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

Polychlorinated Biphenyls

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 29, 2009

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 4

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903006

Sample Identification

EB052709
M-127B
FB060409

Introduction

This data review covers 3 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.

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 multicomponent compounds was 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.

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.

V. Blanks

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

Sample EB052709 was identified as an equipment blank. No polychlorinated biphenyl contaminants were found in this blank.

Sample FB060409 was identified as a field 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.

XII. Compound Quantitation and Reported CRQLs

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 R090306	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 Polychlorinated Biphenyls - Data Qualification Summary - SDG R0903006

SDG	Sample	Compound	Flag	A or P	Reason
R0903006	EB052709 M-127B FB060409	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (PQL) (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 4

LDC #: 21495B3b
SDG #: R0903006
Laboratory: Columbia Analytical Services

Date: 9/16/09
Page: 1 of 1
Reviewer: JVC
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: 5/27-28/09, 6/04/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	RSD
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	A	
XII.	Compound quantitation and reported CRQLs	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	ND	EB = 1 FB = 3

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	EB052709	11	88638 MB	21		31	
2	M-127B	12	89250	22		32	
3	FB060409	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 #: 21495 B3b
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
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%?	✓			
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%.0 for individual breakdown in the Evaluation mix standards?			✓	
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 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 #: 21495 B36
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: JV6
2nd Reviewer: [illegible]

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 #: 21495 B26
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SV6
2nd Reviewer: [illegible]

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 (500 std)	Recalculated CF (50 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	6/10/09	1260-1 (DB-1701)	2.757e5	2.756 e5	2.964 e5	2.968 e5	9.8	9.8
			↓ (DB-17)	3.540 ↓	3.540 ↓	3.782 ↓	3.782 ↓	9.71	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 #: 21495 B3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: JVG
2nd Reviewer: ✓

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

The continuing calibration percent difference (%D) values were recalculated for ______________________ using the following calculation:

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
* AH084	6/11/09	1260-1 (DB-1701)	296.376 e3	314.710 e3	314.8 e3	6.2	6.2
		↓ (DB-17)	378.204 e3	408.409 e3	408.4 ↓	8.0	8.0
AH097	6/15/09	1260-1 (DB-1701)	296.376 e3	306.622 e3	306.6 e3	3.5	3.4
		↓ (DB-17)	378.204 ↓	403.393 ↓	403.4 ↓	6.7	6.7

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 #: 21495 B3b
SDG #: Sa Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: SVG
2nd reviewer: Q

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: # 2

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Tetrachloro-m-xylene						
Tetrachloro-m-xylene	DB-17	100	102.9	103	103	0
Decachlorobiphenyl	↓	↓	47.96	48	48	↓
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 #: 21495 B36
SDG #: See Cover

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

Page: 1 of 1
Reviewer: VV6
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: 88638 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	4.83	4.17	97	97	83	83	15	15

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 #: 21495B36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JG
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: June 23, 2009

LDC Report Date: September 22, 2009

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-125B
M-125BMS
M-125BMSD

Introduction

This data review covers 3 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.

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 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.

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.

V. Blanks

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

Sample FB060409 (from SDG R090306) was identified as a field 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

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)	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
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0903404

SDG	Sample	Compound	Flag	A or P	Reason
R0903404	M-125B	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 R0903404

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495E3b
SDG #: R0903404
Laboratory: Columbia Analytical Services

Date: 9/17/09
Page: 1 of 1
Reviewer: JVL
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: 6/23/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
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	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

1	M-125B	11		21		31	
2	M-125BMS	12		22		32	
3	M-125BMSD	13		23		33	
4	90220 MB	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	

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 10 through June 11, 2009

LDC Report Date: September 22, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903184

Sample Identification

SA56-0.5B
RSA03-0.5B
SA166-0.5B

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 8082 for Polychlorinated Biphenyls.

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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.

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.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl 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. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Column	Surrogate	%R (Limits)	Compound	Flag	A or P
RSA03-0.5B	Not specified	Decachlorobiphenyl	290 (40-140)	All TCL compounds	J+ (all detects)	P

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 R0903184	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
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0903184

SDG	Sample	Compound	Flag	A or P	Reason
R0903184	RSA03-0.5B	All TCL compounds	J+ (all detects)	P	Surrogate recovery (%R) (s)
R0903184	SA56-0.5B RSA03-0.5B SA166-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495F3b
SDG #: R0903184
Laboratory: Columbia Analytical Services

Date: 9/17/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

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: 6/10-11/09
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	N	Client Spike
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	N	

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

Validated Samples: Soil

1	SA56-0.5B	11	89340 MB	21		31	
2	RSA03-0.5B	12	89401 MB	22		32	
3	SA166-0.5B	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	

#2 - RSA03
↳ letter not #

LDC #: 21495F36
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

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

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

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

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

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		2	Not spec	B	290 (40-140)	J+ dets / P (S)
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 19, 2009

LDC Report Date: September 22, 2009

Matrix: Soil

Parameters: Polychlorinated Biphenyls

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903443

Sample Identification

SA129-0.5B

Introduction

This data review covers one soil sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 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.

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 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.

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.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl 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. 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 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
Polychlorinated Biphenyls - Data Qualification Summary - SDG R0903443

SDG	Sample	Compound	Flag	A or P	Reason
R0903443	SA129-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)

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

No Sample Data Qualified in this SDG

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

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495G3b
SDG #: R0903443
Laboratory: Columbia Analytical Services

Date: 9/16/09
Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

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: 6/1a/09
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ 20%
V.	Blanks	A	
VI.	Surrogate spikes	SW	
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	N	

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

Validated Samples: Soil

1	SA129-0.5B	11		21		31	
2	90255 MB	12		22		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 #: 21495 G3b
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Reviewer: JVC
2nd Reviewer:

