LABORATORY DATA CONSULTANTS, INC.
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Northgate Environmental Management, Inc.
1100 Quail Street Ste. 102
New Port beach, CA 92660
ATTN: Ms. Cindy Arnold

February 19, 2010

SUBJECT: Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada, Data Validation

Dear Ms. Arnold,

Enclosed are the revised data validation reports for the fractions listed below. The data validation was performed under Stage 2B & 4 guidelines. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 21768:

SDG #	Fraction
R0903918	Polychlorinated Biphenyls, Polychlorinated Biphenyls as Congeners

Please feel free to contact us if you have any questions.

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: July 17, 2009

LDC Report Date: February 18, 2010

Matrix: Water

Parameters: Polychlorinated Biphenyls

***Validation Level:** Stage 2B & 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903918

Sample Identification

EB071709-GW
TR-6B**

**Indicates sample underwent Stage 4 review.
*Changed validation level from Stage 2B to Stage 4 for noted sample

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

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.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is 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 multicompound compounds were performed for the primary (quantitation) column as required by the 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 for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

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.

Retention time windows were evaluated and considered technically acceptable for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples on which a Stage 2B review was performed.

V. Blanks

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

Sample EB071709-GW was identified as an equipment blank. No polychlorinated biphenyl 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

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

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. Project Quantitation Limit

All project quantitation limits were within validation criteria for samples on which a Stage 4 review was performed.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903918	All compounds reported below the PQL.	J (all detects)	A

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

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
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0903918

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903918	EB071709-GW TR-6B**	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG R0903918

No Sample Data Qualified in this SDG

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls - Equipment Blank Data Qualification Summary - SDG R0903918

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21768A3b
SDG #: R0903918
Laboratory: Columbia Analytical Services

Date: 10/27/09
Page: 1 of 1
Reviewer: JR
2nd Reviewer: [signature]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/17/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	% RSD ≤20%
IV.	Continuing calibration/ICV	A	CCV/ICV ≤20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	Client spec.
VIII.	Laboratory control samples	A	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	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	EB = 1

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

Validated Samples: Water

1	EB071709-GW	11		21		31	
2	TR-6B	12		22		32	
3	91602 MB	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	

LDC #: 21768 A3L
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer: [illegible]

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

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓	WA		
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 properly 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	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and sample analysis?			✓	
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?			✓	
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recovieries 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Were extract cleanup blanks analyzed with every batch requiring clean-up?	✓			
Was there contamination in the method blanks or clean-up blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				

LDC #: 22 21768 A3b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JVC
2nd Reviewer: [signature]

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?	✓			
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 quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
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.		✓		

LDC #: 21768A36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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

#	Standard ID	Calibration Date	Compound	Reported CF (150 std)	Recalculated CF (150 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/10/09	PCB-1260-1 (DB-1701)	3.276e5	327617.63	2.964e5	2.964e5	9.80	9.80
			(DB-17)	4.15z	415161.11	3.787	3.787	9.91	9.92
2									
3									
4									

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

LDC #: 29768A36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: MV
2nd Reviewer: [illegible]

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

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)

#	Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
1	CCV 20B	7/22/09	1260 - 1 (DB-1701)	296.376 e3	262.547 e3	262600	11.4	11.4
			↓ (DB-17)	378.204 ↓	339.136 ↓	339200	10.3	10.3
2								
3								
4								

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

LDC #: 22768A3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer: 9

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: #7

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	DB-1701	100	79.646	80	80	0
Decachlorobiphenyl	↓	↓	92.966	93	93	↓
Decachlorobiphenyl						

Sample ID:

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

Sample ID:

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

Sample ID:

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

Notes:

LDC #: 25768A36
SDG #: See Cover

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

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

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

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:

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

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

LCS = Laboratory control sample percent recovery
LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: 91602 LCS/D

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC										
4,4'-DDT										
Aroclor 1260	5.00	5.00	4.31	4.81	88	86	96	96	11	11

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

LDC #: ~~33~~ 21768#3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

Example:

Sample I.D. _____ _____ND:

Conc. = (_____)
( )

=

#	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 17, 2009

LDC Report Date: February 18, 2010

Matrix: Water

Parameters: Polychlorinated Biphenyls as Congeners

***Validation Stage:** Stage 2B & 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903918

Sample Identification

EB071709-GW
TR-6B**

**Indicates sample underwent Stage 4 review.
*Changed validation Stage from Stage 2B to Stage 4 for noted sample

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668A for Polychlorinated Biphenyls as Congeners.

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 Polychlorinated Dioxins/Dibenzofurans Data Review (September 2005) 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.

Samples indicated by a double asterisk on the front cover underwent a Stage 4 review. A Stage 2B review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Stage 2B criteria since this review is 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.

*Indicates change as the result of report review.

I. Technical Holding Times

All technical holding time requirements were met.

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

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency and all criteria were met.

III. Initial Calibration

A five point initial calibration was performed as required by the method.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation criteria.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequencies.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 30.0% for unlabeled compounds and less than or equal to 50.0% for labeled compounds.

The ion abundance ratios for all compounds were within validation criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900286-01	7/30/09	PCB-1 PCB-3 PCB-8 PCB-11 PCB-18+30 PCB-17 PCB-16 PCB-32 PCB-26+29 PCB-31	19.3 pg/L 19.5 pg/L 124 pg/L 1200 pg/L 137 pg/L 58.4 pg/L 57.7 pg/L 42.8 pg/L 29.7 pg/L 144 pg/L	All samples in SDG R0903918

*Indicates change as the result of report review.

