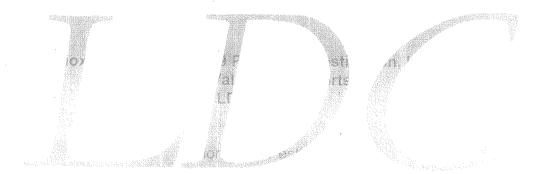
Tronox LLC Facility, 2009 Phase B Investigation, Henderson Data Validation Reports LDC #21495

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)	Ρ

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)	A

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)	Ρ

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)	A

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)	A	Continuing calibration (%D) (c)
R0903006	MC-3B EB052709 M-127B	Endrin aldehyde	J- (all detects) UJ (all non-detects)	P	Laboratory control samples (%R) (I)
R0903006	MC-3B EB052709 M-127B FB060409	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 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 Stage 4

LDC #: 21495B3a SDG #: R0903006

Laboratory: Columbia Analytical Services

Date: 9/14/09 Page: 1 of Reviewer: 34 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
Ι.	Technical holding times	A	Sampling dates: 5/27-28/09 6/04/09
11.	GC/ECD Instrument Performance Check	A	·
111.	Initial calibration	Ä	RSD
IV.	Continuing calibration/ICV	SW	CCN/1W = 202
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec
VIII.	Laboratory control samples	SW	Client spec US B
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	Ă	
XII.	Compound quantitation and reported CRQLs	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	EB = 2 $FB = 4$

Note:

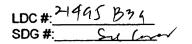
A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

	Mate					1
1 1	MC-3B	11	88678 MB	21	31	
2	EB052709	12 1	- 89250 J	22	32	
+ 3	M-127B	13		23	33	
ر 4 ک	FB060409	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	



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

Validation Area	Yes	No	NĂ	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.		Ē		
II. GC/ECD instrument performance check				
Was the instrument performance found to be acceptable?				
III. Initial calibration	T			
Did the laboratory perform a 5 point calibration prior to sample analysis?	\square	Ĺ		
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations $(\%$ RSD) $\leq 20\%$?	~	,		
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				
What type of continuing calibration calculation was performed?%D or%R	\square			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?				
Were endrin and 4,4'-DDT breakdowns \leq 15%.0 for individual breakdown in the Evaluation mix standards?	1			
Was a continuing calibration analyzed daily?	<			
Were all percent differences (%D) <36%.0 or percent recovieries 89-119%?				
Were all the retention times within the acceptance windows?				
V. Blanks				
Was a method blank associated with every sample in this SDG?	\square			·
Was a method blank analyzed for each matrix and concentration?		Г		
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, Startogata spikes	I 1	<u> </u>	P	
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?		\angle		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?				
VII. Matrix spike/Matrix spike duplicates				

VALIDATION FINDINGS CHECKLIST

LDC #: 21495 B39 SDG #: Su Cord

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?	\angle			
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?			<	
IX Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				<
X. 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 partomance				
System performance was found to be acceptable.				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XIV. Field suplicates				
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)

L

A. alpha-BHC	l. Dieldrin	Q. Endrin ketone	V Araclas 1343	
				66.
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	
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Arocior-1260	J.,
E. Heptachior	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. DB 1701	E
G. Heptachior epoxide	0.4,4-DDT	W. Aroclor-1221	EE. HPRACHLOND LEATENE MM.	MM.
H. Endosulfan I	P. Methoxychior	X. Aroclor-1232	Ľ.	NN.

Notes:

COMPLST-3S.wpd

LDC # 21 415 839 SDG #: 24 Lora

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

_ور 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".

PN N/A

2 What type or calibration verification calculation was performed? <u>%D or RPD</u> Were Evaluation mix standards run before initial calibration and before samples? Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (<u><</u>15.0% for individual breakdowns)? N N/A

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

Did the continuing calibration standards meet the percent difference (%D) /relative percent difference (RPD) oriteria of <45.0%? evel IV/D Only N N/A

Y)N N/A		Were the retention times for all calibrated compounds	times for all	calibrated com	pounds within their	within their respective acceptance windows?	ince windows?			
#	Date	Standard ID	Column	Compound	%D (Limit <u>15.0)</u>	φΩ RT (Limits)	(s)	Associated Samples	Qualifications	
	6/18/09	FA58)	STX-C42	E (+)) (4. 89250 MD	3+ deb. (()
		(MDI)		R	51,8)	(1		1
							(
) ((
)	6/0/00	Hexac	Hexachloro benzene	zone not	t pertrimed	an acr	provided)	1.2	J/WJ /P	(7)
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A. alpha-BHC B. beta-BHC C. delta-BHC D. gamma-BHC	A. alpha-BHC B. beta-BHC C. delta-BHC D. gamma-BHC	E. Heptachlor F. Aldrin G. Heptachlor epoxide H. Endosulfan I		=	M. 4,4'-DDD N. Endosulfan sulfate O. 4,4'-DDT P. Methoxychlor	Q. Endrin ketone R. Endrin aldehyde S. alpha-Chlordane T. gamma-Chlordane	U. Toxaphene V. Aroclor-1016 W. Aroclor-1221 X. Aroclor-1232	Y. Aroclor-1242 5 Z. Aroclor-1248 21 AA. Aroclor-1254 21 BB. Aroclor-1260 2 BB. Aroclor-1260	CC. DB 608 GG. DD. DB 1701 HH. EE. Htrachlarabenterie	

CONCAL.3S.wpd

LDC #: 21495 B39 SDG #: 21 495

VALIDATION FINDINGS WORKSHEET Surrogate Spikes

Page: 1 of 1 Reviewer: 376 2nd Reviewer: 2

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". <u>N N/A</u> Were surrogates spiked into all samples, standards and blanks? <u>Y N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits? YN N/A

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications	
		(xaa))	IN-XIS IN	A B	0 (40-140)	No guad	
		$(100\times)$			(7) 7		
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	Letter Designation	n Surrogate Compound		Recovery QC Limits (Soil)	Recovery QC Limits (Water)	ts (Water) Comments	
	A	Tetrachloro-m-xviene					

Decachlorobipheny

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MEINUL: GU PESUCIDES/PUBS (EPA 200 840 MEINOD 8081/8082	v ov 840 Me questions al ntrol sample:	strod 8081/8082) nswered "N". Not app s (LCS) and laborator	METAUD: GO PESIGIOES/PODS (EPA SVV 846 Method 8081/8082) Ptease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A" V_N N/A	dentified as "N/A". cate (LCSD) analvzec	Desticides/PCDS (EPA SW 646 INERTION 8081/8082) lifications 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?	2nd Reviewer:
below for all aboratory col e LCS percer	nt recoveries	(/or/) arra relative per	rcent differences (RPC) within the QC limits	\$2	
LCS analyzed	every 20 sal	mples for each matrix	/ Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?	extraction was perfe	ormed?	
rcs/rcsp ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
8638 USA	R	22 (52-120)	27 (50-130)	()	1-3 RA638MB	J-/W/ P/11)
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VALIDATION FINDINGS WORKSHEET

LDC #: 21 495 839 Z SDG #:

VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

200 Page: / of / 2nd Reviewer: 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

Recalculated %RSD 7, 46 5015 んり とう 、 4.99 6.08 2,58 3.35 G Reported. %RSD <u>ح</u> م 3.35 5.64 2.40 5,61 5.2 4 9 6,69 5 Recalculated 5 CF (Intial) 2. 107 0,994 492 し、ららく x60.7 6,987 5.651 2.110 Ø C 67 CF (initial) Reported 7.092 6.982 2.651 2.1.7 0.909 2.110 0.99 3 2695 2.038 c7 **Recalculated** CF (^た/の std) 5 7.29× 2.741 1.004 SLOC 2.793 7.081 110.1 CF (1৩/1എ std) 2,07 e7 61 Reported. 7.292 2.793 1.004. 07.40 2,075 7.081 110.1 £ 2 N 3 STX-CUPI) STK-CLP λ $\left| \right\rangle$ Compound Q σ I \mathbf{I} A 4 A 4 6/co/9 6/2/rg Calibration Date Standard ID Z 1-54 # 2 ო 4 Comments: Refer to Initial Calibration findings worksheet for list of gualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

LDC #: 21495 B39 SDG #: 54 (2000)

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page: _ of 2nd Reviewer: Reviewer:

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 = _____Initial Calibration Factor or _____Nominal Amount (ng) C = ____Calibration Factor from Continuing Calibration Standard or _____Calculated Amount (ng)

using the following calculation:

CFICONC 22.697 EC 9.834 70.756 70.756 71.456 71.456 71.456 71.456 71.456 71.456 71.456 71.456 71.456 72.576 70.796		Reported Receivitated	H Reported	Recalculated
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		CF/Cone CF/Cone CCV CCV	G %	Q%
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	(dry-self)	22,697 EC 22,082	ec 4.7	4.7
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	P 9.926		6'a	6.9
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	~	72, 256 70, TST	۰. ۲	6.0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	P & I 26.941		t 2.4	か・と
P I 9.7926 9.759 80 H 2 70.916 71.455 P X 26.549 X.538 H Syx-cup 21.666 23.175 P I 9.944 10.796 H X G.3878 77.900	-		دو ا	5, 3
H 7 70.916 71.455 P X 7 26.949 71.455 H Syx-cup1 21.666.66 23.175.66 P 1 9.994 10.796 H X C9.818 77.980	P [] 9.926	9.799 20 9.799	1.3	1.3
P X Z6.999 L Z6.538 L H Spx-cup) Z1.6666 Z3.17566 P 1 9.994 10.796 H X C9.818 77.900	~	71.455 1 71.455	¢ لا	٥, ٩
H STX-CLP1 21.666 66 23.175 e6 P 1 9.994 10.796 H 2 69.818 77.900	P X 7 26.999	825.22 H 24.528	V 1.6	9 1
P 1 1 9.994 10.796 1 H 2 69.818 77.900			e.7 2 s	7.v
69.818	P 1 9.994		28	@ }
		205.77 (77.90)	9.11	11.6
P 548.12 / 29.72 / P d	22.3c X A 4	28.85 X 28.82	× 8.8	8.8