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

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

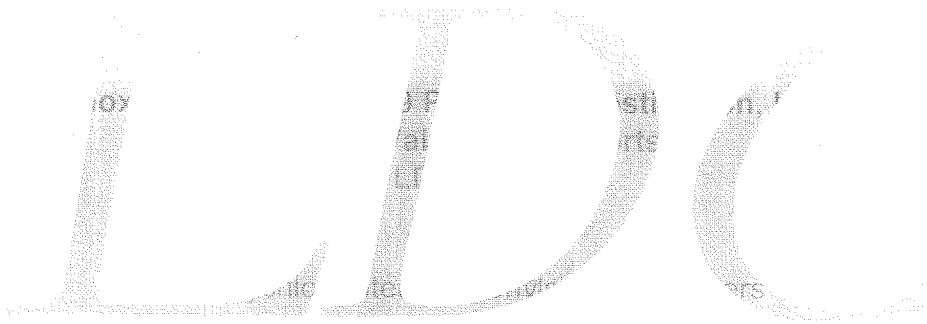
Y N N/A Were surrogates spiked into all samples, standards and blanks?
Y N N/A Did all surrogate percent recoveries (%R) meet the QC limits?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
		1 (SDG)	Not spec	A, B	0 (40-140)	No qual
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tetrachloro-m-xylene			
B	Decachlorobiphenyl			

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

Polychlorinated Biphenyls as Congeners



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:	October 7, 2009
Matrix:	Water
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Stage 4
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	R0903006

Sample Identification

EB052709
M-127B
FB060409

Introduction

This data review covers 3 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.

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. 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
EQ0900193-01	6/5/09	PCB-11	932 pg/L	EB052709
		PCB-18+30	74.6 pg/L	M-127B
		PCB-17	43.5 pg/L	
		PCB-16	53.5 pg/L	
		PCB-32	33.5 pg/L	
		PCB-31	90.1 pg/L	
		PCB-20+28	92.1 pg/L	
		PCB-21+33	60.9 pg/L	
		PCB-22	32.4 pg/L	
		PCB-52	115 pg/L	
		PCB-49+69	47.4 pg/L	
		PCB-48	57.1 pg/L	
		PCB-44+47+65	75.5 pg/L	
		PCB-70+61+74+76	142 pg/L	
		PCB-66	39.7 pg/L	
		PCB-56	17.0 pg/L	
		PCB-95	91.0 pg/L	
		PCB-88+91	45.5 pg/L	
		PCB-84	131 pg/L	
		PCB-90+101+113	483 pg/L	
		PCB-83+99	233 pg/L	
		PCB-86+87+97+108+119+125	360 pg/L	
		PCB-117	54.5 pg/L	
		PCB-85+116	514 pg/L	
		PCB-110+115	115 pg/L	
		PCB-82	45.1 pg/L	
		PCB-109	11.7 pg/L	
		PCB-118	381 pg/L	
		PCB-105	140 pg/L	
		PCB-136	49.2 pg/L	
		PCB-135+151	89.9 pg/L	
		PCB-147+149	215 pg/L	
		PCB-132	118 pg/L	
		PCB-146	30.5 pg/L	
		PCB-153+168	234 pg/L	
		PCB-137	36.2 pg/L	
		PCB-129+138+163	455 pg/L	
		PCB-158	41.8 pg/L	
		PCB-128+166	122 pg/L	
		PCB-167	25.8 pg/L	
		PCB-156+157	166 pg/L	
		PCB-179	13.8 pg/L	
		PCB-187	49.0 pg/L	
		PCB-183	22.7 pg/L	
		PCB-174	45.8 pg/L	
		PCB-177	26.1 pg/L	
		PCB-171+173	27.4 pg/L	
		PCB-172	22.1 pg/L	
		PCB-180+193	254 pg/L	
		PCB-170	321 pg/L	
		PCB-190	41.5 pg/L	
		PCB-189	24.3 pg/L	
		PCB-202	16.1 pg/L	
		PCB-201	4.31 pg/L	
		PCB-198+199	77.9 pg/L	
		PCB-196	27.0 pg/L	
		PCB-203	50.0 pg/L	
		PCB-195	32.2 pg/L	
		PCB-194	214 pg/L	
		PCB-205	6.18 pg/L	
		PCB-208	29.8 pg/L	
		PCB-207	7.91 pg/L	
		PCB-206	168 pg/L	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
EQ0900193-01	6/5/09	PCB-209	29.0 pg/L	EB052709
		Total DiCB	932 pg/L	M-127B
		Total TriCB	481 pg/L	
		Total TetraCB	494 pg/L	
		Total PentaCB	2600 pg/L	
		Total HexaCB	1580 pg/L	
		Total HeptaCB	848 pg/L	
		Total OctaCB	427 pg/L	
		Total NonaCB	206 pg/L	
EQ0900205-01	6/15/09	PCB-11	1150 pg/L	FB060409
		PCB-18+30	82.5 pg/L	
		PCB-31	85.0 pg/L	
		PCB-20+28	83.7 pg/L	
		PCB-52	109 pg/L	
		PCB-44+47+65	86.0 pg/L	
		PCB-70+61+74+76	79.0 pg/L	
		PCB-95	82.9 pg/L	
		PCB-89	239 pg/L	
		PCB-90+101+113	48.4 pg/L	
		PCB-83+99	69.0 pg/L	
		PCB-112	202 pg/L	
		PCB-86+87+97+108+119+125	64.6 pg/L	
		PCB-110+115	78.0 pg/L	
		PCB-107+124	145 pg/L	
		PCB-118	39.8 pg/L	
		PCB-114	52.8 pg/L	
		PCB-135+151	116 pg/L	
		PCB-146	94.3 pg/L	
		PCB-130	167 pg/L	
		PCB-198+199	22.0 pg/L	
		PCB-203	12.6 pg/L	
		PCB-208	12.0 pg/L	
		PCB-206	22.1 pg/L	
		PCB-209	34.0 pg/L	
		Total DiCB	1150 pg/L	
		Total TriCB	251 pg/L	
		Total TetraCB	274 pg/L	
		Total PentaCB	1020 pg/L	
		Total HexaCB	377 pg/L	
		Total OctaCB	34.5 pg/L	
		Total NonaCB	34.1 pg/L	