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900286-01 (continued)	7/30/09	PCB-20+28	136 pg/L	All samples in SDG R0903918
		PCB-21+33	79.9 pg/L	
		PCB-22	45.8 pg/L	
		PCB-37	23.0 pg/L	
		PCB-50+53	15.6 pg/L	
		PCB-45+51	24.4 pg/L	
		PCB-52	142 pg/L	
		PCB-49+69	60.4 pg/L	
		PCB-48	22.9 pg/L	
		PCB-44+47+65	105 pg/L	
		PCB-59+62+75	8.34 pg/L	
		PCB-42	23.0 pg/L	
		PCB-41+71+40	44.5 pg/L	
		PCB-64	43.7 pg/L	
		PCB-68	7.94 pg/L	
		PCB-70+61+74+76	128 pg/L	
		PCB-66	65.0 pg/L	
		PCB-56	22.4 pg/L	
		PCB-60	13.3 pg/L	
		PCB-95	88.9 pg/L	
		PCB-88+91	13.5 pg/L	
		PCB-84	27.2 pg/L	
		PCB-92	15.0 pg/L	
		PCB-90+101+113	77.4 pg/L	
		PCB-83+99	34.5 pg/L	
		PCB-86+87+97+108+119+125	54.8 pg/L	
		PCB-85+116	8.36 pg/L	
		PCB-110+115	86.3 pg/L	
		PCB-82	8.62 pg/L	
		PCB-118	41.2 pg/L	
		PCB-105	19.0 pg/L	
		PCB-136	10.6 pg/L	
		PCB-135+151	25.4 pg/L	
		PCB-147+149	48.3 pg/L	
		PCB-132	24.1 pg/L	
		PCB-146	6.64 pg/L	
		PCB-153+168	45.7 pg/L	
		PCB-141	11.4 pg/L	
		PCB-129+138+163	72.0 pg/L	
		PCB-158	5.25 pg/L	
		PCB-128+166	10.5 pg/L	
		PCB-156+157	7.17 pg/L	
		PCB-179	5.99 pg/L	
		PCB-187	11.9 pg/L	
		PCB-174	6.47 pg/L	
		PCB-180+193	12.2 pg/L	
		PCB-202	5.00 pg/L	
		PCB-201	2.61 pg/L	
		PCB-198+199	22.4 pg/L	
		PCB-196	4.24 pg/L	
		PCB-203	9.00 pg/L	
		PCB-194	6.26 pg/L	
		PCB-208	13.0 pg/L	
		PCB-206	33.5 pg/L	
		PCB-209	11.3 pg/L	
		Total MonoCB	38.9 pg/L	
		Total DiCB	1330 pg/L	
		Total TriCB	754 pg/L	
		Total TetraCB	727 pg/L	
		Total PentaCB	475 pg/L	
		Total HexaCB	267 pg/L	
		Total HeptaCB	36.5 pg/L	

*Indicates change as the result of report review.

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900286-01 (continued)	7/30/09	Total OctaCB Total NonaCB	49.6 pg/L 46.5 pg/L	All samples in SDG R0903918

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

Sample	Compound	Reported Concentration	Modified Final Concentration
TR-6B**	PCB-8	219 pg/L	219U pg/L
	PCB-11	1020 pg/L	1020U pg/L
	PCB-18+30	103 pg/L	103U pg/L
	PCB-17	43.3 pg/L	43.3U pg/L
	PCB-16	57.7 pg/L	57.7U pg/L
	PCB-32	27.2 pg/L	27.2U pg/L
	PCB-26+29	33.3 pg/L	33.3U pg/L
	PCB-31	112 pg/L	112U pg/L
	PCB-20+28	94.7 pg/L	94.7U pg/L
	PCB-21+33	68.1 pg/L	68.1U pg/L
	PCB-22	45.3 pg/L	45.3U pg/L
	PCB-52	115 pg/L	115U pg/L
	PCB-49+69	40.1 pg/L	40.1U pg/L
	PCB-44+47+65	75.6 pg/L	75.6U pg/L
	PCB-41+71+40	21.4 pg/L	21.4U pg/L
	PCB-64	23.2 pg/L	23.2U pg/L
	PCB-70+61+74+76	88.9 pg/L	88.9U pg/L
	PCB-66	38.4 pg/L	38.4U pg/L
	PCB-56	18.1 pg/L	18.1U pg/L
	PCB-60	9.94 pg/L	9.94U pg/L
	PCB-95	89.3 pg/L	89.3U pg/L
	PCB-88+91	11.6 pg/L	11.6U pg/L
	PCB-84	27.1 pg/L	27.1U pg/L
	PCB-92	18.0 pg/L	18.0U pg/L
	PCB-90+101+113	95.4 pg/L	95.4U pg/L
	PCB-83+99	41.2 pg/L	41.2U pg/L
	PCB-86+87+97+108+119+125	74.7 pg/L	74.7U pg/L
	PCB-85+116	9.89 pg/L	9.89U pg/L
	PCB-110+115	119 pg/L	119U pg/L
	PCB-118	79.4 pg/L	79.4U pg/L
	PCB-105	42.6 pg/L	42.6U pg/L
	PCB-136	11.4 pg/L	11.4U pg/L
	PCB-135+151	30.4 pg/L	30.4U pg/L
	PCB-147+149	66.9 pg/L	66.9U pg/L
	PCB-132	41.1 pg/L	41.1U pg/L
	PCB-146	14.4 pg/L	14.4U pg/L
	PCB-153+168	67.6 pg/L	67.6U pg/L
	PCB-141	17.0 pg/L	17.0U pg/L
	PCB-129+138+163	118 pg/L	118U pg/L
	PCB-158	11.9 pg/L	11.9U pg/L
	PCB-128+166	18.6 pg/L	18.6U pg/L
	PCB-156+157	17.1 pg/L	17.1U pg/L
	PCB-179	5.31 pg/L	5.31U pg/L
	PCB-187	19.9 pg/L	19.9U pg/L
	PCB-174	13.7 pg/L	13.7U pg/L
	PCB-180+193	28.2 pg/L	28.2U pg/L
	PCB-198+199	23.1 pg/L	23.1U pg/L
	PCB-196	8.98 pg/L	8.98U pg/L
	PCB-203	13.4 pg/L	13.4U pg/L

*Indicates change as the result of report review.