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

LDC #: 21 495 B39 SDG #: SDG

VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page: _____of__ Reviewer: <u>J/L</u> 2nd reviewer: 0

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

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

% Recovery: SF/SS * 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID:	Ħ	2
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Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene	STX-GLP/	(9)	47.89	F 8	48	0
Tetrachloro-m-xylene	1					
Decachlorobiphenyl		ł	46.47	66	66	ł
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:

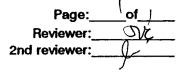
Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

	TICIDES/PCDS ((EPA SW 84)	METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)	1/8082)						
The percent recoveries (%R) and Relative Percent difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:	ries (%R) and ed below usin	Relative Per g the followin	cent differenc ig calculation:	e (RPD) of the	laboratory control	sample and labo	rratory control san	nple duplicate w	vere recalcui	ated for
% Recovery = 100* (SSC-SC)/SA	-scysa		Where: SS SA	SSC = Spiked sample concentration SA = Spike added	le concentration	O S	SC = Concentration			
KPD = LCS - LCSD * 2/(LCS + LCSD)	2/(LCS + LCSD)			LCS = Laboratory co	Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery	overy LCSD = Labo	xatory control sample	duplicate percent re	covery	
LCS/LCSD samples:	s: <u>88 6 7 8</u>	28 UCS/D	, A							
	Sp.	Spike	Spiked	Spiked Sample	rcs	Ş	FC	LCSD		LCS/LCSD
Compound	PA V	Added Mg /L)	Concentra (^{UK} //	ntration	Percent Recovery	(ecovery	Percent	Percent Recovery	Ŗ	RPD
	rcs	LCSD	LCS	rcsp	Reported	Recaic.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	6,200	(105 '0	VC1.0	0. (87	хG	95	93	93	9	ઝ
4,4'-DDT		4	0,181	0.19)	41	٩١	96	96	ч	Ч
Aroclor 1260										

LDC #: 21 495 \$34 SDG #:_ Su Com

VALIDATION FINDINGS WORKSHEET Sample Calculation Verification



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

YN N/A YN 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: STX-CLPI Sample I.D. $\frac{\#}{\#}$ $\frac{B}{B}$: Conc. = $(\frac{417.5e6}{(1.192e7)})(10ml)(100)$ = 33.3 ug Λ

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

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	Tetrachloro-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)	A

All compounds reported below the PQL were qualified as follows:

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

Raw data were not reviewed for this SDG.

XIII. 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 RSA13-0.5B RSAJ5-0.5B RSAK5-0.5B RSAJ2-0.5B	Hexachlorobenzene	x	A
RSA12-0.5BDL RSAI3-0.5BDL RSAJ5-0.5BDL RSAK5-0.5BDL RSAJ2-0.5BDL	All TCL compounds except Hexachlorobenzene	Х	A
RSAL3-0.5B	4,4'-DDE	x	A
RSAL3-0.5BDL	All TCL compounds except 4,4'-DDE	x	A

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)	A	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 RSAJ2-0.5B RSAJ2-0.5B RSAJ2-0.5BDL RSAJ3-0.5B	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	x	A	Overall assessment of data (o)
R0903051	RSA12-0.5BDL RSAI3-0.5BDL RSAJ5-0.5BDL RSAK5-0.5BDL RSAK5-0.5BDL RSAJ2-0.5BDL	All TCL compounds except Hexachlorobenzene	x	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	x	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

VALIDATION COMPLETENESS WORKSHEET

LDC #:__21495C3a SDG #: R0903051

Laboratory: Columbia Analytical 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.

Stage 2B

	Validation Area		Comments
1.	Technical holding times	A	Sampling dates: 6/01 - 04 /09
11.	GC/ECD Instrument Performance Check	Á	, , , , , , , , , , , , , , , , , , , ,
111.	Initial calibration	A	•
IV.	Continuing calibration/ICV	SWA	$C\alpha/1\alpha = 20$?
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 = FB 072109-50 from 2090401

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:

valida	ted Samples: کم'		+	Hater					
1 -	RSA12-0.5B	٢	11	RSAM3-0.5B	S	21-7	15 8356 MB	31	
2 7	RSA12-0.5BDL		12 7	RSAM2-0.5B		22 7	88785 MB	32	
37	RSAI3-0.5B		13 3	RSAJ2-0.5B		233	88986 MB	33	
4 1	RSAI3-0.5BDL		14 >	RSAJ2-0.5BDL		24		34	
5 Y	RSAJ5-0.5B		15	RSAJ3-0.5B	L	25		35	
6 *	RSAJ5-0.5BDL		18 +	FB080409-	≁	26		36	
7 Y	RSAK5-0.5B		17 2	RSAI3-0.5BMS	ς	27		37	
8 7	RSAK5-0.5BDL		18 7	RSAI3-0.5BMSD		28		38	
9 Y	RSAL3-0.5B		19 🕉	RSAJ2-0.5BMS		29		39	
ر 10	RSAL3-0.5BDL		20 3	RSAJ2-0.5BMSD	V	30		40	

16 reported on RO 90 3006)

VALIDATION FINDINGS WORKSHEET

×

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

A. alpha-BHC	l. Dieldrin	Q. Endrin ketone	Y. Arocior-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	-
D. gamma-BHC	L. Endosulfan II	T. gamma-Chiordane	BB. Aroclor-1260	.tt
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	
G. Heptachlor epoxide	0.4,4,4 ⁻¹ ,0	W. Arocior-1221	EE. Hexachlorobenzene	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	Ë	NN.

Notes:

Sun Sam	VALIDATION FINDINGS WORKSHEET Surrogate Spikes 2nd Reviewer		Phase see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". V 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?	ple ID Column Compound %R (Limits) Oualifications	Not spec B 21065 (40-140) NO 57420	A 677 ()		16× 2 B 1143 ()	- $($ $) o $ $($ $) () (()) ($, , , , , , , , , , , , , , , , , , ,	C	$\sqrt{(2)}$		(z_{nx})	rrogate Compound Recovery QC Limits (Soil) Recovery QC Limits (Water) Comments	
	VALID	METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)	ow for all questions answered "N". Not a gates spiked into all samples, standards ogate percent recoveries (%R) meet the		Not succ		(X010)	((× 0/)	(Xanol)							$V (x_{n\times}) V$	bound	

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

Z ۵ 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". <u>Y N N/A</u> Were surrogates spiked into all samples, standards and blanks? <u>Y N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits? Y N MA

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	ð	Qualifications
	-	3 (NX) &	Not Spec	Ø	1060 (40-140)	No SHAR	
		×	-			0	
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		\$8 785 MB	Λ	¥	8	9-18/6	(51
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	-				(
Lett	Letter Designation	Surrogate Compound		ecovery OC Limite (Sol			
				Vecovery do Limits (2011)	U Recovery QC Limits (Water)	s (Water)	Comments
	A	Tetrachloro-m-xylene					

Decachlorobiphenyl

ф ∢

LDC #: 21 4 95 C 3a SDG #: Ed Cmy

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1 Reviewer: 14 2nd Reviewer

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

N N/A		W N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed	IS) and mat ted every 20) sample	es for eac					:				
¥.		Were the MS/MSD per	cent recove	ries (%F	A) and the	e relative	percent diff	rerences		in the QC lin	nits?			
Ц	Date	DI DSW/SW	Compound		MS %R (Limits)		MSD %R (Limits)	its)	RPD	RPD (Limits)	Associated Samples	Qua	Qualifications	
		12 /18	All Tol		% R(1	outsi	40. W.	Vinits)		1 ()	3,4	No que	<u>n (1</u>	cerbi
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VALIDATION FINDINGS WORKSHEET Laboratory Control Samples

Page: Lof Reviewer: 2nd Reviewer:

> Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

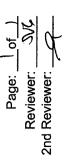
Were a laboratory control samples (LCS) and laboratory control sample duplicate (LCSD) analyzed for each matrix in this SDG? Were the LCS percent recoveries (%R) and relative percent differences (RPD) within the QC limits? <u>V N N/A</u> W <u>V N N/A</u> W Level I<u>V/D</u> Only