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
EB052709	PCB-11	677 pg/L	677U pg/L
	PCB-18+30	50.4 pg/L	50.4U pg/L
	PCB-17	29.5 pg/L	29.5U pg/L
	PCB-16	36.1 pg/L	36.1U pg/L
	PCB-32	19.7 pg/L	19.7U pg/L
	PCB-31	63.3 pg/L	63.3U pg/L
	PCB-20+28	57.8 pg/L	57.8U pg/L
	PCB-21+33	40.2 pg/L	40.2U pg/L
	PCB-22	22.9 pg/L	22.9U pg/L
	PCB-52	68.2 pg/L	68.2U pg/L
	PCB-49+69	31.2 pg/L	31.2U pg/L
	PCB-44+47+65	50.8 pg/L	50.8U pg/L
	PCB-70+61+74+76	53.2 pg/L	53.2U pg/L
	PCB-66	23.9 pg/L	23.9U pg/L
	PCB-56	12.1 pg/L	12.1U pg/L
	PCB-95	65.8 pg/L	65.8U pg/L
	PCB-84	20.3 pg/L	20.3U pg/L
	PCB-90+101+113	72.4 pg/L	72.4U pg/L
	PCB-83+99	37.0 pg/L	37.0U pg/L
	PCB-86+87+97+108+119+125	53.6 pg/L	53.6U pg/L
	PCB-110+115	92.5 pg/L	92.5U pg/L
	PCB-118	57.6 pg/L	57.6U pg/L
	PCB-105	22.5 pg/L	22.5U pg/L
	PCB-136	9.21 pg/L	9.21U pg/L
	PCB-135+151	20.3 pg/L	20.3U pg/L
	PCB-147+149	46.5 pg/L	46.5U pg/L
	PCB-132	22.8 pg/L	22.8U pg/L
	PCB-146	5.32 pg/L	5.32U pg/L
	PCB-153+168	42.5 pg/L	42.5U pg/L
	PCB-129+138+163	59.6 pg/L	59.6U pg/L
	PCB-158	5.18 pg/L	5.18U pg/L
	PCB-128+166	7.01 pg/L	7.01U pg/L
	PCB-156+157	8.48 pg/L	8.48U pg/L
	PCB-179	6.25 pg/L	6.25U pg/L
	PCB-187	14.9 pg/L	14.9U pg/L
	PCB-180+193	17.3 pg/L	17.3U pg/L
	PCB-170	9.99 pg/L	9.99U pg/L
	PCB-202	7.65 pg/L	7.65U pg/L
	PCB-198+199	24.0 pg/L	24.0U pg/L
	PCB-203	14.6 pg/L	14.6U pg/L
	PCB-194	23.5 pg/L	23.5U pg/L
	PCB-208	13.0 pg/L	13.0U pg/L
	PCB-206	44.1 pg/L	44.1U pg/L
	PCB-209	16.6 pg/L	16.6U pg/L
	Total DiCB	677 pg/L	677U pg/L
	Total TriCB	320 pg/L	320U pg/L
	Total TetraCB	263 pg/L	263U pg/L
	Total PentaCB	432 pg/L	432U pg/L
	Total HexaCB	237 pg/L	237U pg/L
	Total HeptaCB	48.5 pg/L	48.5U pg/L
	Total OctaCB	69.7 pg/L	69.7U pg/L
	Total NonaCB	57.1 pg/L	57.1U pg/L

Sample	Compound	Reported Concentration	Modified Final Concentration
M-127B	PCB-11	1100 pg/L	1100U pg/L
	PCB-18+30	206 pg/L	206U pg/L
	PCB-17	48.8 pg/L	48.8U pg/L
	PCB-16	73.1 pg/L	73.1U pg/L
	PCB-32	33.8 pg/L	33.8U pg/L
	PCB-31	102 pg/L	102U pg/L
	PCB-20+28	264 pg/L	264U pg/L
	PCB-21+33	84.5 pg/L	84.5U pg/L
	PCB-22	34.3 pg/L	34.3U pg/L
	PCB-49+69	53.1 pg/L	53.1U pg/L
	PCB-44+47+65	262 pg/L	262U pg/L
	PCB-70+61+74+76	168 pg/L	168U pg/L
	PCB-66	29.3 pg/L	29.3U pg/L
	PCB-56	57.9 pg/L	57.9U pg/L
	PCB-95	78.7 pg/L	78.7U pg/L
	PCB-84	23.2 pg/L	23.2U pg/L
	PCB-90+101+113	73.4 pg/L	73.4U pg/L
	PCB-83+99	33.3 pg/L	33.3U pg/L
	PCB-86+87+97+108+119+125	55.2 pg/L	55.2U pg/L
	PCB-110+115	84.1 pg/L	84.1U pg/L
	PCB-118	52.2 pg/L	52.2U pg/L
	PCB-105	19.7 pg/L	19.7U pg/L
	PCB-136	9.49 pg/L	9.49U pg/L
	PCB-135+151	21.2 pg/L	21.2U pg/L
	PCB-147+149	45.9 pg/L	45.9U pg/L
	PCB-132	20.8 pg/L	20.8U pg/L
	PCB-146	8.00 pg/L	8.00U pg/L
	PCB-153+168	41.0 pg/L	41.0U pg/L
	PCB-129+138+163	54.7 pg/L	54.7U pg/L
	PCB-158	5.70 pg/L	5.70U pg/L
	PCB-128+166	6.62 pg/L	6.62U pg/L
	PCB-156+157	4.84 pg/L	4.84U pg/L
	PCB-179	7.08 pg/L	7.08U pg/L
	PCB-187	19.0 pg/L	19.0U pg/L
	PCB-183	6.99 pg/L	6.99U pg/L
	PCB-174	7.08 pg/L	7.08U pg/L
	PCB-180+193	16.6 pg/L	16.6U pg/L
	PCB-202	11.6 pg/L	11.6U pg/L
	PCB-201	9.85 pg/L	9.85U pg/L
	PCB-198+199	31.4 pg/L	31.4U pg/L
	PCB-196	12.1 pg/L	12.1U pg/L
	PCB-203	14.0 pg/L	14.0U pg/L
	PCB-194	9.09 pg/L	9.09U pg/L
	PCB-205	4.17 pg/L	4.17U pg/L
	PCB-208	42.0 pg/L	42.0U pg/L
	PCB-206	58.5 pg/L	58.5U pg/L
	Total DiCB	1830 pg/L	1830U pg/L
	Total TriCB	1430 pg/L	1430U pg/L
	Total TetraCB	1610 pg/L	1610U pg/L
	Total PentaCB	431 pg/L	431U pg/L
	Total HexaCB	228 pg/L	228U pg/L
	Total HeptaCB	59.5 pg/L	59.5U pg/L
	Total OctaCB	113 pg/L	113U pg/L
	Total NonaCB	166 pg/L	166U pg/L