Sample	Compound	Reported Concentration	Modified Final Concentration
TR-6B** (continued)	PCB-194	18.8 pg/L	18.8U pg/L
	PCB-208	15.1 pg/L	15.1U pg/L
	PCB-206	48.2 pg/L	48.2U pg/L
	PCB-209	24.7 pg/L	24.7U pg/L
	Total DiCB	1550 pg/L	1550U pg/L
	Total TriCB	584 pg/L	584U pg/L
	Total TetraCB	430 pg/L	430U pg/L
	Total PentaCB	608 pg/L	608U pg/L
	Total HexaCB	414 pg/L	414U pg/L
	Total HeptaCB	89.7 pg/L	89.7U pg/L
	Total OctaCB	64.3 pg/L	64.3U pg/L
	Total NonaCB	63.3 pg/L	63.3U pg/L
EB071709-GW	PCB-1	30.1 pg/L	30.1U pg/L
	PCB-3	31.9 pg/L	31.9U pg/L
	PCB-8	112 pg/L	112U pg/L
	PCB-11	1080 pg/L	1080U pg/L
	PCB-18+30	68.2 pg/L	68.2U pg/L
	PCB-17	29.9 pg/L	29.9U pg/L
	PCB-16	35.4 pg/L	35.4U pg/L
	PCB-32	19.8 pg/L	19.8U pg/L
	PCB-31	80.4 pg/L	80.4U pg/L
	PCB-20+28	84.5 pg/L	84.5U pg/L
	PCB-21+33	55.6 pg/L	55.6U pg/L
	PCB-22	35.9 pg/L	35.9U pg/L
	PCB-52	92.0 pg/L	92.0U pg/L
	PCB-49+69	35.9 pg/L	35.9U pg/L
	PCB-44+47+65	71.8 pg/L	71.8U pg/L
	PCB-41+71+40	29.1 pg/L	29.1U pg/L
	PCB-64	26.8 pg/L	26.8U pg/L
	PCB-70+61+74+76	98.2 pg/L	98.2U pg/L
	PCB-66	43.4 pg/L	43.4U pg/L
	PCB-56	21.0 pg/L	21.0U pg/L
	PCB-60	10.5 pg/L	10.5U pg/L
	PCB-95	70.3 pg/L	70.3U pg/L
	PCB-88+91	11.2 pg/L	11.2U pg/L
	PCB-84	22.3 pg/L	22.3U pg/L
	PCB-92	13.4 pg/L	13.4U pg/L
	PCB-90+101+113	70.1 pg/L	70.1U pg/L
	PCB-83+99	31.6 pg/L	31.6U pg/L
	PCB-86+87+97+108+119+125	49.9 pg/L	49.9U pg/L
	PCB-85+116	5.00 pg/L	5.00U pg/L
	PCB-110+115	76.0 pg/L	76.0U pg/L
	PCB-82	10.3 pg/L	10.3U pg/L
	PCB-118	42.6 pg/L	42.6U pg/L
	PCB-105	16.8 pg/L	16.8U pg/L
	PCB-136	9.77 pg/L	9.77U pg/L
	PCB-135+151	22.5 pg/L	22.5U pg/L
	PCB-147+149	48.5 pg/L	48.5U pg/L
	PCB-132	19.7 pg/L	19.7U pg/L
	PCB-146	7.79 pg/L	7.79U pg/L
	PCB-153+168	43.3 pg/L	43.3U pg/L
	PCB-141	12.5 pg/L	12.5U pg/L
	PCB-129+138+163	61.0 pg/L	61.0U pg/L
	PCB-158	5.93 pg/L	5.93U pg/L
	PCB-128+166	10.3 pg/L	10.3U pg/L
	PCB-156+157	8.03 pg/L	8.03U pg/L
	PCB-179	6.38 pg/L	6.38U pg/L

*Indicates change as the result of report review.

Sample	Compound	Reported Concentration	Modified Final Concentration
EB071709-GW (continued)	PCB-187	12.9 pg/L	12.9U pg/L
	PCB-174	9.48 pg/L	9.48U pg/L
	PCB-180+193	18.0 pg/L	18.0U pg/L
	PCB-202	7.02 pg/L	7.02U pg/L
	PCB-198+199	22.2 pg/L	22.2U pg/L
	PCB-196	4.27 pg/L	4.27U pg/L
	PCB-203	11.7 pg/L	11.7U pg/L
	PCB-194	7.72 pg/L	7.72U pg/L
	PCB-208	13.9 pg/L	13.9U pg/L
	PCB-206	39.0 pg/L	39.0U pg/L
	PCB-209	12.1 pg/L	12.1U pg/L
	Total MonoCB	62.0 pg/L	62.0U pg/L
	Total DiCB	1190 pg/L	1190U pg/L
	Total TriCB	410 pg/L	410U pg/L
	Total TetraCB	432 pg/L	432U pg/L
	Total PentaCB	419 pg/L	419U pg/L
	Total HexaCB	263 pg/L	263U pg/L
	Total HeptaCB	65.0 pg/L	65.0U pg/L
	Total OctaCB	52.8 pg/L	52.8U pg/L
	Total NonaCB	56.8 pg/L	56.8U pg/L

Sample EB071709-GW was identified as an equipment blank. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank with the following exceptions:

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB071709-GW	7/17/09	PCB-1	30.1 pg/L	TR-6B**
		PCB-3	31.9 pg/L	
		PCB-8	112 pg/L	
		PCB-11	1080 pg/L	
		PCB-18+30	68.2 pg/L	
		PCB-17	29.9 pg/L	
		PCB-16	35.4 pg/L	
		PCB-32	19.8 pg/L	
		PCB-31	80.4 pg/L	
		PCB-20+28	84.5 pg/L	
		PCB-21+33	55.6 pg/L	
		PCB-22	35.9 pg/L	
		PCB-52	92.0 pg/L	
		PCB-49+69	35.9 pg/L	
		PCB-44+47+65	71.8 pg/L	
		PCB-41+71+40	29.1 pg/L	
		PCB-64	26.8 pg/L	
		PCB-70+61+74+76	98.2 pg/L	
		PCB-66	43.4 pg/L	
		PCB-56	21.0 pg/L	
		PCB-60	10.5 pg/L	
		PCB-77	3.47 pg/L	
		PCB-95	70.3 pg/L	
		PCB-88+91	11.2 pg/L	
		PCB-84	22.3 pg/L	
		PCB-92	13.4 pg/L	
		PCB-90+101+113	70.1 pg/L	
		PCB-83+99	31.6 pg/L	
		PCB-86+87+97+108+119+125	49.9 pg/L	
		PCB-85+116	5.00 pg/L	

*Indicates change as the result of report review.

Equipment Blank ID	Sampling Date	Compound	Concentration	Associated Samples
EB071709-GW (continued)	7/17/09	PCB-110+115	76.0 pg/L	TR-6B**
		PCB-82	10.3 pg/L	
		PCB-118	42.6 pg/L	
		PCB-105	16.8 pg/L	
		PCB-136	9.77 pg/L	
		PCB-135+151	22.5 pg/L	
		PCB-144	2.68 pg/L	
		PCB-147+149	48.5 pg/L	
		PCB-132	19.7 pg/L	
		PCB-146	7.79 pg/L	
		PCB-153+168	43.3 pg/L	
		PCB-141	12.5 pg/L	
		PCB-130	2.84 pg/L	
		PCB-137	3.60 pg/L	
		PCB-164	2.79 pg/L	
		PCB-129+138+163	61.0 pg/L	
		PCB-158	5.93 pg/L	
		PCB-128+166	10.3 pg/L	
		PCB-167	2.38 pg/L	
		PCB-156+157	8.03 pg/L	
		PCB-179	6.38 pg/L	
		PCB-187	12.9 pg/L	
		PCB-183	5.53 pg/L	
		PCB-174	9.48 pg/L	
		PCB-177	4.54 pg/L	
		PCB-180+193	18.0 pg/L	
		PCB-170	8.13 pg/L	
		PCB-202	7.02 pg/L	
		PCB-198+199	22.2 pg/L	
		PCB-196	4.27 pg/L	
		PCB-203	11.7 pg/L	
		PCB-194	7.72 pg/L	
		PCB-208	13.9 pg/L	
		PCB-207	3.84 pg/L	
		PCB-206	39.0 pg/L	
		PCB-209	12.1 pg/L	
		Total MonoCB	62.0 pg/L	
		Total DiCB	1190 pg/L	
		Total TriCB	410 pg/L	
		Total TetraCB	432 pg/L	
		Total PentaCB	419 pg/L	
		Total HexaCB	263 pg/L	
		Total HeptaCB	65.0 pg/L	
		Total OctaCB	52.8 pg/L	
		Total NonaCB	56.8 pg/L	

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

*Indicates change as the result of report review.