N (Ki, A) Wass a LCS analyzed every 20 samples for each matrix covintention and the samples of the samples for each matrix of the samples for each matrix and the samples of the			. 5				- 5	<u>?</u>			5																	
Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed. Variation Matchina, Lesuces ID Matchina, Se 785 Matchina, Se 775 Matchina, Se 775 <td></td> <td>ations</td> <td>1 -2</td> <td></td> <td></td> <td></td> <td>EV577)</td> <td></td> <td>10527</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>		ations	1 -2				EV577)		10527										-									
Was a LOS analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Lcs.tcsDip compound w.t.(Limits) R PD (Limits) Associate 8.8 755 LL1 /D EE 1/4 (20-150) (11) (11) (40) 8.8 755 LL1 /D EE 1/4 (20-150) (11) (11) (40) (11) (40) (11) (40) (11) (40) (11) (40) (11) (40) (11) (11) (40) (11) (40) (11) (40) (11) (40) (11)		Qualific	1 7																									
	rmed?	Associated Samples					2																					
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	or whenever a sample	LCSD %R (Limits)	()	()	()	(()	•	()	(()	()	(~ ~		()	()	(()	()				· · ·	· · ·	()	()
	nples for each matrix	LCS %R (Limits)		() .	()	()		()	-05)	()	()	(()	()	()	()	()	(()	()	()	()	()	()	()	()	()	()
	every 20 san	Compound	EFF E				Ŧ	N	R	8	φ	-50	v	٩														
N N/A	Was a LCS analyzed	rcs/rcsp id	9/571 28288				4 5m 98/88																					
	N N/A)	# Date																										

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LDC #: 21445 (34 SDG # Ly Car

Compound Quantitation and Reported CRQLs VALIDATION FINDINGS WORKSHEET



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

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? X N N/A X N N/A

·				 		 	 	 	
Qualifications	JACTS/A (E)		*						
Associated Samples	13573	6							
Finding	> cal rance		*						
Compound Name	¥	F	>						
#	1								

Comments: <u>See sample calculation verification worksheet for recalculations</u>

LDC #: 2/445 (34 SDG #: 54 (20-4)

VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

of) Page: 2nd Reviewer: 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.

<u>(X N N/A</u> Was the overall quality and usability of the data acceptable?

*	Date	Sample ID	Finding	Associated Samples	Qualifications	
		3 57.13	EE > cal range		X	(o)
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		346814	All tx cent EE di)			*
			/			
		d	J > cal range			
			ð			
		lo	All excent J di)			
						A
Comr	Comments:					

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Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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.

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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-130B M-29B	J+ (all detects)	A

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	H-28AB AW-BW-02B M-142B M-130B M-29B 89250MB 89410MB 89788MB	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.

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)	A

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. 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
М-29В	All TCL compounds	x	A

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)	A	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)	A	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)	A	Project Quantitation Limit (sp)
R0903243	M-29B	All TCL compounds	x	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 Stage 2B

LDC #: 21495D3a SDG #: R0903243

Laboratory: Columbia Analytical Services

Page: \ of Reviewer: 31 2nd Reviewer:

Date: 9/17/09

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	Å	
111.	Initial calibration	A	
IV.	Continuing calibration/ICV	5W	CCN/100 = 203
V,	Blanks	A	
VI.	Surrogate spikes	S₩	
VII.	Matrix spike/Matrix spike duplicates	Ň	Chient Sper
VIII.	Laboratory control samples	A	Client spec LCS /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
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1 1	H-28AB	11	89250 MB	21	31	
2 7	AW-BW-02B	ר ₁₂ ר	89410 MB	22	32	
3 7	M-142B	133	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	

D34	Ł.
21495	La Co
LDC#:	SDG #:

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**



 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".

 Vhat type or calibration verification calculation was performed?
 %D or ______RPD

 What type or calibration verification calculation was performed?
 %D or ______RPD

 Were Evaluation mix standards run before initial calibration and before samples?
 %D or ______RPD

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

Was at least one standard run daily to verify the working curve? Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of <u><15.0</u>%? evel IVID Only N/N/A N/N/N

Compound
(+) 25.2
(+)
-5
M. 4,4'-DDD N. Endosulfan sulfate O. 4,4'-DDT P. Methoxchlor

CONCAL.3S.wpd

LDC #: 214 95 D34 SDG #: Sie Con->

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

ž lof Q Page: Reviewer: 2nd Reviewer:

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

Prease see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". <u>V N N/A</u> <u>V N N/A</u> Were surrogates spiked into all samples, standards and blanks? <u>V N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

Qualifications	(NJ (2) (2)																	Comments
	1.1																	s (Water)
mits)	(40-140)		()	()	()	()	()	(()	()	()	()	()	()	()	()		Recovery QC Limits (Water)
%R (Limits)	28																	
Surrogate Compound																		Recovery QC Limits (Soll)
Column	Not Spec	1																
Sample ID																		Surrogate Compound
Date												 				-		Letter Designation
#																		Let

Tetrachloro-m-xylene Decachlorobiphenyl

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VALIDATION FINDINGS WORKSHEET Overall Assessment of Data



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.

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

		 	 	 	 	 _	 		1
Qualifications	X/A								
Associated Samples									
Finding	sur vitride l'inits								
Sample ID	Ş								
Date									
#									

Comments:

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)	A

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)	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.

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)	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 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)	A	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

LDC #: 21495E3a SDG #: R0903404

Stage 2B

Date:	4/17/09
Page:_	<u></u>
Reviewer:	JVG
2nd Reviewer:	L
	1

Laboratory: Columbia Analytical Services

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
Ι.	Technical holding times	A	Sampling dates: 6/17-24/89
11.	GC/ECD Instrument Performance Check	Á	,
111.	Initial calibration	NEWA	
IV.	Continuing calibration/ICV	SW	CON/10N = 202
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS 1/2
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 R0902006

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:

validai	WWer			
1)	M-78B	111 89788 MB	21	31
2 1	M-128B	12 × 89964 MB	22	32
3 1	H-38B	13 7 90220 MB	23	33
4 7 4	M-19B	14	24	34
₅ γ	M-34B	15	25	35
6 7	M-125B	16	26	36
7)	M-22AB	17	27	37
8 7	M-17AB	18	28	38
9	M-125BMS	19	29	39
10	M-125BMSD	20	30	40

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VALIDATION FINDINGS WORKSHEET **Continuing Calibration**

Lof 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? _____%D or _____RPD

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

N N/A

ANN A

N N/A

N/N/N

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

2

Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of 2450%? Was at least one standard run daily to verify the working curve?

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ations	/A (c)				<u></u>	-																		GG. HH. betizene
Qualific	J+dets.				->																			CC. DB 608 GG. HH. DD. DB 1701 HH. EE. <u>H X X A Gl</u> Ion DC A Z Ene
clated Samples	89788 MP																							Y. Aroclor-1242 Z. Aroclor-1248 AA. Aroclor-1254 BB. Aroclor-1260
Asso('n																							ne 016 232
s)	((((((<u>^</u>	(((((() ((() () ((U. Toxaphene V. Aroclor-1016 W. Aroclor-1221 X. Aroclor-1232
RT (Limit)))))	_)))))	~))	Q. Endrin ketone R. Endrin aldehyde S. alpha-Chlordane T. gamma-Chlordane
202																								. End R. End Hph Эал
%D (Limit ≤ 15.0) ≦	25.2	21. 8			کا، لا																			M. 4,4'-DDD N. Endosulfan sulfate O. 4,4'-DDT P. Methoxychlor
p	£	E			F																			M. 4,4'- N. Endo O. 4,4'- P. Meth
Compou	ىد	R			ΕE																			l. Dieldrin J. 4,4'-DDE K. Endrin L. Endosulfan II
Column	STY-CUP				1017-X45																			
Standard ID	FA 581	CNOIJ			FA 672	(00)																		E. Heptachlor F. Aldrin G. Heptachlor epoxide H. Endosulfan I
<u>\</u>	12											_												A. alpha-BHC B. beta-BHC C. delta-BHC D. gamma-BHC
	Date Standard ID Column Compound (Limit ≤ 15:8) らん 2 RT (Limits) Associated Samples	Date Standard ID Column Compound (Limit $\le 13-0\%$ LPC \ge RT (Limits) Associated Samples Qualifications $\sqrt{k}/6a$ $\mp A 5 \& I$ $SY788 MP$ $\Im + \delta 4 K_5 / A$ $($	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	DateStandard IDColumnCompound(Limit ≤ 13.60) ≤ 20 RT (Limits)Associated SamplesQualifications $6/8/6q$ $FA \leq S_1$ $STr-CuP$ E (1) $2 \leq .2$ $(-)$ $1 - 3$, 89788 MD $3 + dx_{T-A}^{-1}$ $6/8/6q$ $FA \leq S_1$ $STr-CuP$ R $(+)$ 21 , 8 $(-)$ $1 - 3$, 89788 MD $3 + dx_{T-A}^{-1}$ (10) (10) R $(+)$ 21 , 8 $(-)$ $(-)$ $1 - 3$, 89788 MD $3 + dx_{T-A}^{-1}$ (10) (10) R $(+)$ 21 , 8 $(-)$ $(-)$ $(-)$ $(-)$ $(-)$ $(22)/6a$ $FA = 672$ $577-CuP$ $E = (-1)$ 31 , 5 $(-)$ $(-)$ $(-)$ $(-)$	DateStandard IDColumnCompound(Limit ≤ 35.4) ≤ 20 RT (Limits)Associated SamplesQualifications $6/8/6q$ $FA \le S$ St (1) $2 \le .2$ (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) $6/8/6q$ $FA \le S$ R (1) $2 \le .2$ (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (10) R (1) 21 8 (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (10) R (1) 21 8 (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (10) R (1) 21 8 (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (10) R (1) 21 8 (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (10) (1) $1 = 3$ 89788 MD $3 + dxR_A$ (1) (1) (1) (1) (10) (1) (1) (1) (1) (1) (1) (1) (1) (1) (10) (1) (1) (1) (1) (1) (1) (1) (1) (1) (10) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (10) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) (10) (1) (1) <	DateStandard IDColumnColumnCompound(Limit ≤ 15.49 , $t \leq 0$ RT (Limits)Associated SamplesQualifications $b/k/bq$ $FA 5 \& I$ $STr. LuprerE(1)2 S. \gamma(1)1-3, 8q 7 88Mp5 + d_{1} t_{2} A(1)b/k/bq(10V)R(+)2I.8(-)1-3, 8q 7 88Mp5 + d_{1} t_{2} A(-)b/k/bqFA 672STr. LuprerR(+)2I.8(-)(-)1-3, 8q 7 88Mp5 + d_{1} t_{2} Ab/25/bqFA 672STr. LuprerEF2I.8(-)(-)(-)(-)b/22/bqFA 672STr. LuprerEF2I.3I.(-)(-)(-)(-)(-)b/22/bqFA 672STr. LuprerEF(-)3I.(-)(-)(-)(-)b/22/bqFA 672STr. LuprerEF(-)(-)(-)(-)(-)(-)b/22/bqFA 672STr. LuprerEF(-)(-)(-)(-)(-)(-)b/22/bqFA 672STr. 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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:	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 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 RSAK4-0.5B RSAK4-0.5B RSAJ6-0.5BMSD SA35-0.5BMSD SA35-0.5BMSD SA35-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD SA182-0.5BMSD 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)	A