Sample	Compound	Reported Concentration	Modified Final Concentration
FB060409	PCB-11	1240 pg/L	1240U pg/L
	PCB-18+30	84.0 pg/L	84.0U pg/L
	PCB-31	92.5 pg/L	92.5U pg/L
	PCB-20+28	91.6 pg/L	91.6U pg/L
	PCB-52	105 pg/L	105U pg/L
	PCB-44+47+65	78.0 pg/L	78.0U pg/L
	PCB-70+61+74+76	71.5 pg/L	71.5U pg/L
	PCB-95	95.6 pg/L	95.6U pg/L
	PCB-90+101+113	84.3 pg/L	84.3U pg/L
	PCB-110+115	106 pg/L	106U pg/L
	PCB-118	51.7 pg/L	51.7U pg/L
	PCB-198+199	22.4 pg/L	22.4U pg/L
	PCB-203	13.1 pg/L	13.1U pg/L
	PCB-208	11.9 pg/L	11.9U pg/L
	PCB-206	26.3 pg/L	26.3U pg/L
	PCB-209	10.2 pg/L	10.2U pg/L
	Total DiCB	1240 pg/L	1240U pg/L
	Total TriCB	331 pg/L	331U pg/L
	Total TetraCB	255 pg/L	255U pg/L
	Total PentaCB	338 pg/L	338U pg/L
	Total HexaCB	105 pg/L	105U pg/L
	Total OctaCB	35.4 pg/L	35.4U pg/L
	Total NonaCB	38.2 pg/L	38.2U pg/L

Sample EB052709 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
EB052709	5/27/09	PCB-1	21.5 pg/L	No associated samples in this SDG
		PCB-11	677 pg/L	
		PCB-18+30	50.4 pg/L	
		PCB-17	29.5 pg/L	
		PCB-16	36.1 pg/L	
		PCB-32	19.7 pg/L	
		PCB-31	63.3 pg/L	
		PCB-20+28	57.8 pg/L	
		PCB-21+33	40.2 pg/L	
		PCB-22	22.9 pg/L	
		PCB-52	68.2 pg/L	
		PCB-49+69	31.2 pg/L	
		PCB-44+47+65	50.8 pg/L	
		PCB-64	19.5 pg/L	
		PCB-70+61+74+76	53.2 pg/L	
		PCB-66	23.9 pg/L	
		PCB-56	12.1 pg/L	
		PCB-60	4.62 pg/L	
		PCB-95	65.8 pg/L	
		PCB-84	20.3 pg/L	
		PCB-92	9.93 pg/L	
		PCB-90+101+113	72.4 pg/L	
		PCB-83+99	37.0 pg/L	
		PCB-86+87+97+108+119+125	53.6 pg/L	
		PCB-110+115	92.5 pg/L	
		PCB-118	57.6 pg/L	
		PCB-105	22.5 pg/L	
		PCB-136	9.21 pg/L	
		PCB-135+151	20.3 pg/L	
		PCB-147+149	46.5 pg/L	
		PCB-132	22.8 pg/L	
		PCB-146	5.32 pg/L	
		PCB-153+168	42.5 pg/L	
		PCB-141	9.68 pg/L	
		PCB-129+138+163	59.6 pg/L	
		PCB-158	5.18 pg/L	
		PCB-128+166	7.01 pg/L	
		PCB-156+157	8.48 pg/L	
		PCB-179	6.25 pg/L	
		PCB-187	14.9 pg/L	
		PCB-180+193	17.3 pg/L	
		PCB-170	9.99 pg/L	
		PCB-202	7.65 pg/L	
		PCB-198+199	24.0 pg/L	
		PCB-203	14.6 pg/L	
		PCB-194	23.5 pg/L	
		PCB-208	13.0 pg/L	
		PCB-206	44.1 pg/L	
		PCB-209	16.6 pg/L	
		Total MonoCB	21.5 pg/L	
		Total DiCB	677 pg/L	
		Total TriCB	320 pg/L	
		Total TetraCB	263 pg/L	
		Total PentaCB	432 pg/L	
		Total HexaCB	237 pg/L	
		Total HeptaCB	48.5 pg/L	
		Total OctaCB	69.7 pg/L	
		Total NonaCB	57.1 pg/L	

Sample FB060409 was identified as a field blank. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB060409	6/4/09	PCB-11	1240 pg/L	No associated samples in this SDG
		PCB-18+30	84.0 pg/L	
		PCB-31	92.5 pg/L	
		PCB-20+28	91.6 pg/L	
		PCB-21+33	63.2 pg/L	
		PCB-52	105 pg/L	
		PCB-44+47+65	78.0 pg/L	
		PCB-70+61+74+76	71.5 pg/L	
		PCB-95	95.6 pg/L	
		PCB-90+101+113	84.3 pg/L	
		PCB-110+115	106 pg/L	
		PCB-118	51.7 pg/L	
		PCB-147+149	36.7 pg/L	
		PCB-153+168	25.3 pg/L	
		PCB-129+138+163	43.3 pg/L	
		PCB-198+199	22.4 pg/L	
		PCB-203	13.1 pg/L	
		PCB-208	11.9 pg/L	
		PCB-206	26.3 pg/L	
		PCB-209	10.2 pg/L	
		Total DiCB	1240 pg/L	
		Total TriCB	331 pg/L	
		Total TetraCB	255 pg/L	
		Total PentaCB	338 pg/L	
		Total HexaCB	105 pg/L	
		Total OctaCB	35.4 pg/L	
		Total NonaCB	38.2 pg/L	

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.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

XI. 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

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903006	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

XII. System Performance

The system performance was acceptable.