Sample	Compound	Reported Concentration	Modified Final Concentration
TR-6B**	PCB-3	103 pg/L	103U pg/L
	PCB-8	219 pg/L	219U pg/L
	PCB-11	1120 pg/L	1120U pg/L
	PCB-18+30	103 pg/L	103U pg/L
	PCB-17	43.3 pg/L	43.3U pg/L
	PCB-16	57.7 pg/L	57.7U pg/L
	PCB-32	27.2 pg/L	27.2U pg/L
	PCB-31	112 pg/L	112U pg/L
	PCB-20+28	94.7 pg/L	94.7U pg/L
	PCB-21+33	68.1 pg/L	68.1U pg/L
	PCB-22	45.3 pg/L	45.3U pg/L
	PCB-52	115 pg/L	115U pg/L
	PCB-49+69	40.1 pg/L	40.1U pg/L
	PCB-44+47+65	75.6 pg/L	75.6U pg/L
	PCB-41+71+40	21.4 pg/L	21.4U pg/L
	PCB-64	23.2 pg/L	23.2U pg/L
	PCB-70+61+74+76	88.9 pg/L	88.9U pg/L
	PCB-66	38.4 pg/L	38.4U pg/L
	PCB-56	18.1 pg/L	18.1U pg/L
	PCB-60	9.94 pg/L	9.94U pg/L
	PCB-95	89.3 pg/L	89.3U pg/L
	PCB-88+91	11.6 pg/L	11.6U pg/L
	PCB-84	27.1 pg/L	27.1U pg/L
	PCB-92	18.0 pg/L	18.0U pg/L
	PCB-90+101+113	95.4 pg/L	95.4U pg/L
	PCB-83+99	41.2 pg/L	41.2U pg/L
	PCB-86+87+97+108+119+125	74.7 pg/L	74.7U pg/L
	PCB-85+116	9.89 pg/L	9.89U pg/L
	PCB-110+115	119 pg/L	119U pg/L
	PCB-118	79.4 pg/L	79.4U pg/L
	PCB-105	42.6 pg/L	42.6U pg/L
	PCB-136	11.4 pg/L	11.4U pg/L
	PCB-135+151	30.4 pg/L	30.4U pg/L
	PCB-147+149	66.9 pg/L	66.9U pg/L
	PCB-132	41.1 pg/L	41.1U pg/L
	PCB-146	14.4 pg/L	14.4U pg/L
	PCB-153+168	67.6 pg/L	67.6U pg/L
	PCB-141	17.0 pg/L	17.0U pg/L
	PCB-129+138+163	118 pg/L	118U pg/L
	PCB-158	11.9 pg/L	11.9U pg/L
	PCB-128+166	18.6 pg/L	18.6U pg/L
	PCB-156+157	17.1 pg/L	17.1U pg/L
	PCB-179	5.31 pg/L	5.31U pg/L
	PCB-187	19.9 pg/L	19.9U pg/L
	PCB-183	7.79 pg/L	7.79U pg/L
	PCB-174	13.7 pg/L	13.7U pg/L
	PCB-180+193	28.2 pg/L	28.2U pg/L
	PCB-170	14.8 pg/L	14.8U pg/L
	PCB-198+199	23.1 pg/L	23.1U pg/L
	PCB-196	8.98 pg/L	8.98U pg/L
	PCB-203	13.4 pg/L	13.4U pg/L
	PCB-194	18.8 pg/L	18.8U pg/L
	PCB-208	15.1 pg/L	15.1U pg/L
	PCB-206	48.2 pg/L	48.2U pg/L
	PCB-209	24.7 pg/L	24.7U pg/L
	Total DiCB	1550 pg/L	1550U pg/L
	Total TriCB	584 pg/L	584U pg/L
	Total TetraCB	430 pg/L	430U pg/L
	Total PentaCB	608 pg/L	608U pg/L
	Total HexaCB	414 pg/L	414U pg/L
	Total HeptaCB	89.7 pg/L	89.7U pg/L
	Total OctaCB	64.3 pg/L	64.3U pg/L
	Total NonaCB	63.3 pg/L	63.3U pg/L

*Indicates change as the result of report review.

VI. 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.

VII. 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.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard percent recoveries (%R) were within QC limits with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
EB071709-GW	^{13}C-PCB-1 ^{13}C-PCB-3 ^{13}C-PCB-4 ^{13}C-PCB-54	20 (25-150) 21 (25-150) 23 (25-150) 23 (25-150)	PCB-1 thru 14 PCB-40 thru 76 PCB-78 thru 80	J (all detects) UJ (all non-detects)	P
TR-6B**	^{13}C-PCB-1 ^{13}C-PCB-3 ^{13}C-PCB-4 ^{13}C-PCB-15 ^{13}C-PCB-19 ^{13}C-PCB-54	19 (25-150) 19 (25-150) 22 (25-150) 24 (25-150) 23 (25-150) 22 (25-150)	PCB-1 thru 36 PCB-38 thru 76 PCB-78 thru 80	J (all detects) UJ (all non-detects)	P
EQ0900286-01	^{13}C-PCB-1 ^{13}C-PCB-3 ^{13}C-PCB-4 ^{13}C-PCB-19 ^{13}C-PCB-54	13 (25-150) 16 (25-150) 19 (25-150) 21 (25-150) 23 (25-150)	PCB-1 thru 14 PCB-16 thru 36 PCB-38 thru 76 PCB-78 thru 80	J (all detects) UJ (all non-detects)	P

X. Target Compound Identifications

All target compound identifications were within validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

*Indicates change as the result of report review.

XI. Project Quantitation Limit

All project quantitation limits were within validation criteria for samples on which a Stage 4 review was performed.

All compounds reported below the PQL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903918	All compounds reported below the PQL.	J (all detects)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903918	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

XII. System Performance

The system performance was acceptable validation criteria for samples on which a Stage 4 review was performed. Raw data were not evaluated for the samples reviewed by Stage 2B criteria.