VIII. Laboratory Control Samples (LCS)

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

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag	A or P
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)	Ρ

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)	A

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	×××	A
RSAJ6-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	A

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)	RPD	5 122		A or P	
Compound	RSAK4-0.5B	RSAK4009-0.5B	(Limits)	Difference (Limits)	Flags		
Hexachlorobenzene	170	250	38 (≤50)	-	-	-	
beta-BHC	330	570	53 (≤50)	-	J (all detects)	A	

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 RSAK4009-0.5B	Heptachlor Endrin aldehyde	J+ (all detects) J+ (all detects)	A	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)	Р	Laboratory control samples (%R)(RPD) (I,id)
R0903184	RSAJ6-0.5B	Hexachlorobenzene beta-BHC	J (all detects) J (all detects)	A	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 RSAK4-0.5B RSAK4009-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903184	RSAJ6-0.5B	Hexachlorobenzene beta-BHC	X X	A	Overall assessment of data (o)
R0903184	RSAJ6-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	A	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

Stage 2B

LDC #: 21495F3a

SDG #: R0903184

Laboratory: Columbia Analytical Services

Date: <u>9/17/or</u> Page: <u>1 of </u> Reviewer: <u>JVZ</u> 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: 6/05 - 11 /0 9
11.	GC/ECD Instrument Performance Check	A	'
	Initial calibration	Â	
IV.	Continuing calibration/ICV	SW	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

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

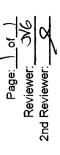
Validated Samples:

1	RSAJ6-0.5B	3 SA166-0.5B 21 89047 N	1B 31
2	RSAJ6-0.5BDL	3 RSAK4-0.5B D 22 7 89340 M	1 B 32
3	RSAK6-0.5B	3 RSAK4009-0.5B p 23 2 89401 1	M 15 33
4 (RSAK8-0.5B	RSAJ6-0.5BMS 24	34
5	RSAL7-0.5B	RSAJ6-0.5BMSD 25	35
₆ 1	RSAL8-0.5B	▶ SA35-0.5BMS 26	36
7 Y	SA35-0.5B	* SA35-0.5BMSD 27	37
8 7	SA176-0.5B	> SA182-0.5BMS 28	38
9 Y	RSA03-0.5B	3 SA182-0.5BMSD 29	39
10 >	SA182-0.5B	30	40

(#9- RSAO > 4 witer not #)

LDC #: 21495 F3C See Lourd SDG #:

VALIDATION FINDINGS WORKSHEET **Continuing Calibration**



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"

X-N N/X

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?

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

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5 Z. Aroclor-1248
21 AA. Aroclor-1254
88 Aroclor-1264
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V. Aroclor-1016
W. Aroclor-1221
X Aroclor-1232
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R. Endrin aldehyde
S. alpha-Chlordane
T. camma-Chlordane
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| 22,2 | 21,X | | | | | | | | | |

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N. Endosulfan sulfate
O. 4,4'-DDT
P. Mathowchlor
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F. Aldrin
G. Heptachlor epoxide
H. Endosulfan I
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 | | | | | | A. alpha-BHC
B. beta-BHC
C. detta-BHC
D. genma-BHC
 |
| | /13/65 FA521 STX-CP2 E (f) 25,2 () 2-57-19 JA12/A (| $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | $ \begin{array}{c c c c c c c c c c c c c c c c c c c $ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ | $I3/6_{7}$ $FA5S_{1}$ $S_{1}x.op_{7}$ E (1) $2s.2$ (1) $2-5-1q$ $TAtth/A$ (1) (10^{10}) R (1) 21.8 (1) $89340MB$, $S_{5}5401MB$ R (1) (10^{10}) R (1) 21.8 (1) (1) (1) (10^{10}) R (1) (1) (1) (1) (1) (10^{10}) (1) (1) (1) (1) (1) (1) (10^{10}) (1) (1) (1) (1) (1) (1) (1) | $I3/h_{5}$ $FA 55$ E (h) $2s.2$ $($ $)$ $2-5,7-19$ $\int -4rE/A$ $($ (10^{10}) R (r) $2r,K$ $($ $)$ $87340MF$, $55401MF$, $55401MF$ C (10^{10}) R (r) $2r,K$ $($ $)$ $37340MF$, $55401MF$ C (10^{10}) (r) (r) (r) $($ $)$ $($ <th< th=""><th>(13/bf) $FA 5 61$ L_{TX-OPZ} E (h) $2.5.2$ $($ $)$ $2.5 7 - 1q$ $T + ht 5/A$ $($ (10¹) R (1) 21.8 $($ $)$ $85240MB$, $5540MB$, $5540MB$, $5540MB$ $($ $)$ $)$ $)$ $)$ $)$ $)$<th>$/3/5_6$ $FA55l$ $frx.cpz$ E (h) 25.2 (1) $2-5,7-19$ $7+dr5/A$ (1) (10^{10}) R (r) 21.3 (1) $85340MF$, $\$55901MF$, $\$59901MF$ (10^{10}) (10^{10}) (1) (1) (1) (1) (1) (1) (1) (10^{10}) (1) (1) (1) (1) (1) (1) (1) (1) (10^{10}) (1) (1)</th><th>$\Lambda [3/\delta_1]$ $\Gamma A < C + Z$ E (h) $2.5.7$ $($ $($ $2.5,7-19$ $T + dt S / A$ (10^{10}) Γ R (1) $2.1.8$ $($ $($</th><th>$I3565$ FA521 L_{TX-CPZ} E (h) 25.2 $($ $)$ $2-5, 7-19$ $J+atts/A$ $($ $(10v)$ R r 21.5 $($ $)$ $85340MF$, $85401Mb$ V $(10v)$ R r 21.5 $($ $)$ $87340MF$, $85401Mb$ V $(10v)$ R r $($ $)$ $($ $)$ $($ $)$ $(10v)$ R $($ $)$ $($ $)$ $($ $)$ $($ $)$ $(10v)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $(10v)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $(10v)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $($ $)$ $(10v)$ $($ $)$ $($ $($ $)$<th>Λ_{15}/s_1 $\overline{F4551}$ $51x \cdot cp_7$ \overline{E} (h) $2s_5, 7$ (i) $2-5, 7-1q$ $\overline{J+att5/A}$ (i) (10v) (i) 21.8 (i) $(i$</th><th>$13/4_5$ I_7x-cp_7 E (\uparrow) $2.5.2$ $($ $)$ $2.5.7 - 19$ $\Im_7 + 4t_5/\Lambda$ $($ $([w)$ R (\uparrow) $21.K$ $($ $)$ $57240ME$, $55401ME$, $55401ME$ $7 + 4t_5/\Lambda$ $($ $(1w)$ R $($ $)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $($ $($ $)$ $($ $)$ $($ $($ $)$ $($ $($ $)$ $($ $)$ $($ $)$ $($ $($ $)$ $($ $($ $)$ $($ $)$ $($ $)$ $($ $($ $)$ $($ $($ $)$ $)$ $($ $)$ $)$ $)$ $)$ $)$<th>$I_{25/5}$ $I_{77-cqr7}$ E (1) $2.5.7$ (1) $3.5.7$ (1) (1)<</th><th>Marking FApped Grave E (h) $2x, 2$ ($2-5, 7-19$ $3+4ith/A$ (104) (104) R (1) $21, Z$ () $35340ME$, $53601ME$, $53601ME$ $374ith/A$ ((104) (104) (104) (104) (104) (104) (104) (104) (104) (104</th><th>(2464 $FA \ FA$ E (1) 21.5 (1) <</th><th>(12/64) $FA 551$ $57 \times cp_7$ E 71 25.7 (12) $7-5.7-19$ $7-675.$ $7-675.$ (100) R (1) 21.8 (1) 5734046, \$594046 5594046, \$594046 67546446, \$594046 67546446, \$594046 $7-677.$ R (1) (1)</th><th>(13.4_5 $FA \not E d$ $\Gamma Y \cdot C \rho Z$ E (\uparrow) $2x \cdot Z$ (t $2x - Iq$ $T + dr K / h$ (10°) $f = 1^{\circ}$ $2t \cdot Z$ (t) $S - 2 - 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Iq$ $T + dr K / h$ (10°) $f = 1^{\circ}$ $2t \cdot Z$ (t) $S - 2 - Iq$ $T + dr K / h$ (10°) $F = 1^{\circ}$ $T = 1^{\circ}$ $T = 1^{\circ}$ $T = 1^{\circ}$ $T = 1^{\circ}$ (10°) $T = 1^{\circ}$ (10°) $T = 1^{\circ}$ (10°) $T = 1^{\circ}$ (10°) $T = 1^{\circ}$ (10° $T = 1^{\circ}$ (10° $T = 1^{\circ}$ (10° $T = 1^{\circ}$ | ($3A_{5}$) $FA_{5}C$ $Srrcer$ E A $as.2$ (1) $as.5 - iq$ $\Im rdit/A$ (10°) F_{10} 2_{1} (1) 2_{1} (1) $3rdit/A$ (1) 10° $10^$ |