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 R0903006

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903006	EB052709 M-127B FB060409	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903006	EB052709 M-127B FB060409	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG R0903006

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903006	EB052709	PCB-11	677U pg/L	A	bl
		PCB-18+30	50.4U pg/L		
		PCB-17	29.5U pg/L		
		PCB-16	36.1U pg/L		
		PCB-32	19.7U pg/L		
		PCB-31	63.3U pg/L		
		PCB-20+28	57.8U pg/L		
		PCB-21+33	40.2U pg/L		
		PCB-22	22.9U pg/L		
		PCB-52	68.2U pg/L		
		PCB-49+69	31.2U pg/L		
		PCB-44+47+65	50.8U pg/L		
		PCB-70+61+74+76	53.2U pg/L		
		PCB-66	23.9U pg/L		
		PCB-56	12.1U pg/L		
		PCB-95	65.8U pg/L		
		PCB-84	20.3U pg/L		
		PCB-90+101+113	72.4U pg/L		
		PCB-83+99	37.0U pg/L		
		PCB-86+87+97+108+119+125	53.6U pg/L		
		PCB-110+115	92.5U pg/L		
		PCB-118	57.6U pg/L		
		PCB-105	22.5U pg/L		
		PCB-136	9.21U pg/L		
		PCB-135+151	20.3U pg/L		
		PCB-147+149	46.5U pg/L		
		PCB-132	22.8U pg/L		
		PCB-146	5.32U pg/L		
		PCB-153+168	42.5U pg/L		
		PCB-129+138+163	59.6U pg/L		
		PCB-158	5.18U pg/L		
		PCB-128+166	7.01U pg/L		
		PCB-156+157	8.48U pg/L		
		PCB-179	6.25U pg/L		
		PCB-187	14.9U pg/L		
		PCB-180+193	17.3U pg/L		
		PCB-170	9.99U pg/L		
		PCB-202	7.65U pg/L		
		PCB-198+199	24.0U pg/L		
		PCB-203	14.6U pg/L		
		PCB-194	23.5U pg/L		
		PCB-208	13.0U pg/L		
		PCB-206	44.1U pg/L		
		PCB-209	16.6U pg/L		
		Total DiCB	677U pg/L		
		Total TriCB	320U pg/L		
		Total TetraCB	263U pg/L		
		Total PentaCB	432U pg/L		
		Total HexaCB	237U pg/L		
		Total HeptaCB	48.5U pg/L		
		Total OctaCB	69.7U pg/L		
		Total NonaCB	57.1U pg/L		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903006	M-127B	PCB-11	1100U pg/L	A	bl
		PCB-18+30	206U pg/L		
		PCB-17	48.8U pg/L		
		PCB-16	73.1U pg/L		
		PCB-32	33.8U pg/L		
		PCB-31	102U pg/L		
		PCB-20+28	264U pg/L		
		PCB-21+33	84.5U pg/L		
		PCB-22	34.3U pg/L		
		PCB-49+69	53.1U pg/L		
		PCB-44+47+65	262U pg/L		
		PCB-70+61+74+76	168U pg/L		
		PCB-66	29.3U pg/L		
		PCB-56	57.9U pg/L		
		PCB-95	78.7U pg/L		
		PCB-84	23.2U pg/L		
		PCB-90+101+113	73.4U pg/L		
		PCB-83+99	33.3U pg/L		
		PCB-86+87+97+108+119+125	55.2U pg/L		
		PCB-110+115	84.1U pg/L		
		PCB-118	52.2U pg/L		
		PCB-105	19.7U pg/L		
		PCB-136	9.49U pg/L		
		PCB-135+151	21.2U pg/L		
		PCB-147+149	45.9U pg/L		
		PCB-132	20.8U pg/L		
		PCB-146	8.00U pg/L		
		PCB-153+168	41.0U pg/L		
		PCB-129+138+163	54.7U pg/L		
		PCB-158	5.70U pg/L		
		PCB-128+166	6.62U pg/L		
		PCB-156+157	4.84U pg/L		
		PCB-179	7.08U pg/L		
		PCB-187	19.0U pg/L		
		PCB-183	6.99U pg/L		
		PCB-174	7.08U pg/L		
		PCB-180+193	16.6U pg/L		
		PCB-202	11.6U pg/L		
		PCB-201	9.85U pg/L		
		PCB-198+199	31.4U pg/L		
		PCB-196	12.1U pg/L		
		PCB-203	14.0U pg/L		
		PCB-194	9.09U pg/L		
		PCB-205	4.17U pg/L		
		PCB-208	42.0U pg/L		
		PCB-206	58.5U pg/L		
		Total DiCB	1830U pg/L		
		Total TriCB	1430U pg/L		
		Total TetraCB	1610U pg/L		
		Total PentaCB	431U pg/L		
		Total HexaCB	228U pg/L		
		Total HeptaCB	59.5U pg/L		
		Total OctaCB	113U pg/L		
		Total NonaCB	166U pg/L		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903006	FB060409	PCB-11	1240U pg/L	A	bl
		PCB-18+30	84.0U pg/L		
		PCB-31	92.5U pg/L		
		PCB-20+28	91.6U pg/L		
		PCB-52	105U pg/L		
		PCB-44+47+65	78.0U pg/L		
		PCB-70+61+74+76	71.5U pg/L		
		PCB-95	95.6U pg/L		
		PCB-90+101+113	84.3U pg/L		
		PCB-110+115	106U pg/L		
		PCB-118	51.7U pg/L		
		PCB-198+199	22.4U pg/L		
		PCB-203	13.1U pg/L		
		PCB-208	11.9U pg/L		
		PCB-206	26.3U pg/L		
		PCB-209	10.2U pg/L		
		Total DiCB	1240U pg/L		
		Total TriCB	331U pg/L		
		Total TetraCB	255U pg/L		
		Total PentaCB	338U pg/L		
		Total HexaCB	105U pg/L		
		Total OctaCB	35.4U pg/L		
		Total NonaCB	38.2U pg/L		

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG R0903006

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET

LDC #: 21495B3c
SDG #: E0903006
Laboratory: Columbia Analytical Services

Stage 4 ~~2B~~

Date: 9/21/09
Page: 1 of 1
Reviewer: T
2nd Reviewer: ~~T~~

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: 5/27-6/4/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	20/3570
IV.	Routine calibration/ICV	A	30/6070
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	~~A~~ SW	
X.	Target compound identifications	A	
XI.	Compound quantitation and CRQLs	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB=1. FB=3

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:

MH2O2

1	EB052709 **	11[1]	E0900205-01	21[1]	U21948	31	
2	M-127B **	12[2]	E0900193-01	22[2]	U21943	32	
3[1]	FB060409	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 #: 21495B3C
SDG #: See Cover

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: Q

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) $\leq$ 25% for unlabeled standards and $\leq$ 30% for labeled standards?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound $\geq$ 2.5 and for each recovery and internal standard $\geq$ 10?	✓			
IV. Continuing calibration				
Was a routine calibration performed at the beginning of each 12 hour period?	✓			
Were all percent differences (%D) $\leq$ ~~40%~~ 30/50% for unlabeled and 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 #: 24935c
SDG #: See cover

VALIDATION FINDINGS CHECKLIST

Reviewer: 8
2nd Reviewer: 8

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 #: 21495B3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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: 6/5/09 **Blank analysis date:** 6/15/09
Conc. units: pg/L **Associated samples:** 1 - 2

Compound	Blank ID	Sample Identification								
	FQ0900193-01	1	2							
PCB 11	932	677/U	1100/U							
PCBs 18+30	74.6	50.4/U	206/U							
PCB 17	43.5	29.5/U	48.8/U							
PCB 16	53.5	36.1/U	73.1/U							
PCB 32	33.5	19.7/U	33.8/U							
PCB 31	90.1	63.3/U	102/U							
PCBs 20+28	92.1	57.8/U	264/U							
PCBs 21+33	60.9	40.2/U	84.5/U							
PCB 22	32.4	22.9/U	34.3/U							
PCB 52	115	68.2/U	-							
PCBs 49+69	47.4	31.2/U	53.1/U							
PCB 48	57.1									
PCBs 44+47+65	75.5	50.8/U	262/U							
PCBs 70+61+74+76	142	53.2/U	168/U							
PCB 66	39.7	23.9/U	29.3/U							
PCB 56	17.0	12.1/U	57.9/U							
PCB 95	91.0	65.8/U	78.7/U							
PCBs 88+91	45.5									
PCB 84	131	20.3/U	23.2/U							
PCBs 90+101+113	483	72.4/U	73.4/U							
PCBs 83+99	233	37.0/U	33.3/U							

PCBs 86+87+97+108+119+125	360	53.6/U	55.2/U							
PCB 117	54.5									
PCBs 85+116	514									
PCBs 110+115	115	92.5/U	84.1/U							
PCB 82	45.1									
PCB 109	11.7									
PCB 118	381	57.6/U	52.2/U							
PCB 105	140	22.5/U	19.7/U							
PCB 136	49.2	9.21/U	9.49/U							
PCBs 135+151	89.9	20.3/U	21.2/U							
PCBs 147+149	215	46.5/U	45.9/U							
PCB 132	118	22.8/U	20.8/U							
PCB 146	30.5	5.32/U	8.00/U							
PCBs 153+168	234	42.5/U	41.0/U							
PCB 137	36.2									
PCBs 129+138+163	455	59.6/U	54.7/U							
PCB 158	41.8	5.18/U	5.70/U							
PCBs 128+166	122	7.01/U	6.62/U							
PCB 167	25.8									
PCBs 156+157	166	8.48/U	4.84/U							
PCB 179	13.8	6.25/U	7.08/U							
PCB 187	49.0	14.9/U	19.0/U							
PCB 183	22.7		6.99/U							
PCB 174	45.8		7.08/U							
PCB 177	26.1									
PCBs 171+173	27.4									
PCB 172	22.1									
PCBs 180+193	254	17.3/U	16.6/U							
PCB 170	321	9.99/U								
PCB 190	41.5									
PCB 189	24.3									

PCB 202	16.1	7.65/U	11.6/U							
PCB 201	4.31		9.85/U							
PCBs 198+199	77.9	24.0/U	31.4/U							
PCB 196	27.0		12.1/U							
PCB 203	50.0	14.6/U	14.0/U							
PCB 195	32.2									
PCB 194	214	23.5/U	9.09/U							
PCB 205	6.18		4.17/U							
PCB 208	29.8	13.0/U	42.0/U							
PCB 207	7.91		-							
PCB 206	168	44.1/U	58.5/U							
PCB 209	29.0	16.6/U	-							
Total DiCB	932	677/U	1830/U							
Total TriCB	481	320/U	1430/U							
Total TetraCB	494	263/U	1610/U							
Total PentaCB	2600	432/U	431/U							
Total HexaCB	1580	237/U	228/U							
Total HeptaCB	848	48.5/U	59.5/U							
Total OctaCB	427	69.7/U	113/U							
Total NonaCB	206	57.1/U	166/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".

LDC #: 21495B3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Q
2nd Reviewer: 1

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: 6/15/09 **Blank analysis date:** 6/22/09
Conc. units: pg/L **Associated samples:** 3

Compound	Blank ID	Sample Identification								
	EQ0900205-01	3								
PCB 11	1150	1240/U								
PCBs 18+30	82.5	84.0/U								
PCB 31	85.0	92.5/U								
PCBs 20+28	83.7	91.6/U								
PCB 52	109	105/U								
PCBs 44+47+65	86.0	78.0/U								
PCBs 70+61+74+76	79.0	71.5/U								
PCB 95	82.9	95.6/U								
PCB 89	239									
PCBs 90+101+113	48.4	84.3/U								
PCBs 83+99	69.0									
PCB 112	202									
PCBs 86+87+97+108+119+125	64.6									
PCBs 110+115	78.0	106/U								
PCBs 107+124	145									
PCB 118	39.8	51.7/U								
PCB 114	52.8									
PCBs 135+151	116									
PCB 146	94.3									
PCB 130	167									
PCBs 198+199	22.0	22.4/U								

PCB 203	12.6	13.1/U								
PCB 208	12.0	11.9/U								
PCB 206	22.1	26.3/U								
PCB 209	34.0	10.2/U								
Total DiCB	1150	1240/U								
Total TriCB	251	331/U								
Total TetraCB	274	255/U								
Total PentaCB	1020	338/U								
Total HexaCB	377	105/U								
Total OctaCB	34.5	35.4/U								
Total NonaCB	34.1	38.2/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".

