RSAI2-10BDL D√		16	RSAI3-10BMS	ح	26		36
7	2	RSAI2009-10B D,		17	RSAI3-10BMSD		27		37
8	٦	RSAI2009-10BDL 沈		18	RSAI2-10BMS		28		38
9	7	RSAI2-20B		19	RSAI2-10BMSD		29		39
10	~	RSAI2-31B	ł	20		1	30		40

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	.99
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ŧ
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	
D. gamma-BHC	L. Endosulfan II	T. garmna-Chiordane	BB. Aroclor-1260	JJ.
E. Heptachlor	М. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	4
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. Hexachlorobenzune	MM.
H. Endosulfan I	P. Methoxychior	X. Aroclor-1232	FF.	NN.

Notes:

LDC# 21495 Kan SDG #:_

VALIDATION FINDINGS WORKSHEET Blanks

Page: 1 of 1 Reviewer:___ 2nd Reviewer.

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

Y N N/A Were all samples associated with a method blank? Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed? Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below. Yor, N/A Was there contamination in the method blanks? If yes, please see the qualifications below. Yor, units: Was there contamination in the method blanks? If yes, please see the qualifications. Yor, Inits: Was there contamination in the method blanks? If yes, please see the qualifications. Yor, Inits: Was there contamination in the method blanks? If yes, please see the qualifications.		Blank ID	V tion data	NV AS a method blank performed for each matrix and whenever a sample extraction was performed? NVA If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies?		
---	--	----------	----------------	---	--	--

Sample Identification 218 Associated samples: rawts A Blank analysis date: 40348 MB 0.89 出 Blank extraction date:

1.78

Blank ID	Sample identification	ntfication

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five-times the method blank concentration were qualified as not detected, "U".

LDC#: 21415 Kgr. SnG#: 526 W.

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: 2nd Reviewer:_ Reviewer:

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

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

| N/A | Were surrogates spiked into all samples, standards and blanks?
| Y(N)N/A | Did all surrogate percent recoveries (%R) meet the QC limits?

							_	_				 	 	 	 		
and the state of t	(V)							<u>A</u>									
%R (Limits)	2116 (4, 140)	()	0 0	(963 ()	()	W7 (V)	()	()	()	(()	
Surrogate Compound	4		A. B		ધ		2										
Column	Not GOL	-					7										
Sample ID	(/o/)		(xaan) 8 9 ;		(10x)		7 (lox)										Lancació de portario.
Date	٠		2														Letter Designation
*																	Let

Letter Designation	Surrogate Compound	Recovery QC Limits (Soll)	Recovery Of Limits Advances	
			(Jacober) AC LIMITS (Water)	Comments
Ą	Tetrachloro-m-xylene			
0	Decachlorobinhany			

LDC#: 21 495 K31 SDG#: SCC COPEN

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer: 3\(\frac{1}{2}\)

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

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

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

Y N N/A

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

*	Date	QI QSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		<i>L</i> 1/ 91	All com	ر بو	P2R outsidelimits	mits ()	7	Noqual (LCS/Di
		,	В	()	()	41 (30)		,
				attached report)	()	()		
				<u>`</u>	()	()		
)))		
		61/81	All con	All compounds have	2 R overide	1, mits()	2 ' 0	No grad (LESTO in)
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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0903584

Date Collected: 6/25/09 Date Received: 6/26/09 Date Analyzed: 7/13/09

Matrix Spike Summary Organochlorine Pesticides by Gas Chromatography

Sample Name:

RSAI3-10B

Lab Code:

R0903584-004

Units: µg/Kg Basis: Dry

Analytical Method: 8081A Prep Method:

EPA 3550C

		N	Iatrix Spike	•			ate Matrix				nnn
	Sample	Re	Q0905219-0	6		Re	Q0905219-0°		% Rec	-	RPD
Analyte Name	Result	Result	Amount	% Rec		Result	Amount	% Rec	Limits	RPD	Limit
4,4'-DDD	ND	ND	7.28	0	*	ND	7.28	-	* 58 - 121	0	30
4,4'-DDE	ND	ND	7.28	0	*	ND	7.28	-	* 56 - 125	0	30
4,4'-DDT	ND	ND	7.28	0	*	ND	7.28	-	* 9 - 149	0	30
Aldrin	ND	ND	7.28	0	*	ND	7.28	-	* 15 - 135	0	30
Dieldrin	ND	ND	7.28	0	*	ND	7.28	-	* 25 - 150	0	30
Endosulfan I	ND	ND	7.28	0	*	ND	7.28		* 56 - 119	0	30
Endosulfan II	ND	ND	7.28	0	*	ND	7.28	_	* 65 - 127	0	30
Endosulfan Sulfate	ND	ND	7.28	0	*	ND	7.28	-	* 37 - 122	0	30
Endrin	ND	ND	7.28	0	*	ND	7.28	-	* 28 - 143	0	30
Endrin Aldehyde	ND	ND	7.28	0	*	ND	7.28	•	* 18 - 135	0	30
Endrin Ketone	ND	ND	7.28	0	*	ND	7.28	•	* 57 - 123	0	30
Heptachlor	ND	ND	7.28	0	*	ND	7.28	0	* 35 - 127	0	30
Heptachlor Epoxide	ND	ND	7.28	0	*	ND	7.28	-	* 61 - 120	0	30
Hexachlorobenzene	13000	21600	18.2	48760	#	28800	18.2	88440	# 20 - 150	29	30
	ND	ND	36,4	0	*	ND	36.4	0	* 38 - 149	0	30
Methoxychlor alpha-BHC	ND	ND	7.28	0	*	ND	7.28	0	* 53 - 130	0	30
alpha-Chlordane	ND	ND	7.28	0	*	ND	7.28	0	* 27 - 130	0	30
	ND	542	7.28	7450	*	819	7.28	11250	* 35 - 142	41	* 30
beta-BHC	ND	ND	7.28	0	*	ND	7.28	0	* 44 - 119	0	30
delta-BHC	ND	ND	7.28	o	*	ND	7.28	0	* 37 - 124	0	30
gamma-BHC (Lindane) gamma-Chlordane	ND	ND	7.28	0	*	ND	7.28	0	* 38 - 127	0	30

Comments:		

COLUMBIA ANALYTICAL SERVICES, INC.

OA/QC Report

Client:

Northgate Environmental

Project:

Tronox LLC Henderson/2027.001

Sample Matrix:

Soil

Service Request: R0903584

Date Collected: 6/26/09 Date Received: 6/27/09 Date Analyzed: 7/14/09

Matrix Spike Summary Organochlorine Pesticides by Gas Chromatography

Sample Name:

RSAI2-10B

Lab Code:

R0903584-013

Units: µg/Kg Basis: Dry

Analytical Method: 8081A Prep Method:

EPA 3550C

Prep Memoa:	FR 3330C										
			Aatrix Spike			Duplic	ate Matrix	Spike	e/ Dec		RPD
	Sample	Re	Q0905276-0	4			Q0905276-0	5	% Rec	RPD	Limit
Analyte Name	Result	Result	Amount	% Rec	2	Result	Amount	% Rec	Limits		
4,4'-DDD	ND	ND	7.26	0	*	ND	7.26	•	* 58 - 121	0	30 30
4,4'-DDE	ND	ND	7.26	0	*	ND	7,26	_	* 56 - 125	0	30
,	ND	ND	7.26	0	*	ND	7.26	•	* 9-149	0	30 30
4,4'-DDT	ND	ND	7.26	0	*	ND	7.26	•	* 15 - 135	0	30
Aldrin	ND	ND	7.26	0	*	ND	7.26	0	* 25 - 150	0	
Dieldrin	ND	ND	7.26	0	*	ND	7.26	0	* 56 - 119	0	30
Endosulfan I	ND	ND	7.26	0	*	ND	7.26	0	* 65 - 127	0	30
Endosulfan II	ND	ND	7.26	0	*	ND	7.26	0	* 37 - 122	0	30
Endosulfan Sulfate	ND	ND	7.26	0	*	ND	7.26	0	* 28 - 143	0	30
Endrin	ND ND	ND	7.26	0	*	ND	7.26	0	* 18 - 135	0	30
Endrin Aldehyde		ND	7.26	0	*	ND	7.26	0	* 57 - 123	0	30
Endrin Ketone	ND	ND	7.26	ő	*	ND	7.26	0	* 35 - 127	0	30
Heptachlor	ND		7.26	0	*	ND	7.26	0	* 61 - 120	0	30
Heptachlor Epoxide	ND	ND	18.2	380	#	6630	18.2	-380	# 20 - 150	2	30
Hexachlorobenzene	6700	6760	36.3	0	*	ND	36.3	0	* 38 - 149	0	30
Methoxychlor	ND	ND		0	*	ND	7.26	0	* 53 - 130	0	30
alpha-BHC	ND	ND	7.26	0	*	ND	7.26	0	* 27 - 130	0	30
alpha-Chlordane	ND	ND	7.26	-	*	ND	7.26	0	* 35 - 142	0	30
beta-BHC	ND	ND	7.26	0	*	ND	7.26	0	* 44 - 119	0	30
delta-BHC	ND	ND	7.26	0	*		7.26	ő	* 37 - 124	0	30
gamma-BHC (Lindar	ie) ND	ND	7.26	0	*	1122		ő	* 38 - 127	0	30
gamma-Chlordane	ND	ND	7.26	0	*	ND	7.26	Ů			