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET Blanks

Page. 1 of 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". Were all samples associated with a method blank? Y N N/A

If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies? Was a method blank performed for each matrix and whenever a sample extraction was performed? X N N/A Y/N N/A

Was there contamination in the method blanks? If yes, please see the qualifications below. te: $\frac{6/69}{6}$ (69) (69) Blank analysis date: $\frac{1}{6}$ $\frac{1}{12}$ /6 $\frac{1}{6}$ Biank extraction date: 6/04/05Biank analysis date: 6 Conc. units: 1/2 1/2 X N N/A

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	c						
	sample identification						
	Nan						
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Blank analysis date: Blank extraction date:

Associated samples:

	Sample Identification				
	Sa				
	Blank ID				
Conc. units:	Compound				

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",

FBR	Z
S D	5
5/2	<i>S</i>
LDC #	SDG #

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

5 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". <u>A N/A</u> Were surrogates spiked into all samples, standards and blanks? <u>Y N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

Qualifications	quel																		Comments		
	No										 _								ts (Water)		
(s	40-1401												('	(Recovery QC Limits (Water)		
%R (Limits)	9667 (6 8 G (0	~	463 (231 ()	4920 (y V	- ~ 	-77 ()	400 (0	~)	~)	Rec		
Surrog ate Compound	<u> </u>	A	A B		B	ß		Ъ Д	4		\$		2	A					Recovery QC Limits (Soll)		
Column	Not Spec																		Re		
	1(0X) N		2 (Immy) 1		4 (20X)	9 (Lex)		I (row) 1			(x) x)		13 (50x)						Surrogate Compound	Tetrachloro-m-xylene	Decachiorobiphenyl
Date							7										-		Letter Designation	A	в
#																			Lette		

LDC #: 21495 F3a SDG #: Jee Conel

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

36 Page: 1 of 1 q 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". <u>X N N/A</u> Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? AN NA

NN	<u>Y N N/A</u> Y (N) N/A	Was a MS/MSD analyzed every 20 samples for each Were the MS/MSD percent recoveries (%R) and the r	yzed every 2(ercent recove		atrix or whenever a sa ative percent differenc	matrix or whenever a sample extraction was performed? elative percent differences (RPD) within the QC limits?	rformed? : limits?		1
#	Date	QI QSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications	
		14 /JS	All C	compounds have	64	Hints ()	1,2	No may rush	
				()	()	()			<u>\</u>
I				()	()	()			
		16/17	Severa	I compounds	hove (3 R and	(Sada N	7		
			1 anter	de librits)				<u> </u>
				()	())			<u> </u>
				()	()	()			1
		18/19	A11 co	compounds except	R have 2R	outside timit	lq	<u>/</u>	<u>r</u>
			dr	x 2 com	b have RPD's	entrided himits			1 1
					()				
			2	0 (18-135)	0 (18-155)	()	->	[J-/R/A (m)	
				(()	()			
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VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs



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 MA Y N NIA

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?

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Qualifications	Y.					-				
ğ	JACONA									
	5		 		 					
Samples										
Associated Samples										
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	rnee	0	 	 	 		 	 	 	
	cal ranks					-				
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Finding										
	B	'								
	ÊÐ									
(<i>D</i> d-Name										
Cample (D Compound Name										
r Sa										
#								 	 	

Comments: See sample calculation verification worksheet for recalculations

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VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: <u>lof 1</u> Reviewer: <u>NY</u> 2nd Reviewer: <u></u>

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?

Qualifications	X/A (0)	\	~	•						
Associated Samples	ð	0	di]							
Finding	FE, B > cal range		All except FE B							
Sample ID			2							
# Date										

Comments:

LDC #: 21495 F 34 SDG #: <u>Su</u> Corry

VALIDATION FINDINGS WORKSHEET Field Duplicates

Page:_	of
Reviewer:	SVC
2nd reviewer:	r
-	

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



Were field duplicate pairs identified in this SDG? Were target compounds detected in thie field duplicate pairs?

	Concentrati	ion (15/leg)		Parent only
Compound	12	13	550 RPD	only
Eŧ	[70	250	38	-
В	330	\$70	53	JAets A (fd

	Concentration ()	
Compound		RPD

	Concentration ()	
Compound		RPD

	Concentration ()	
Compound		RPD
	<u> </u>	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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)	A

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	Compound	Flag	A or P	Reason (Code)
R0903443	SA129-0.5B RSAN5-0.5B RSAO6-0.5B	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 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 #: <u>21495G3a</u> SDG #: R0903443

Stage 2B

Date:	a/16/09
Page _:_Reviewer	lof JVG
2nd Reviewer:	Ţ

Laboratory: Columbia Analytical Services

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
١.	Technical holding times	A	Sampling dates: 6/19 - 24/09
11.	GC/ECD Instrument Performance Check	4	1
- 111.	Initial calibration	^	
IV.	Continuing calibration/ICV	A	COV/AV = 202
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS /D
IX.	Regional quality assurance and quality control	N	
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	Á	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

r					
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	<u> </u>	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 alpha-BHC	l. Dieldrin	Q. Endrin ketone	Y. Arocior-1242	G G.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroslor-1248	HK.
C. detta-BHC	K. Endrin	8. alpha-Chlordane	A. Aroior1264	H.
D. gamma-BHC	L. Endosulfan #	T. gamma-Chlordane	BB. Arocior-1280	JJ.
E. Heptachior	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Adrin	N. Endosulfan suffate	V. Arocior-1018	DD. DB 1701	E
G. Heptachlor epoxide	0.4,4°-DDT	W. Aroslor-1221	EE. Hyxichterneurzene	MM.
H. Endoeulfan I	P. Methoxychior	X. Arocior-1232	Ť	NN.

Notes:

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LDC #:	SDG #:

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

o 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". <u>V</u> N N/A Were surrogates spiked into all samples, standards and blanks? <u>V(N)N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

Comments	s (Water)	Recovery QC Limits (Water)	(I)	Recovery QC Limits (Soil)		Surrogate Compound	Letter Designation	
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Su L'	11 50	(40-140)	Q	A B	Not spur	1 (1000×)		
Qualifications		%R (Limits)	%R	Surrogate Compound	Column	Sample ID	Date	#

Tetrachloro-m-xylene Decachlorobiphenyl

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LDC #: 21495 634 SDG #: 54 Cra

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

oť Page: Reviewer: 2nd Reviewer:

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

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>XN N/A</u> Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? N N/A

F	Y N N/A	Were the MS/MSD percent recoveries (%R) and the	ercent recove		relative percent differences (RPD) within the QC limits?	es (RPD) within the Q	C limits?	
*	Date	DI DSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		1 4 /5	L	()	44 (65-127)	55 (30)	×.	No quee (NSin)
		~	N	()		() ~ 2		
			R	()		46 ()		
			Ø	()	47 (57-123)	() /S		
			٩	(33 (38-149)	() ()		<i>A</i>
			В	(1)1-5E , 291	(2) (35-142)	32 (1)	1	1 (105/Dim)
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VALIDATION FINDINGS WORKSHEET

Laboratory Control Samples

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

> Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)

V N N/A

Level WHD Only

1		- 5		1	·	-	1/					7					1										
	Qualifications	No may CLUS	4																								
rmed?	Associated Samples	411 + BIK																									
Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?	RPD (Limits)	(26) 19	()	()	(()	()	()			()	()	()	· ·	(()	()	()	()) (()	((()	((
or whenever a sampl	LCSD %R (Límits)	((()	()		()		()	(()	()	()	()	()	()	()	•	()	()		()	()	()	()	()) (
nples for each matrix	LCS %R (LImits)	154 (50-130)	() .	()	()		()	(()	(()	()	(()	()	()	()	()	()	()	()	()	()	()	()	()
every 20 sar	Compound	0																									
Was a LCS analyzed	LCS/LCSD ID	90255 US 10																									
Y N(N/A)	# Date																										

V:\Validation Worksheets\Pesticides\LCS.3S

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facility,	2009	Phase	В	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)	A

All compounds reported below the PQL were qualified as follows:

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

Raw data were not reviewed for this SDG.