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 Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG R0903918

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903918	EB071709-GW	PCB-1 thru 14 PCB-40 thru 76 PCB-78 thru 80	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
R0903918	TR-6B**	PCB-1 thru 36 PCB-38 thru 76 PCB-78 thru 80	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
R0903918	EB071709-GW TR-6B**	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903918	EB071709-GW TR-6B**	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)

*Indicates change as the result of report review.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG R0903918

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903918	TR-6B**	PCB-8	219U pg/L	A	bl
		PCB-11	1020U pg/L		
		PCB-18+30	103U pg/L		
		PCB-17	43.3U pg/L		
		PCB-16	57.7U pg/L		
		PCB-32	27.2U pg/L		
		PCB-26+29	33.3U pg/L		
		PCB-31	112U pg/L		
		PCB-20+28	94.7U pg/L		
		PCB-21+33	68.1U pg/L		
		PCB-22	45.3U pg/L		
		PCB-52	115U pg/L		
		PCB-49+69	40.1U pg/L		
		PCB-44+47+65	75.6U pg/L		
		PCB-41+71+40	21.4U pg/L		
		PCB-64	23.2U pg/L		
		PCB-70+61+74+76	88.9U pg/L		
		PCB-66	38.4U pg/L		
		PCB-56	18.1U pg/L		
		PCB-60	9.94U pg/L		
		PCB-95	89.3U pg/L		
		PCB-88+91	11.6U pg/L		
		PCB-84	27.1U pg/L		
		PCB-92	18.0U pg/L		
		PCB-90+101+113	95.4U pg/L		
		PCB-83+99	41.2U pg/L		
		PCB-86+87+97+108+119+125	74.7U pg/L		
		PCB-85+116	9.89U pg/L		
		PCB-110+115	119U pg/L		
		PCB-118	79.4U pg/L		
		PCB-105	42.6U pg/L		
		PCB-136	11.4U pg/L		
		PCB-135+151	30.4U pg/L		
		PCB-147+149	66.9U pg/L		
		PCB-132	41.1U pg/L		
		PCB-146	14.4U pg/L		
		PCB-153+168	67.6U pg/L		
		PCB-141	17.0U pg/L		
		PCB-129+138+163	118U pg/L		
		PCB-158	11.9U pg/L		
		PCB-128+166	18.6U pg/L		
		PCB-156+157	17.1U pg/L		
		PCB-179	5.31U pg/L		
		PCB-187	19.9U pg/L		
		PCB-174	13.7U pg/L		
		PCB-180+193	28.2U pg/L		
		PCB-198+199	23.1U pg/L		
		PCB-196	8.98U pg/L		
		PCB-203	13.4U pg/L		

*Indicates change as the result of report review.

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903918	TR-6B** (continued)	PCB-194	18.8U pg/L	A	bl
		PCB-208	15.1U pg/L		
		PCB-206	48.2U pg/L		
		PCB-209	24.7U pg/L		
		Total DiCB	1550U pg/L		
		Total TriCB	584U pg/L		
		Total TetraCB	430U pg/L		
		Total PentaCB	608U pg/L		
		Total HexaCB	414U pg/L		
		Total HeptaCB	89.7U pg/L		
		Total OctaCB	64.3U pg/L		
		Total NonaCB	63.3U pg/L		
R0903918	EB071709-GW	PCB-1	30.1U pg/L	A	bl
		PCB-3	31.9U pg/L		
		PCB-8	112U pg/L		
		PCB-11	1080U pg/L		
		PCB-18+30	68.2U pg/L		
		PCB-17	29.9U pg/L		
		PCB-16	35.4U pg/L		
		PCB-32	19.8U pg/L		
		PCB-31	80.4U pg/L		
		PCB-20+28	84.5U pg/L		
		PCB-21+33	55.6U pg/L		
		PCB-22	35.9U pg/L		
		PCB-52	92.0U pg/L		
		PCB-49+69	35.9U pg/L		
		PCB-44+47+65	71.8U pg/L		
		PCB-41+71+40	29.1U pg/L		
		PCB-64	26.8U pg/L		
		PCB-70+61+74+76	98.2U pg/L		
		PCB-66	43.4U pg/L		
		PCB-56	21.0U pg/L		
		PCB-60	10.5U pg/L		
		PCB-95	70.3U pg/L		
		PCB-88+91	11.2U pg/L		
		PCB-84	22.3U pg/L		
		PCB-92	13.4U pg/L		
		PCB-90+101+113	70.1U pg/L		
		PCB-83+99	31.6U pg/L		
		PCB-86+87+97+108+119+125	49.9U pg/L		
		PCB-85+116	5.00U pg/L		
		PCB-110+115	76.0U pg/L		
		PCB-82	10.3U pg/L		
		PCB-118	42.6U pg/L		
		PCB-105	16.8U pg/L		
		PCB-136	9.77U pg/L		
		PCB-135+151	22.5U pg/L		
		PCB-147+149	48.5U pg/L		
		PCB-132	19.7U pg/L		
		PCB-146	7.79U pg/L		
		PCB-153+168	43.3U pg/L		
		PCB-141	12.5U pg/L		
		PCB-129+138+163	61.0U pg/L		
		PCB-158	5.93U pg/L		
		PCB-128+166	10.3U pg/L		
		PCB-156+157	8.03U pg/L		
		PCB-179	6.38U pg/L		

*Indicates change as the result of report review.

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903918	EB071709-GW (continued)	PCB-187	12.9U pg/L	A	bl
		PCB-174	9.48U pg/L		
		PCB-180+193	18.0U pg/L		
		PCB-202	7.02U pg/L		
		PCB-198+199	22.2U pg/L		
		PCB-196	4.27U pg/L		
		PCB-203	11.7U pg/L		
		PCB-194	7.72U pg/L		
		PCB-208	13.9U pg/L		
		PCB-206	39.0U pg/L		
		PCB-209	12.1U pg/L		
		Total MonoCB	62.0U pg/L		
		Total DiCB	1190U pg/L		
		Total TriCB	410U pg/L		
		Total TetraCB	432U pg/L		
		Total PentaCB	419U pg/L		
		Total HexaCB	263U pg/L		
		Total HeptaCB	65.0U pg/L		
		Total OctaCB	52.8U pg/L		
		Total NonaCB	56.8U pg/L		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls as Congeners - Equipment Blank Data Qualification Summary - SDG R0903918

*Indicates change as the result of report review.