Comments:		

メペイ	1
495 ·	S
# 2	*
LDC	SDG

VALIDATION FINDINGS WORKSHEET

Page: 1 of

Laboratory Control Samples

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

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

Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? YN N/A Y(N/N/A

Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Level 1/40 Only ∀/<u>N</u> Z ≻

	. ģ	· 						_						_	_											
Qualifications	No mal (1000																									
Associated Samples	1-4 9 4348 MB																									
RPD (Limits)	1 06) 18	()	())		())	()	()	()	()	()))	())))	()	()	()	())	()	()	
LCSD %R (Limits)	()	()	()	()		()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	()	(
LCS %R (Limits)	48 (50-130)	()	()	()	,	()		()			()	()	()	()		()	()	()	()	()	()	()	()	()	()	
Compound	~																									
CS/CCSD ID	90348 165/0																									
# Date																										

LDC # 2/495 K32 SDG #:

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET

Reviewer:

Page: 2nd Reviewer:

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

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

Y N N/A

Did the reported results for detected target compounds agree within 10.0% of the recalculated results? Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Qualifications	Jacks/A (e)								
Associated Samples									
Finding	EE > col range	D							
Sample 1D Sompound Name	1 5 7								
#									

Comments: See sample calculation verification worksheet for recalculations

LDC# 21495 Kgg SDG# 50 Cm

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page:

Reviewer: 2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

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

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

Y N N/A

Was the overall quality and usability of the data acceptable?

						ſ
#	Date	Sample ID	Finding	Associated Samples	Qualifications	
		15.7	' \		(0) A/X	
		, , ,	(
		2, 6, 8	All except EE 1;		→	
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LDC #:_	2149	SK 3a
	_	Coney

VALIDATION FINDINGS WORKSHEET <u>Field Duplicates</u>

Page:	<u> </u>
Reviewer:	- 7VG
2nd reviewer:	9

METHOD: GC Pesticides/PCBs (EPA SW846 Method 8081/8082)

/	Y	N	N/A
	A	Ν	N/A

Were field duplicate pairs identified in this SDG?

Were target compounds detected in thie field duplicate pairs?

	Concentration	on (US/kg)	
· Compound	2	7	RPD
J	47	48	1 (=36DiH)
0	7)	66	5 1
EE	2100	2100	0 (=502 RPp)
В	120	100	18 L

	Concentration	on (45/kg)	
Compound	6	8	RPD
ŧ ŧ	6700	7000	300 (=1900 Diff)

	Concentratio	n1 49/ts)	
Compound	13	14	RPD
ŧ.	2.3	3. 0 U	0.7 (= 3.0 Diff)

	Concentration ()	
Compound		RPD

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Tronox LLC Facility, 2009 Phase B Investigation,

Henderson, Nevada

Collection Date:

July 6 through July 7, 2009

LDC Report Date:

September 27, 2009

Matrix:

Soil

Parameters:

Chlorinated Pesticides

Validation Level:

Stage 2B

Laboratory:

Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903729

Sample Identification

RSAK4-10B

RSAK4-20B

RSAK4-31B

RSAL4-0.5B

RSAL4009-0.5B

RSAL4-10B

RSAL4-28B

Introduction

This data review covers 7 soil samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8081A for Chlorinated Pesticides.

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

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

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

The following are definitions of the data qualifiers:

- J+ Data are qualified as estimated, with a high bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J- Data are qualified as estimated, with a low bias likely to occur. False positives or false negatives are unlikely to have been reported.
- J Data are qualified as estimated; it is not possible to assess the direction of the potential bias. False positives or false negatives are unlikely to have been reported.
- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- R Data are qualified as rejected. There is a significant potential for the reporting of false negatives or false positives.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- B The analytical result may be a false positive totally attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JB The analytical result may be biased high and partially attributable to blank contamination. This qualifier is applicable to radiochemistry analysis only.
- JK The analytical result is an estimated maximum possible concentration (EMPC).
- X The analytical result is not used for reporting because a more accurate and precise result is reported in its place.
- J-TDS The analytical result is estimated based on failure of the Total Dissolved Solids (TDS) correctness check performed in accordance with the Standard Method 1030E.
- J-CAB The analytical result is estimated based on failure of the cation-anion balance correctness check performed in accordance with Standard Method 1030E.
- J-TDS & CAB The analytical result is unreliable based on the failure of the cation-anion balance and TDS correctness check performed in accordance with standard Method 1030E.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of single compounds were performed for the primary (quantitation) column and confirmation column as required by this method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 20.0% QC limits.