XIII. 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	A
SA106-0.5BDL	All TCL compounds except Hexachlorobenzene	x	A

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)	A	Project Quantitation Limit (e)
R0903615	RSAO5-0.5B SA106-0.5B SA106-0.5BDL	All compounds reported below the PQL.	J (all detects)	A	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	x	A	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 Stage 2B

LDC #: 21495H3a SDG #: R0903615

Laboratory: Columbia Analytical Services

Date: 9/18/09 Page: | of Reviewer: JVG 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	. <u>i //</u>	Comments
<u> </u>	Technical holding times	A	Sampling dates: 6 / 29 - 29/09
11.	GC/ECD Instrument Performance Check	Å	, , ,
- 111.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	Car/101 6202
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	client spec LCS/D
VIII.	Laboratory control samples	A	LCS /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	SN)	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Sol

ND = No compounds detected R = Rinsate FB = Field blank

D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

-						
1	RSAO5-0.5B	11	90 767 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. Arocior-1242	66.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	H
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Arocior-1254	ï
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. Arocior-1016	DD. DB 1701	IT.
G. Heptachlor epoxide	0.4,4'-DDT	W. Arocior-1221	EE. H & Xach Loro benzere MM.	.ww
H. Endosulfan I	P. Methoxychior	X. Aroclor-1232	FF.	NN.

COMPLST-3S.wpd

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Notes:

LDC #: 21495 H34 S SDG #:

VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

36 Page: _____of ___ 2nd Reviewer: Reviewer:

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

Place see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". <u>VON/A</u> Were surrogates spiked into all samples, standards and blanks? <u>Y (N N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

	_			_			-		-				_	 -							
Qualifications		1 quest																	Commante	ettipiiii>>	
	1		× ((((() ((() (mits (Water)	· · · · · · · · · · · · · · · · · · ·	
%R (Limits)	(fn-140	»)))))))	-		, ,)))	,	_	Recovery QC Limits (Water)		
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Surrogate Compound		7																	Recovery QC Limits (Soil)		
Column		1,1																			
Sample ID	(10×)	) (rous) E																	Surrogate Compound	Tetrachloro-m-xylene	Decachlorobiphenvi
Date	-																·		Letter Designation	A	ഒ
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SUR.3S

LDC #: 21495 H34 Set Com SDG #:

## **Compound Quantitation and Reported CRQLs** VALIDATION FINDINGS WORKSHEET



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

		-	 	r			 	 ,	 
Qualifications	JAUS/A (E)								
Associated Samples	2								
Finding	> cal rare	0							
Compound Name	EE								
#									

Comments: See sample calculation verification worksheet for recalculations

## VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

Page: 1 of 1 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?

Qualifications	$\times / A$ (o)		t							
Associated Samples										
Finding	tt > cu rand	0	AU exurt EE dil	3						
Sample ID	R		2							
Date										
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Comments:

V:\Validation Worksheets\Pesticides\OVR.3S

### 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 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)	A

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)	A
EB070109-SO1RE	Not specified	Decachlorobiphenyl	36 (40-140)	All TCL compounds	J- (all detects) UJ (all non-detects)	A

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Although the MS 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)	A
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	A
RSAK3-0.5B	Hexachlorobenzene beta-BHC	x x	A
RSAK3-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	A
SA82-0.5B	Hexachlorobenzene	x	A
SA82-0.5BDL	All TCL compounds except Hexachlorobenzene	x	A

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)	A	Technical holding times (h)
R0903678	EB070109-SO1 EB070109-SO1RE	All TCL compounds	J- (all detects) UJ (all non-detects)	A	Surrogate spikes (%R) (s)
R0903678	RSAK3-0.5B	Hexachlorobenzene beta-BHC	J (all detects) J (all detects)	A	Project Quantitation Limit (e)
R0903678	SA82-0.5B	A82-0.5B Hexachlorobenzene		A	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 RSAL3-30B 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	78 RSAK3-0.5B Hexachlorobenzene beta-BHC		x x	А	Overall assessment of data (o)
R0903678	RSAK3-0.5BDL	All TCL compounds except Hexachlorobenzene beta-BHC	x	A	Overall assessment of data (o)
R0903678	SA82-0.5B	Hexachlorobenzene	x	A	Overall assessment of data (o)
R0903678	SA82-0.5BDL	All TCL compounds except Hexachlorobenzene	x	A	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

Stage 2B

LDC #: 21495I3a

### SDG #: R0903678

Laboratory: Columbia Analytical Services

Date: 6 /18/04 Page: 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
I.	Technical holding times	SW	Sampling dates: 7/01-02/09
II.	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	COV/IN = 20 3
V.	Blanks	A	
VI.	Surrogate spikes	SW	
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	SM	
XIII.	Overall assessment of data	SW	
XIV.	Field duplicates	Ŵ	
XV.	Field blanks	ND	EB = 1, 2 FB = FB072109-SO from ROP.

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:
vanuateu	oumpies.

valida	ted Samples: W ん	to	r	+ Seil					· · · · · · · · · · · · · · · · · · ·
1	EB070109-SO1	W	114	RSAK3-0.5BDL	٢	21 /	90 782 MB	31	
<u>,</u> 7	EB070109-SO1RE		12 年	RSAK3-10B		22	914 94 MB	32	
3 <b>3</b>	RSAN6-0.5B	Ś	13 <b>4</b>	RSAK3-20B		23 3	90767 MB	33	
4 3	SA82-0.5B		14 Y	RSAK3-31B		24 4	91091 MB	34	
53	SA82-0.5BDL		15 <b>3</b>	SA82-0.5BMS		25	91494 MB	35	
63	SA82-10B		16 )	SA82-0.5BMSD		26		36	
7 }	SA82-29B		17 <b>F</b>	RSAK3-31BMS		27		37	
₈ 3	RSAL3-10B		18 <b>Ý</b>	RSAK3-31BMSD		28		38	
9 <b>3</b>	RSAL3-30B		19			29		39	
10 <b>7</b>	RSAK3-0.5B	1	20			30		40	

VALIDATION FINDINGS WORKSHEET

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

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

COMPLST-3S.wpd

Notes:____

LDC #: 21495 I 34 SDG #: Sa Con

### VALIDATION FINDINGS WORKSHEET <u>Technical Holding Times</u>

Page:_	of /
Reviewer:	JV6
2nd Reviewer:	

All circled dates have exceeded the technical holding times.

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
2	W	N	7/01/09	Extraction date	7/23/09	the second s	5-/R/A
			• •				
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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.

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### VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

Page: 1 of 1 310 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? Y N/N/A Did all surrogate percent recoveries (%R) meet the QC limits?

*	Date	Sample ID	Column	Surrogate Compound	את (Limits)	Qualifications	
		_	Met spec		26 (40-140)	1-1-145 /A	
			-				Τ
		2			36 (		T
							T
		3 (Lon)			176 (	) No miso,	
							T
		4 (10x) 4		V	178 (		Τ
					•		T
		5 (50x)		A, B	) 0		
				-			T
		10 (10x)		Ð	シアチラ (		
				A	246 (		T
							Γ
		1 ( 5000X)	7	A, 8	0		T
							T
							1
							1
					)		T
							Τ
					,		Ī
Letti	Letter Designation	Surrogate Compound	Ā	Recovery QC Limits (Soil)	II) Recovery QC Limits (Water)		Γ
	۷	Tetrachloro-m-xylene					

SUR.3S

Decachiorobiphenyl

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LDC #: 21495 T 34 SDG #: Sug Coner

### VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Reviewer: JVL Page: / of / 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". <u>AN N/A</u> Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? <u>AN N/A</u> Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

۲ ۲	Y N'N/A	Were the MS/MSD percent recoveries (%R) and the r	rcent recover	ries (%R) and the rela	elative percent differences (RPD) within the QC limits?	s (RPD) within the QC	: limits?		
*	Date	QI QSW/SW	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications	
		15/16	All com	All compounds ( have ) &	R		4 S	No sual (LESDin)	<u>.</u>
			( Ere	'atteched the		( )			\
						( )			
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### COLUMBIA ANALYTICAL SERVICES, INC.

### QA/QC Report

Client:Northgate EnvironmentalProject:Tronox LLC Henderson/2027.001Sample 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:	SA82-0.5B
Lab Code:	R0903678-007

2-0.5B 03678-007 Units: µg/Kg Basis: Dry

Analytical Method: 8081A Prep Method: EPA 3541

	Sample		Aatrix Spike Q0905448-0				ate Matrix 20905448-0	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	
4,4'-DDT	ND	ND	6.85	0	¥	ND	6.85	0	* 9 - 149	0	30	
Aldrin	ND	ND	6.85	0	*	ND	6.85	0	* 15 - 135	0	30	
Dieldrin	ND	ND	6.85	0	*	ND	6.85	0	* 25 - 150	0	30	
Endosulfan I	ND	ND	6.85	0	*	ND	6,85	0	* 56 - 119	0	30	
Endosulfan II	ND	ND	6.85	0	*	ND	6.85	0	* 65 - 127	0	30	
Endosulfan Sulfate	ND	ND	6.85	0	*	ND	6.85	0	* 37 - 122	0	30	
Endrin	ND	ND	6.85	0	*	ND	6.85	0	* 28 - 143	0	30	
Endrin Aldehyde	ND	ND	6.85	0	*	ND	6.85	0	* 18 - 135	0	30	
Endrin Ketone	ND	ND	6.85	0	*	ND	6,85	0	* 57 - 123	0	30 30	
Heptachlor	ND	ND	6.85	0	*	ND	6.85	0	* 35 - 127	0	30 30	
Heptachlor Epoxide	ND	ND	6.85	0	*	ND	6.85	0	* 61 - 120	0	30	
Hexachlorobenzene	540	686	17.1	825	#	666	17.1	712	# 20 - 150	3	30 30	
Methoxychlor	ND	ND	34.3	0	*	ND	34.3	0	* 38 - 149	0	30	
alpha-BHC	ND	ND	6.85	0	*	ND	6.85	0	* 53 - 130	0	30 30	
alpha-Chlordane	ND	ND	6.85	0	*	ND	6.85	0	* 27 - 130	0	30 30	
beta-BHC	57	105	6.85	693	#	94.9	6.85	548	# 35 - 142	10	30	
delta-BHC	ND	ND	6.85	0	*	ND	6.85	0	* 44 - 119	0	30 30	
gamma-BHC (Lindane)	ND	ND	6.85	0	*	ND	6.85	0	* 37 - 124	0	30 30	
gamma-Chlordane	ND	ND	6.85	0	*	ND	6.85	0	* 38 - 127	0	30	

Comments:

SuperSet Reference: 0

09-0000110238 rev 00

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LDC #:	SDG #:

### VALIDATION FINDINGS WORKSHEET Laboratory Control Samples

Page: / of 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".