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903918	TR-6B**	PCB-3	103U pg/L	A	be
		PCB-8	219U pg/L		
		PCB-11	1120U pg/L		
		PCB-18+30	103U pg/L		
		PCB-17	43.3U pg/L		
		PCB-16	57.7U pg/L		
		PCB-32	27.2U pg/L		
		PCB-31	112U pg/L		
		PCB-20+28	94.7U pg/L		
		PCB-21+33	68.1U pg/L		
		PCB-22	45.3U pg/L		
		PCB-52	115U pg/L		
		PCB-49+69	40.1U pg/L		
		PCB-44+47+65	75.6U pg/L		
		PCB-41+71+40	21.4U pg/L		
		PCB-64	23.2U pg/L		
		PCB-70+61+74+76	88.9U pg/L		
		PCB-66	38.4U pg/L		
		PCB-56	18.1U pg/L		
		PCB-60	9.94U pg/L		
		PCB-95	89.3U pg/L		
		PCB-88+91	11.6U pg/L		
		PCB-84	27.1U pg/L		
		PCB-92	18.0U pg/L		
		PCB-90+101+113	95.4U pg/L		
		PCB-83+99	41.2U pg/L		
		PCB-86+87+97+108+119+125	74.7U pg/L		
		PCB-85+116	9.89U pg/L		
		PCB-110+115	119U pg/L		
		PCB-118	79.4U pg/L		

*Indicates change as the result of report review.

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903918	TR-6B** (continued)	PCB-105	42.6U pg/L	A	be
		PCB-136	11.4U pg/L		
		PCB-135+151	30.4U pg/L		
		PCB-147+149	66.9U pg/L		
		PCB-132	41.1U pg/L		
		PCB-146	14.4U pg/L		
		PCB-153+168	67.6U pg/L		
		PCB-141	17.0U pg/L		
		PCB-129+138+163	118U pg/L		
		PCB-158	11.9U pg/L		
		PCB-128+166	18.6U pg/L		
		PCB-156+157	17.1U pg/L		
		PCB-179	5.31U pg/L		
		PCB-187	19.9U pg/L		
		PCB-183	7.79U pg/L		
		PCB-174	13.7U pg/L		
		PCB-180+193	28.2U pg/L		
		PCB-170	14.8U pg/L		
		PCB-198+199	23.1U pg/L		
		PCB-196	8.98U pg/L		
		PCB-203	13.4U pg/L		
		PCB-194	18.8U pg/L		
		PCB-208	15.1U pg/L		
		PCB-206	48.2U pg/L		
		PCB-209	24.7U pg/L		
		Total DiCB	1550U pg/L		
		Total TriCB	584U pg/L		
		Total TetraCB	430U pg/L		
		Total PentaCB	608U pg/L		
		Total HexaCB	414U pg/L		
		Total HeptaCB	89.7U pg/L		
		Total OctaCB	64.3U pg/L		
		Total NonaCB	63.3U pg/L		

*Indicates change as the result of report review.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B/4

LDC #: 21768A3c
SDG #: R0903918
Laboratory: Columbia Analytical Services

Date: 10/27/09
Page: 1 of 1
Reviewer: a
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Polychlorinated Biphenyl Congeners (EPA Method 1668A)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 7/17/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration/ICV	A	
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client spiked
VII.	Laboratory control samples	A	LCS/D
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW	All 2up results - JT(E)
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB=1

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

Validated Samples: ** 1-one 1V

1	EB071709-GW W	11	EB0900286-01	21	U220031	31	
2	TR-6B ** W	12		22	U220019	32	
3		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	

LDC #: 27768A3C
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: AL

Method: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
III. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for unlabeled and labeled standards?	✓			35%
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IV. Continuing calibration				
Was a routine calibration performed at the beginning of each 12 hour period?	✓			
Were all percent differences (%D) ≤ 30% for unlabeled and ≤ 50% for labeled standards?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

LDC #: 21768A3C
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
VIII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
IX. Internal standards				
Were internal standard recoveries within the 25-150% criteria?		✓		
Was the minimum S/N ratio of all internal standard peaks > 10?	✓			
X. Target compound identification				
For polychlorinated biphenyl congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For polychlorinated biphenyl congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For other polychlorinated biphenyl congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XI. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
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.	✓			

LDC #: 21768A3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668)

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

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated? If yes, please see qualification below.

Blank extraction date: 7/30/09 **Blank analysis date:** 8/5/09
Conc. units: pg/L **A/sociated samples:** All Waters (BI)

Compound	Blank ID	Sample Identification								
	FQ0900286-01	5X		2	1					
PCB 1	19.3	96.5		-	30.1/U					
PCB 3	19.5	97.5		-	31.9/U					
PCB 8	124	620		219/U	112/U					
PCB 11	1200	6000		1020/U	1080/U					
PCBs 18+30	137	685		103/U	68.2/U					
PCB 17	58.4	292		43.3/U	29.9/U					
PCB 16	57.7	288.5		57.7/U	35.4/U					
PCB 32	42.8	214		27.2/U	19.8/U					
PCBs 26+29	29.7	148.5		33.3/U						
PCB 31	144	720		112/U	80.4/U					
PCBs 20+28	136	680		94.7/U	84.5/U					
PCBs 21+33	79.9	399.5		68.1/U	55.6/U					
PCB 22	45.8	229		45.3/U	35.9/U					
PCB 37	23.0	115								
PCBs 50+53	15.6	78								
PCBs 45+51	24.4	122								
PCB 52	142	710		115/U	92.0/U					
PCBs 49+69	60.4	302		40.1/U	~~35.~~/U					
PCB 48	22.9	114.5			35.9					
PCBs 44+47+65	105	525		75.6/U	71.8/U					
PCBs 59+62+75	8.34	41.7								

PCB 42	23.0	115								
PCBs 41+71+40	44.5	222.5		21.4/U	29.1/U					
PCB 64	43.7	218.5		23.2/U	26.8/U					
PCB 68	7.94	39.7								
PCBs 70+61+74+76	128	640		88.9/U	98.2/U					
PCB 66	65.0	325		38.4/U	43.4/U					
PCB 56	22.4	112		18.1/U	21.0/U					
PCB 60	13.3	66.5		9.94/U	10.5/U					
PCB 95	88.9	444.5		89.3/U	70.3/U					
PCBs 88+91	13.5	67.5		11.6/U	11.2/U					
PCB 84	27.2	136		27.1/U	22.3/U					
PCB 92	15.0	75		18.0/U	13.4/U					
PCBs 90+101+113	77.4	387		95.4/U	70.1/U					
PCBs 83+99	34.5	172.5		41.2/U	31.6/U					
PCBs 86+87+97+108+119+125	54.8	274		74.7/U	49.9/U					
PCBs 85+116	8.36	41.8		9.89/U	5.00/U					
PCBs 110+115	86.3	431.5		119/U	76.0/U					
PCB 82	8.62	43.1			10.3/U					
PCB 118	41.2	206		79.4/U	42.6/U					
PCB 105	19.0	95		42.6/U	16.8/U					
PCB 136	10.6	53		11.4/U	9.77/U					
PCBs 135+151	25.4	127		30.4/U	22.5/U					
PCBs 147+149	48.3	241.5		66.9/U	48.5/U					
PCB 132	24.1	120.5		41.1/U	19.7/U					
PCB 146	6.64	33.2		14.4/U	7.79/U					
PCBs 153+168	45.7	228.5		67.6/U	43.3/U					
PCB 141	11.4	57		17.0/U	12.5/U					
PCBs 129+138+163	72.0	360		118/U	61.0/U					
PCB 158	5.25	26.25		11.9/U	5.93/U					
PCBs 128+166	10.5	52.5		18.6/U	10.3/U					
PCBs 156+157	7.17	35.85		17.1/U	8.03/U					