The percent difference (%D) of the second source calibration standard were less than or equal to 20.0% for all compounds.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

V. Blanks

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

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No chlorinated pesticide contaminants were found in this blank.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for RSAK4-10B and RSAK4-20B. Since the samples were diluted out, no data were qualified.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

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

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

Raw data were not reviewed for this SDG.

XII. Project Quantitation Limit

All 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 R0903729	All compounds reported below the PQL.	J (all detects)	А

Raw data were not reviewed for this SDG.

XIII. Overall Assessment of Data

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

XIV. Field Duplicates

Samples RSAL4-0.5B and RSAL4009-0.5B were identified as field duplicates. No chlorinated pesticides were detected in any of the samples with the following exceptions:

	Concentra	tion (ug/Kg)				
Compound	RSAL4-0.5B	RSAL4009-0.5B	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	43	59	31 (≤50)	-	-	•
beta-BHC	4.8	18U	-	13.2 (≤18)	-	-

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Data Qualification Summary - SDG R0903729

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903729	RSAK4-10B RSAK4-20B RSAK4-31B RSAL4-0.5B RSAL4-09-0.5B RSAL4-10B RSAL4-28B	All compounds reported below the PQL.	J (all detects)	А	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG R0903729

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson ET

LDC #: 2	1495L3a	VALIDATION COMPLETENESS WORKSHE
SDG #:_F	R0903729	Stage 2B

Laboratory: Columbia Analytical Services

Stage 2B

Reviewer: 2nd Reviewer:

METHOD: GC Chlorinated Pesticides (EPA SW 846 Method 8081A)

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

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 7/06 - 87/09
II.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	4_	
IV.	Continuing calibration/ICV	A	ca/a = 20 3
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Wient spec
VIII.	Laboratory control samples	A	Usent spec
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D = 4,5
XV.	Field blanks	ho	FB = FB 072109-50 from R0904016

Note:

A = Acceptable

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate TB = Trip blank

EB = Equipment blank

Validated Samples:

0.11

	301				
1	RSAK4-10B	11	91091 MB	21	31
2	RSAK4-20B	12		22	32
3	RSAK4-31B	13		23	33
4	RSAL4-0.5B	14		24	34
5	RSAL4009-0.5B <i>b</i>	15		25	35
6	RSAL4-10B	16		26	36
7	RSAL4-28B	17		27	37
8		18		28	38
9		19		29	39
10		20		30	40

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	H.
D. gamma-BHC	L, Endosulfan li	T. gamma-Chlordane	BB. Aroclor-1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. Hexaching beared MM.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	开 .	NN.

Notes:

COMPLST-3S.wpd

LDC#: 21495132

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: of

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

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

Were surrogates spiked into all samples, standards and blanks?

N/N/A

Did all surrogate percent recoveries (%R) meet the QC limits? X N N/A

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•		
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Qualifications	No grad																
%R (⊔mits)	(40-4)		()		(()	()	()	()	()	()	()	()	()	()	()	
//R	8.51	153															
Surrogate Compound	8																
Column	Not Spec																
Sample ID	(×01)	s (16x)															
Date	-																
#																	

Comments			
Recovery QC Limits (Water)			
Recovery QC Limits (Soil)			
Surrogate Compound	Tetrachloro-m-xylene	Decachlorobipheny	
Letter Designation	A	6 2	

LDC #: 21495 L36 SDG #: Sie Core

VALIDATION FINDINGS WORKSHEET Field Duplicates

METHOD: CC Posticides/PCRs (EPA SW846 Method 8081/8082)

R	N	N/A
Y	N	N/A

IETHOD: GC Pesticides/PCBs (EPA SW846 Meth	od 8081/8082)		1
Were field duplicate pairs identified Were target compounds detected in	in this SDG? n thie field duplicate pa	airs?	
	Concentratio	. Make	
. Commont	4	کی ا	RPD
Compound	43	59	31 (=502, RPD)
	4-8	184	13,2 (= 18 Diff)
		130	(-18 2/17)
	Concentration ()		
Compound			RPD
The state of the s			I
[Concentratio	n ()	
Compound			RPD
			·
			1
[Concentratio	<u> </u>	
Compound			RPD I
		1	

FL	DUP	4.3\$