<u>Y N N/A</u> We <u>Y N N/A</u> We Level IV/D Only ≻j

	Qualifications	No mue (LCSD)	1																							
ned?	Associated Samples																									
Was a LCS analyzed every 20 samples for each matrix or whenever a sample extraction was performed?	RPD (Limits)		( )	)	· ·	(	(	( )	(	( )	( )	( )	(	( )		)	( )	( )	(	( )	( )	(	(	(	(	(
or whenever a sample	LCSD %R (Limits)	( )	( )	( )	· ·	( )	( )	( )	( )	( )	( )	( )	(	(	( )	( )	(	(	( )	( )	( )	(	(	(	( )	)
nples for each matrix	LCS %R (LImits)	( ) (4)	( )	( )	( )	( )		( )	( )	( )	( )	( )	( )	( )		) (	( )	( )	( )	( )	( )	( )	( )	( )	( )	
every 20 sar	Compound	4																								
Was a LCS analyzed	LCS/LCSD ID	91494 LCS /D																								
X N (N/A)	# Date					 																				

V:\Validation Worksheets\Pesticides\LCS.3S

LDC #: 71425 I3 6 SDG #: 54 6my

## VALIDATION FINDINGS WORKSHEET Compound Quantitation and Reported CRQLs

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". Level IV/D Only

Level IV/D Only Y N_N/A

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?

Finding Asso	
Finding 2	

Comments: <u>See sample calculation verification worksheet for recalculations</u>

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БС	SDG

### VALIDATION FINDINGS WORKSHEET Overall Assessment of Data

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.

 $\sqrt{X}$  N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications	
		2	run for	sur outlier in # 1	X/A	(o)
			-			\
	-	0	EF, D > and rate	201		
				0		
			All EXCURT EE B	di']	<b>\</b>	
			•			
		4	EE > cal rares			
		ك	All except EE dil			
Comr	Comments:					

V:\Validation Worksheets\Pesticides\OVR.3S

### 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

September 24, 2009

LDC Report Date:

Matrix:

Parameters:

Water

Stage 2B

Chlorinated Pesticides

Validation Level:

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-12AB M-110B I-ARB

1

### 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)	A

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

7

Tronox Northgate Henderson VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495J3a

### SDG #: R0903561

Laboratory: Columbia Analytical Services

Date: 7/23/69 Page: ______of ___ 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.

Stage 2B

	Validation Area		Comments
<u>I.</u>	Technical holding times	A	Sampling dates: 6/25 - 7/01/09
	GC/ECD Instrument Performance Check	A	,
111.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CON/101 = 20 3
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spec LCS /p
VIII.	Laboratory control samples	A	LCC /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	MD	$p \rightarrow 2, 3$
XV.	Field blanks	ŃD	EB = 6

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:

vallua	Water			
1-1	M-75B	11/ 90 395 MB	21	31
21	м-13АВ 👂	12 7 90700	22	32
3 1	м-13009АВ 💋	133 90782	23	33
4 1	M-64B	14	24	34
5 1	M-111AB	15	25	35
6	EB062909-GW1	16	26	36
<u>ד־7</u>	M-25B	17	27	37
8 7	M-12AB	18	28	38
9 <b>-3</b>	M-110B	19	29	39
10->	I-ARB	20	30	40

### Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:	Tronox LLC Facili	y, 2009	Phase	В	Investigation,
	Henderson, Nevad	ł			

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)	A

All compounds reported below the PQL were qualified as follows:

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

Raw data were not reviewed for this SDG.

### XIII. 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	A
RSAI3-10BDL RSAI2-10BDL RSAI2009-10BDL	All TCL compounds except Hexachlorobenzene	x	A

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)				
Compound	RSAI2-10B	RSAI2009-10B	RPD (Limits)	Difference (Limits)	Flags	A or P
4,4'-DDE	47	48	-	1 (≤36)	-	-

	Concentrat	tion (ug/Kg)		D!//	<u></u>	
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)	-	-	-

	Concentra	tion (ug/Kg)		<b></b>		
Compound	RSAI2-10BDL	RSAI2009-10BDL	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	6700	7000	-	300 (≤1900)	-	-

	Concentra	tion (ug/Kg)		D.4	<u>n</u>	
Compound	RSAJ2-33B	RSAJ2009-33B	RPD (Limits)	Difference (Limits)	Flags	A or P
Hexachlorobenzene	2.3	3.0U	-	0.7 (≤3.0)	-	-

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### 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)	A	Project Quantitation Limit (e)
R0903584	RSAI3-10B RSAI3-10BDL RSAI3-20B RSAI3-32B RSAI2-10B RSAI2-10BDL RSAI2009-10B RSAI2009-10BDL RSAI2-20B RSAI2-31B RSAJ2-10B RSAJ2-20B RSAJ2-20B RSAJ2-33B RSAJ2009-33B EB062609-SO	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903584	RSAI3-10B RSAI2-10B RSAI2009-10B	Hexachlorobenzene	x	A	Overall assessment of data (o)
R0903584	RSAI3-10BDL RSAI2-10BDL RSAI2009-10BDL	All TCL compounds except Hexachlorobenzene	x	A	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 Northgate Henderson** 

VALIDATION COMPLETENESS WORKSHEET Stage 2B

LDC #: 21495K3a SDG #: R0903584

Laboratory: Columbia Analytical Services

Date: 9 21/09 Page: 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
I.	Technical holding times	A	Sampling dates: 6/26/09
II.	GC/ECD Instrument Performance Check	A	
111.	Initial calibration	A	•
IV.	Continuing calibration/ICV	A	COV/100 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	SW	
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 072109-S0 from R0904
XV.	Field blanks	ND	EB=15 FB= FB072109-50 from Rogod

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

Valida	ted Samples:	Watir	1	- Soi)							
1 1	RSAI3-10B	S	11 7	RSAJ2-10B		s	≁ 21	90 3 48	мв	31	
2 1	RSAI3-10BDL		127	RSAJ2-20B			22 )	904 55	MÞ	32	
3 1	RSAI3-20B		+ 13 ~	RSAJ2-33B	D3		23 3	90 581	MB	33	
4	RSAI3-32B		ī4 >	RSAJ2009-33B	Dr .	$\mathbf{y}$	24			34	
5 <b>2</b>	RSAI2-10B		15 3	EB062609-SO	ſ	N	25			35	
6 7	RSAI2-10BDL	Dγ	16	RSAI3-10BMS	2	;	26			36	
7 <b>2</b>	RSAI2009-10B D,		17	RSAI3-10BMSD			27			37	
8 2	RSAI2009-10BDL	Dr	18	RSAI2-10BMS			28			38	
9 ~	RSAI2-20B		19	RSAI2-10BMSD			29			39	
10 ~	RSAI2-31B	Ţ	20			$\mathbf{r}$	30			40	

VALIDATION FINDINGS WORKSHEET

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

A sinhs_RHC	1 Dialdrin	O Endrin katana	V Arealar 4747	
			1. AUOGIOF=124.2	00.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	Ĥ
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. Heptachior	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	<b>H</b>
G. Heptachlor epoxide	0. 4,4'-DDT	W. Aroclor-1221	EE. Hexa chlorobenzone	MM.
H. Endosulfan I	P. Methoxychior	X. Aroclor-1232	FF.	NN.