PCB 179	5.99	29.95		5.31/U	6.38/U					
PCB 187	11.9	59.5		19.9/U	12.9/U					
PCB 174	6.47	32.35		13.7/U	9.48/U					
PCBs 180+193	12.2	61		28.2/U	18.0/U					
PCB 202	5.00	25			7.02/U					
PCB 201	2.61	13.05								
PCBs 198+199	22.4	112		23.1/U	22.2/U					
PCB 196	4.24	21.2		8.98/U	4.27/U					
PCB 203	9.00	45		13.4/U	11.7/U					
PCB 194	6.26	31.3		18.8/U	7.72/U					
PCB 208	13.0	65		15.1/U	13.9/U					
PCB 206	33.5	167.5		48.2/U	39.0/U					
PCB 209	11.3	56.5		24.7/U	12.1/U					
Total MonoCB	38.9	194.5		-	62.0/U					
Total DiCB	1330	6650		1550/U	1190/U					
Total TriCB	754	3770		584/U	410/U					
Total TetraCB	727	3635		430/U	432/U					
Total PentaCB	475	2375		608/U	419/U					
Total HexaCB	267	1335		414/U	263/U					
Total HeptaCB	36.5	182.5		89.7/U	65.0/U					
Total OctaCB	49.6	248		64.3/U	52.8/U					
Total NonaCB	46.5	232.5		63.3/U	56.8/U					

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

LDC #: 21768A3c
SDG #: R0903918

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: A

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Blank units: pg/L **Associated sample units:** pg/L
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2 (Be) be

Compound	Blank ID	Sample Identification								
	EB071709-GW	(5X)		2						
PCB 1	30.1	150.5		-						
PCB 3	31.9	159.5		103/U						
PCB 8	112	560		219/U						
PCB 11	1080	5400		1120/U						
PCBs 18+30	68.2	341		103/U						
PCB 17	29.9	149.5		43.3/U						
PCB 16	35.4	177		57.7/U						
PCB 32	19.8	99		27.2/U						
PCB 31	80.4	402		112/U						
PCBs 20+28	84.5	422.5		94.7/U						
PCBs 21+33	55.6	278		68.1/U						
PCB 22	35.9	179.5		45.3/U						
PCB 52	92.0	460		115/U						
PCBs 49+69	35.9	179.5		40.1/U						
PCBs 44+47+65	71.8	359		75.6/U						
PCBs 41+71+40	29.1	145.5		21.4/U						
PCB 64	26.8	134		23.2/U						
PCBs 70+61+74+76	98.2	491		88.9/U						
PCB 66	43.4	217		38.4/U						
PCB 56	21.0	105		18.1/U						
PCB 60	10.5	52.5		9.94/U						
PCB 77	3.47	17.35								
PCB 95	70.3	351.5		89.3/U						

PCBs 88+91	11.2	56		11.6/U						
PCB 84	22.3	111.5		27.1/U						
PCB 92	13.4	67		18.0/U						
PCBs 90+101+113	70.1	350.5		95.4/U						
PCBs 83+99	31.6	158		41.2/U						
PCBs 86+87+97+108+119+125	49.9	249.5		74.7/U						
PCBs 85+116	5.00	25		9.89/U						
PCBs 110+115	76.0	380		119/U						
PCB 82	10.3	51.5								
PCB 118	42.6	213		79.4/U						
PCB 105	16.8	84		42.6/U						
PCB 136	9.77	48.85		11.4/U						
PCBs 135+151	22.5	112.5		30.4/U						
PCB 144	2.68	13.4								
PCBs 147+149	48.5	242.5		66.9/U						
PCB 132	19.7	98.5		41.1/U						
PCB 146	7.79	38.95		14.4/U						
PCBs 153+168	43.3	216.5		67.6/U						
PCB 141	12.5	62.5		17.0/U						
PCB 130	2.84	14.2								
PCB 137	3.60	18								
PCB 164	2.79	13.95								
PCBs 129+138+163	61.0	305		118/U						
PCB 158	5.93	29.65		11.9/U						
PCBs 128+166	10.3	51.5		18.6/U						
PCB 167	2.38	11.9								
PCBs 156+157	8.03	40.15		17.1/U						
PCB 179	6.38	31.9		5.31/U						
PCB 187	12.9	64.5		19.9/U						
PCB 183	5.53	27.65		7.79/U						

PCB 174	9.48	47.4		13.7/U						
PCB 177	4.54	22.7								
PCBs 180+193	18.0	90		28.2/U						
PCB 170	8.13	40.65		14.8/U						
PCB 202	7.02	35.1								
PCBs 198+199	22.2	111		23.1/U						
PCB 196	4.27	21.35		8.98/U						
PCB 203	11.7	58.5		13.4/U						
PCB 194	7.72	38.6		18.8/U						
PCB 208	13.9	69.5		15.1/U						
PCB 207	3.84	19.2								
PCB 206	39.0	195		48.2/U						
PCB 209	12.1	60.5		24.7/U						
Total MonoCB	62.0	310		-						
Total DiCB	1190	5950		1550/U						
Total TriCB	410	2050		584/U						
Total TetraCB	432	2160		430/U						
Total PentaCB	419	2095		608/U						
Total HexaCB	263	1315		414/U						
Total HeptaCB	65.0	325		89.7/U						
Total OctaCB	52.8	264		64.3/U						
Total NonaCB	56.8	284		63.3/U						

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".

V:\Pei\Tronox\FQC\21768A3c_EB_Area 4_GW.wpd

LDC #: 21T68A3c
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Internal Standards

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

METHOD: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668)

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

Y N N/A Are all internal standard recoveries were within the 25-150% criteria?

Y N N/A Was the S/N ratio all internal standard peaks ≥ 10?