Notes:

LDC #: 21495 K31 See Corry SDG #:

# VALIDATION FINDINGS WORKSHEET

Blanks

Page: 1 of 9 Reviewer: 2nd Reviewer.__

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

Ptease see qualifications below for all questions answered "N". Not applicable questions are identified as "NIA". Were all samples associated with a method blank? N N/A

A N/A

If extract clean-up was performed, were extract clean-up blanks analyzed at the proper frequencies? Was a method blank performed for each matrix and whenever a sample extraction was performed? N N/A

<u>Y/N N/A</u> Was there contamination in the method blanks? If yes, please see the qualifications below. Henk extraction date:  $\frac{1}{29}$  (or Blank analysis date:  $\frac{7}{10}$  /  $\frac{1}{6}$  /  $\frac{1}{9}$ Y/N N/Y

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	fiication							
	Sample Identification		( {					
	<i>"</i>		TW <					
			ream ts > MB					
			A11 1					
			)					
	Blank ID	90348 MB	0, 89					
			Et					
	ر Compound		-					
<u>il</u>								

1.78

Blank analysis date: Blank extraction date:

Associated samples:

Compound	Blank ID		San	Sample Identification	uc		

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 #: 21445 K34

### VALIDATION FINDINGS WORKSHEET **Surrogate Spikes**

ō ð 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". <u>V</u> N/A Were surrogates spiked into all samples, standards and blanks? <u>Y N/N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications	
		(×0/)	Not Spec	đ	2116 (40-140)	No gual	1
			-	_	( )		Т
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Letter	Letter Designation	Surrogate Compound	ά	ecovery OC Limite (Sali			Г
	V			Marchald an Limits (301)	/ Kecovery QC Limits (Water)	: (Water) Comments	
	c	I ett achioro-m-xylene					Ē
	B	Decachlorobipheny					Т

SUR.3S

LDC #: <u>2/ 495 /</u><br/>SDG #: <u>566 (</u>27-67

### VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

Page: _____of___ Reviewer: ______ 2nd Reviewer: ______

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

Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". <u>N N/A</u> Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? <u>N N/A</u> Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was p

		$\frown$	\				~	>																			
ų	Qualifications	I NO GUAL (LCS/D in					No qual CLESP	a																			
perioriteur QC limits?	Associated Samples	1 2					56	-	-														-				
relative percent differences (RPD) within the QC limits?	RPD (Limits)		(OE) 1+		( )		1, mits( )	( )	( )	(	( )	( )	( )	· ·	( )	( )	( )	(	( )	( )	( )	( )	( )	( )	( )	( )	(
tive percent differenc	MSD %R (Limits)	or R outside Whits	( )	( )	( )	( )	BR ontride	() (+		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
	MS %R (Limits)	le )	( )	attached report)			compounds have	r		( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )
ercent recover	Compound	All com	B				All com	Cree b																			
Were the MS/MSD percent recoveries (%R) and the	ai asw/sw	16 /17	/ , ,				18/9																				
Y(N)NIA	# Date																										

### 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

t i cp meenou.											
			Aatrix Spike				ate Matrix		0/ D		RPD
	Sample	R	Q0905219-0	6		R	Q0905219-0		% Rec	<b>73707</b> 0	
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	v	* 9 - 149	0	30 30
Aldrin	ND	ND	7.28	0	*	ND	7.28	-	* 15 - 135	0	
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	0	* 65 - 127	0	30
Endosulfan Sulfate	ND	ND	7.28	0	*	ND	7.28	0	* 37 - 122	0	30
Endrin	ND	ND	7.28	0	*	ND	7.28	0	* 28 - 143	0	30
Endrin Aldehyde	ND	ND	7.28	0	¥	ND	7.28	0	* 18 - 135	0	30
Endrin Ketone	ND	ND	7.28	0	*	ND	7.28	0	* 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	0	* 61 - 120	0	30
Hexachlorobenzene	13000		18.2	48760	#	28800	18.2	88440	# 20 - 150	29	30
Methoxychlor	ND	ND	36.4	0	*	ND	36.4	0	* 38 - 149	0	30
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
beta-BHC	ND	542	7.28	7450	*	819	7.28	11250	* 35 - 142	- <b>T</b> I	* 30
delta-BHC	ND	ND	7.28	0	*	ND	7.28	0	* 44 - 119	0	30
		ND	7.28	Ō	*	ND	7.28	0	* 37 - 124	0	30
gamma-BHC (Linda gamma-Chlordane	ND	ND	7.28	0	*	ND	7.28	0	* 38 - 127	0	30

Comments:

Matrix Spike Summary

SuperSet Reference: 09-0

09-0000109704 rev 00

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

### Matrix Spike Summary Organochlorine Pesticides by Gas Chromatography

Sample Name:	RSAI2-10B	Units: Basis:	
Lab Code:	R0903584-013	<b>10 64.53</b> .54	, <u>-</u> - <u>-</u>

Analytical Method: 8081A Prep Method: EPA 3550C

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

Comments:

Matrix Spike Summary

SuperSet Reference: 09-0

: 09-0000109704 rev 00

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LDC	SDG

### VALIDATION FINDINGS WORKSHEET Laboratory Control Samples

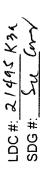
Page: 1 of 1 Reviewer: 016 2nd Reviewer: 016

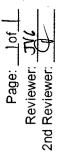
METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082) Diease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

<u>Y N/A</u> W <u>Y N/A</u> W

≻[	Υ N (N/A)	Was a LCS analyzed every 20 samples for each	every 20 sar	nples for e	ach matrix	or whenever a samp	matrix or whenever a sample extraction was performed?	ormed?	
#	Date	ICS/ICSD ID	Compound	LCS %R (Limits)	S mits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		90348 LCS/D	2	48 (1	(20-130)	( )	( are) he	1-4. 9 6348 MB	No mal (LCKD:
				``	(	( )			
				)	(	( )	(		
				)	(	( )			
				)		( )			
				)	(	( )			
						( )			
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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

Level IV/D Only <u>Y N N/A</u> <u>Y N N/A</u>

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?

#	Sample ID Compound Name	Finding	Associated Samples	Qualifications	
	157	EE > cal range		Jach /A	(e)
		D			

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495 K31 SDG #: 54 Cm-1

### VALIDATION FINDINGS WORKSHEET Overall Assessment of Data



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.

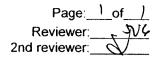
(Y)N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		15.7	EE > cal range		(0) X/A (0)
			1		
		2, 6, 8	All Procent EE 11)		
Com	Comments:				

V:\Validation Worksheets\Pesticides\OVR.3S

LDC #: 21995t 3a SDG #: Su Conor

### VALIDATION FINDINGS WORKSHEET Field Duplicates



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

YN N/A YN N/A

Were field duplicate pairs identified in this SDG? Were target compounds detected in thie field duplicate pairs?

	Concentratio	n (UG/kg)	
· Compound	5	7	RPD
J	47	48	1 (= 36 Diff)
0	7)	66	51
EE	2100	2100	D (= 502 RPp)
B	120	100	18

	Concentratio	no ug ky	
Compound	6	8	RPD
ĒĒ	6700	7000	300 (=1900 Diff)

	<u>Concentratio</u>	ni yata	
Compound	2	14	RPD
ŧĘ	2,3	3. O 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

Soil

LDC Report Date: September 27, 2009

Matrix:

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 RSAL4-0.5B RSAL4-09-0.5B 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)	A

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)		D			
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 RSAL4-0.5B RSAL4-10B RSAL4-28B	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 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 VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495L3a SDG #: R0903729

### Stage 2B

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Reviewer:	SVI
2nd Reviewer:	X
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Laboratory: Columbia Analytical Services

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
١.	Technical holding times	A	Sampling dates: 7/06 - 07/09
11.	GC/ECD Instrument Performance Check	A	,
- 111.	Initial calibration	Á.	
IV.	Continuing calibration/ICV	A	$c\omega/i\omega \leq 20^{2}$
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Mint spec
VIII.	Laboratory control samples	A	Wint spec LCS 10
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	hø	FB = FB 072109-50 from R0904016

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

Soil

ND = No compounds detected R = Rinsate FB = Field blank D = Duplicate TB = Trip blank EB = Equipment blank

Validated Samples:

1	RSAK4-10B		11	91091 MB	21	31
2	RSAK4-20B		12		22	32
3	RSAK4-31B		13		23	33
4	RSAL4-0.5B	Ø	14		24	34
5	RSAL4009-0.5B	b	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. Arocior-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Arocior-1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Arocior-1254	<b>II</b> .
D. gamma-BHC	L. Endosulfan II	T. gamma-Chiordane	BB. Aroclor-1260	.LL
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. Arocior-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	0.4,4'-DDT	W. Arocior-1221	EE. HPXachlura bearene MM.	MM.
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	Ť.	NN.

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Notes:

LDC #: <u>21 495</u> L 32 SDG #: <u>200</u> Cm

### VALIDATION FINDINGS WORKSHEET Surrogate Spikes

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

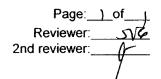
Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A". <u>V N N/A</u> Were surrogates spiked into all samples, standards and blanks? <u>V N/N/A</u> Did all surrogate percent recoveries (%R) meet the QC limits?

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Qualifications	anal																			
	N - 9																			
mits)	(40-140)		( } )	( )	( )	(	(	)	(	( )	)	) (	(	( )	( )	( )	(	(		
%R (LImits)	158		153																	
Surrogate Compound	B		-																	Recovery OC   Imite (Soil)
Column	Not SLEC																			
Sample ID	(×01)	× /	( 16× )																	Surrogate Compound
Date			8																	Letter Designation
#																				Lett

Tetrachloro-m-xylene Decachlorobiphenyl

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### VALIDATION FINDINGS WORKSHEET Field Duplicates



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

Y N N/A Y N N/A

Were field duplicate pairs identified in this SDG? Were target compounds detected in thie field duplicate pairs?

		n ( Mg/Kc)	
· Compound	<u> </u>	<u> </u>	RPD
EE.	43	59	31 (= 502, RPD) 13, ~ (= 18 Dîff)
B	4.8	181	13,2 (= 18 Diff)
1-	· · · · · · · · · · · · · · · · · · ·		

	Concentration ()	
Compound		RPD

	Concentration ()						
Compound			RPD				

	Concentration ()	
Compound		RPD