#	Date	Lab ID/Reference	Compound	% Recovery (Limit: 25-150%)	Qualifications
		1	13C-PCB 1	20	J/UJ/P (1) (PCB1-14, 40-76, 78-80)
			3	21	
			4	23	
			54	23	
		2	13C-PCB 1	19	(PCB1-36, 38-76, 78-80)
			3	19	
			4	22	
			15	24	
			19	23	
			54	22	
		3 2809003B6-01	13C-PCB 1	13	(PCB1-14, 16-36, 38-76, 78-80)
			3	16	
			4	19	
			19	21	
			54	23	

	Internal Standards		Recovery Standards
A.	^{13}C-PCB-77	K.	
B.	^{13}C-PCB-105	L.	
C.	^{13}C-PCB-118	M.	
D.	^{13}C-PCB-126	N.	
E.	^{13}C-PCB-156	O.	
F.	^{13}C-PCB-157	P.	
G.	^{13}C-PCB-169	Q.	
H.	^{13}C-PCB-180	R.	
I.		T.	

LDC #: 21768A36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 4

METHOD: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668)

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

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS3 std)	Recalculated RRF (CS3 std)	Reported %RSD	Recalculated %RSD
1	1CAL	5/1/08	PCB-77 (^{13}C-PCB-77)	1.04	1.04	1.12	1.12	5.22	5.18
			PCB-105 (^{13}C-PCB-105)	1.06	1.06	1.08	1.08	2.09	2.07
			PCB-156 (^{13}C-PCB-156)	1.05	1.05	1.06	1.06	2.36	2.40
			PCB-180 (^{13}C-PCB-180)	0.90	0.90	1.00	1.00	6.59	6.67
2			PCB-77 (^{13}C-PCB-77)						
			PCB-105 (^{13}C-PCB-105)						
			PCB-156 (^{13}C-PCB-156)						
			PCB-180 (^{13}C-PCB-180)						
3			PCB-77 (^{13}C-PCB-77)						
			PCB-105 (^{13}C-PCB-105)						
			PCB-156 (^{13}C-PCB-156)						
			PCB-180 (^{13}C-PCB-180)						

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

LDC #: 21768A3c
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668A)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	~~U220031~~	~~8/6/09~~	PCB 77 (^{13}C-PCB 77)	~~1.04~~	~~46.1~~	~~46.~~		
			PCB 105 (^{13}C-PCB 105)	1.06	~~48.4~~			
			PCB ~~167~~ 156 (^{13}C-PCB ~~167~~) 156	1.05	~~95.4~~			
			PCB 189 (^{13}C-PCB 189)	~~0.98~~	~~45.5~~	-		
2	U220019	8/5/09	PCB 77 (^{13}C-PCB 77)	1.04	46.1	46.1		
			PCB 105 (^{13}C-PCB 105)	1.06	48.4	48.2		
			PCB ~~167~~ 156 (^{13}C-PCB ~~167~~) 156	1.05	95.4	95.1		
			PCB 189 (^{13}C-PCB 189)	0.90	45.5	45.6		
3	U220031	8/6/09	PCB 77 (^{13}C-PCB 77)	1.04	52.1	52.0		
			PCB 105 (^{13}C-PCB 105)	1.06	50.7	50.5		
			PCB ~~167~~ 156 (^{13}C-PCB ~~167~~) 156	1.05	98.6	98.3		
			PCB 189 (^{13}C-PCB 189)	0.90	52.2	52.3		

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

LDC #: 21768A3b
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 1
2nd Reviewer: 1

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668A)

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

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

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

LCS ID: ZB09002 86-01/-03

Compound	Spike Added (pg/L)		Spiked Sample Concentration (pg/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PCB 1	1000	1000	971	970	97	97	97	97	0	1
~~PCB 12~~										
PCB 37	1000	1000	1090	1000	109	109	100	100	9	9
PCB 54			1020	991	102	102	99	99	3	3
PCB 118			872	945	87	87	94	94	8	8
PCB 167			856	954	86	86	95	95	10	11
PCB 188			735	881	74	74	88	88	17	18
PCB 202			831	978	83	83	98	98	17	15
PCB 208			1000	1100	100	100	110	110	10	10
PCB 209	↓	↓	1010	1000	101	101	100	100	1	1

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

Ions Monitored for HRGC/HRMS Analysis of Polychlorinated Biphenyls

Descriptor	Accurate mass[a]	Ion ID	Analyte	Substance
1	289.9224	M	C12 H6 35Cl4	TCB
	291.9194	M+2	C12 H6 35Cl3 37Cl4	TCB
	301.9626	M	13C12 H6 35Cl4	PeCB
	303.9597	M+2	13C12 H6 35Cl3 37Cl	PeCB
	325.8804	M+2	C12 H5 35Cl4 37Cl	PeCB
	327.8775	M+4	C12 H5 35Cl3 37Cl2	PeCB
	[292.9825]	Lock	C7 F11	PFK
2	325.8804	M+2	C12 H5 35Cl4 37Cl	PeCB
	327.8775	M+4	C12 H5 35Cl3 37Cl2	PeCB
	337.9207	M+2	13C12 H5 35Cl4 37Cl	PeCB
	339.9178	M+4	13C12 H5 35Cl3 37Cl2	PeCB
	359.8415	M+2	C12 H4 35Cl5 37Cl	HxCB
	361.8385	M+4	C12 H4 35Cl4 37Cl2	HxCB
	371.8817	M+2	13C12 H4 35Cl5 37Cl	HxCB
	373.8788	M+4	13C12 H4 35Cl4 37Cl2	HxCB
	393.8025	M+2	C12 H3 35Cl6 37Cl	HpCB
	395.7996	M+4	C12 H3 35Cl5 37Cl2	HpCB
	405.8428	M+2	13C12 H3 35Cl6 37Cl	HpCB
	407.8398	M+4	13C12 H3 35Cl5 37Cl2	HpCB
	[354.9892[	Lock	C9F13	PFK
3	509.7229	M+4	13C12 35Cl10 37Cl2	DCB
	511.7199	M+6	13C12 35Cl9 37Cl3	
	513.7170	M+8	13C12 35Cl8 37Cl4	
	[442.9728]	Lock	C10 F17	PFK

S = internal/recovery standard

H = 1.007825
C = 12.000000
^{13}C = 13.003355
F = 18.9984

^{35}Cl = 34.968853
^{37}Cl = 36.965903

LDC #: 21768A3c
SDG #: Section 1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: A

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668A)

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

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

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

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

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

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

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

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

Example:

Sample I.D. 2, PCB 1:

Conc. = $\frac{(8.08|e+03)(2000)(\quad)}{(17.49e+03)(1.115)(1.10)(\quad)}$

= 753.2 PS/L

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