LDC #: 21495B3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer: 1

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:** -
Field blank type: (circle one) Field Blank / Rinsate / Other: FB Associated Samples: None

Compound	Blank ID	Sample Identification								
(5/27/09)	FB052709									
PCB 1	21.5									
PCB 11	677									
PCBs 18+30	50.4									
PCB 17	29.5									
PCB 16	36.1									
PCB 32	19.7									
PCB 31	63.3									
PCBs 20+28	57.8									
PCBs 21+33	40.2									
PCB 22	22.9									
PCB 52	68.2									
PCBs 49+69	31.2									
PCBs 44+47+65	50.8									
PCB 64	19.5									
PCBs 70+61+74+76	53.2									
PCB 66	23.9									
PCB 56	12.1									
PCB 60	4.62									
PCB 95	65.8									
PCB 84	20.3									
PCB 92	9.93									
PCBs 90+101+113	72.4									
PCBs 83+99	37.9									

PCBs 86+87+97+108+119+125	53.6									
PCBs 110+115	92.5									
PCB 118	57.6									
PCB 105	22.5									
PCB 136	9.21									
PCBs 135+151	20.3									
PCBs 147+149	46.5									
PCB 132	22.8									
PCB 146	5.32									
PCBs 153+168	42.5									
PCB 141	9.68									
PCBs 129+138+163	59.6									
PCB 158	5.18									
PCBs 128+166	7.01									
PCBs 156+157	8.48									
PCB 179	6.25									
PCB 187	14.9									
PCBs 180+193	17.3									
PCB 170	9.99									
PCB 202	7.65									
PCBs 198+199	24.0									
PCB 203	14.6									
PCB 194	23.5									
PCB 208	13.0									
PCB 206	44.1									
PCB 209	16.6									
Total MonoCB	21.5									
Total DiCB	677									
Total TriCB	320									
Total TetraCB	263									

Total PentaCB	432									
Total HexaCB	237									
Total HeptaCB	48.5									
Total OctaCB	69.7									
Total NonaCB	57.1									

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".

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LDC #: 21495B3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

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:** - Sample date: 6/4/09
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: None

Compound	Blank ID	Sample Identification								
	FB060409									
PCB 11	1240									
PCBs 18+30	84.0									
PCB 31	92.5									
PCBs 20+28	91.6									
PCBs 21+33	63.2									
PCB 52	105									
PCBs 44+47+65	78.0									
PCBs 70+61+74+76	71.5									
PCB 95	95.6									
PCBs 90+101+113	84.3									
PCBs 110+115	106									
PCB 118	51.7									
PCBs 147+149	36.7									
PCBs 153+168	25.3									
PCBs 129+138+163	43.3									
PCBs 198+199	22.4									
PCB 203	13.1									
PCB 208	11.9									
PCB 206	26.3									
PCB 209	10.2									
Total DiCB	1240									
Total TriCB	331									
Total TetraCB	255									

Total PentaCB	338									
Total HexaCB	105									
Total OctaCB	35.4									
Total NonaCB	38.2									

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".

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LDC #: 24953c
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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 Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N N/A Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	Reported 2nd PC	All	J+ (K)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 21495J2C
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

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 #: 21495B3C
SDG #: Recovery

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: 9
2nd Reviewer: 9

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

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/Conc (CC)	Recalculated RRF/Conc (CC)	Reported %D	Recalculated %D
1	U219473	6/15/09	PCB-77 (^{13}C-PCB-77)	1.04	51.4	51.3		
			PCB-105 (^{13}C-PCB-105)	1.06	50.5	50.3		
			PCB-156 (^{13}C-PCB-156)	1.05	96.6	96.2		
			PCB-180 (^{13}C-PCB-180)	0.90	53.9	54.0		
2	U219482	6/22/09	PCB-77 (^{13}C-PCB-77)	1.04	50.0	50.0		
			PCB-105 (^{13}C-PCB-105)	1.06	49.3	49.1		
			PCB-156 (^{13}C-PCB-156)	1.05	95.3	95.0		
			PCB-180 (^{13}C-PCB-180)	0.90	53.3	53.3		
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 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 #: 49533c
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

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

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

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 recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 280900193-02/3

Compound	Spike Added (PS/L)		Spiked Sample Concentration (PS/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PCB-77	1000	1000	1120	1160	112	112	116	116	4	4
PCB-81	↓	↓	1090	1130	109	109	113	113	4	4
PCB-105			1020	1070	102	102	107	107	5	5
PCB-114			1080	1140	108	108	114	114	5	5
PCB-118			1060	1120	106	106	112	112	6	6
PCB-123			1030	1080	103	103	108	108	5	5
PCB-126			1000	1020	100	100	102	102	2	2
PCB-156/157	2000	2000	1950	1990	97	97	99	99	2	2
~~PCB-157~~										
PCB-167	1000	1000	970	1010	97	97	101	101	4	4
PCB-169	↓	↓	994	1040	99	99	104	104	5	5
~~PCB-170~~										
~~PCB-180~~										
PCB-189	1000	1000	1050	1080	105	105	108	108	3	3

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

LDC #: 24958342
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

Y N N/A Were all reported results recalculated and verified for all level IV samples?

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

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

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

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

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

RRF = Relative response factor of the calibration standard.

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

Df = Dilution factor.

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

Example:

Sample I.D. PCB 1, 1:

Conc. = $\frac{(3.4353e+02)(2000)(\quad)}{(2.841e+04)(1.11)(1.010)(\quad)}$

= 21.57 pg/L

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

Laboratory Data Consultants, Inc.
Data Validation Report

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

Collection Date: June 23, 2009

LDC Report Date: November 3, 2009

Matrix: Water

Parameters: Polychlorinated Biphenyls as Congeners

Validation Level: Stage 2B

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): R0903404

Sample Identification

M-125B
M-125BMS
M-125BMSD

Introduction

This data review covers 3 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 Stage 4 review. Stage 2B review was performed on all of the 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
EQ0900269-01	7/20/09	PCB-11	810 pg/L	All samples in SDG R0903404
		PCB-18+30	84.0 pg/L	
		PCB-31	80.7 pg/L	
		PCB-20+28	71.4 pg/L	
		PCB-21+33	44.5 pg/L	
		PCB-52	95.7 pg/L	
		PCB-49+69	28.6 pg/L	
		PCB-44+47+65	68.2 pg/L	
		PCB-64	19.6 pg/L	
		PCB-70+61+74+76	95.2 pg/L	
		PCB-66	30.0 pg/L	
		PCB-95	166 pg/L	
		PCB-88+91	22.9 pg/L	
		PCB-84	55.1 pg/L	
		PCB-92	34.8 pg/L	
		PCB-90+101+113	198 pg/L	
		PCB-83+99	91.6 pg/L	
		PCB-86+87+97+108+119+125	152 pg/L	
		PCB-85+116	24.8 pg/L	
		PCB-110+115	266 pg/L	
		PCB-118	154 pg/L	
		PCB-105	68.8 pg/L	
		PCB-136	19.3 pg/L	
		PCB-135+151	45.7 pg/L	
		PCB-147+149	119 pg/L	
		PCB-132	73.5 pg/L	
		PCB-146	20.9 pg/L	
		PCB-153+168	129 pg/L	
		PCB-141	32.3 pg/L	
		PCB-137	17.4 pg/L	
		PCB-164	11.1 pg/L	
		PCB-129+138+163	247 pg/L	
		PCB-158	24.7 pg/L	
		PCB-128+166	41.8 pg/L	
		PCB-167	9.04 pg/L	
		PCB-156+157	38.2 pg/L	
		PCB-179	6.33 pg/L	
		PCB-187	20.1 pg/L	
		PCB-174	17.5 pg/L	
		PCB-180+193	36.2 pg/L	
		PCB-170	24.5 pg/L	
		PCB-202	5.23 pg/L	
		PCB-198+199	24.4 pg/L	
		PCB-203	11.3 pg/L	
		PCB-194	11.2 pg/L	
		PCB-208	14.2 pg/L	
		PCB-207	4.80 pg/L	
		PCB-206	37.2 pg/L	
		PCB-209	14.7 pg/L	
		Total DiCB	810 pg/L	
		Total TriCB	281 pg/L	
		Total TetraCB	337 pg/L	
		Total PentaCB	1230 pg/L	
		Total HexaCB	830 pg/L	
		Total HeptaCB	105 pg/L	
		Total OctaCB	52.1 pg/L	
		Total NonaCB	56.1 pg/L	

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:

*Indicates change as the result of report review.

Sample	Compound	Reported Concentration	Modified Final Concentration
*M-125B	PCB-11	747 pg/L	747U pg/L
	PCB-31	43.0 pg/L	43.0U pg/L
	PCB-20+28	42.6 pg/L	42.6U pg/L
	PCB-52	48.0 pg/L	48.0U pg/L
	PCB-44+47+65	49.3 pg/L	49.3U pg/L
	PCB-70+61+74+76	49.1 pg/L	49.1U pg/L
	PCB-95	136 pg/L	136U pg/L
	PCB-84	46.2 pg/L	46.2U pg/L
	PCB-92	24.0 pg/L	24.0U pg/L
	PCB-90+101+113	167 pg/L	167U pg/L
	PCB-83+99	73.6 pg/L	73.6U pg/L
	PCB-86+87+97+108+119+125	122 pg/L	122U pg/L
	PCB-85+116	22.0 pg/L	22.0U pg/L
	PCB-110+115	223 pg/L	223U pg/L
	PCB-118	138 pg/L	138U pg/L
	PCB-105	66.6 pg/L	66.6U pg/L
	PCB-136	20.0 pg/L	20.0U pg/L
	PCB-135+151	39.3 pg/L	39.3U pg/L
	PCB-147+149	108 pg/L	108U pg/L
	PCB-132	59.9 pg/L	59.9U pg/L
	PCB-153+168	115 pg/L	115U pg/L
	PCB-141	28.5 pg/L	28.5U pg/L
	PCB-129+138+163	209 pg/L	209U pg/L
	PCB-158	20.8 pg/L	20.8U pg/L
	PCB-128+166	40.3 pg/L	40.3U pg/L
	PCB-167	13.7 pg/L	13.7U pg/L
	PCB-156+157	58.5 pg/L	58.5U pg/L
	PCB-187	20.2 pg/L	20.2U pg/L
	PCB-180+193	49.7 pg/L	49.7U pg/L
	PCB-198+199	21.1 pg/L	21.1U pg/L
	PCB-203	14.5 pg/L	14.5U pg/L
	PCB-194	13.0 pg/L	13.0U pg/L
	PCB-208	12.7 pg/L	12.7U pg/L
	PCB-207	11.4 pg/L	11.4U pg/L
	PCB-206	37.8 pg/L	37.8U pg/L
	PCB-209	71.2 pg/L	71.2U pg/L
	Total DiCB	747 pg/L	747U pg/L
	Total TriCB	138 pg/L	138U pg/L
	Total TetraCB	146 pg/L	146U pg/L
	Total PentaCB	1040 pg/L	1040U pg/L
	Total HexaCB	756 pg/L	756U pg/L
	Total HeptaCB	141 pg/L	141U pg/L
	Total OctaCB	48.6 pg/L	48.6U pg/L
	Total NonaCB	61.9 pg/L	61.9U pg/L
	PCB-170	17.0 pg/L	17.0U pg/L

*Added PCB-170 to sample M-125B

Sample FB060409 (from SDG R0903006) was identified as a field blank. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank with the following exceptions:

*Indicates change as the result of report review.

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB060409	6/4/09	PCB-11	1240 pg/L	M-125B
		PCB-18+30	84.0 pg/L	
		PCB-31	92.5 pg/L	
		PCB-20+28	91.6 pg/L	
		PCB-21+33	63.2 pg/L	
		PCB-52	105 pg/L	
		PCB-44+47+65	78.0 pg/L	
		PCB-70+61+74+76	71.5 pg/L	
		PCB-95	95.6 pg/L	
		PCB-90+101+113	84.3 pg/L	
		PCB-110+115	106 pg/L	
		PCB-118	51.7 pg/L	
		PCB-147+149	36.7 pg/L	
		PCB-153+168	25.3 pg/L	
		PCB-129+138+163	43.3 pg/L	
		PCB-198+199	22.4 pg/L	
		PCB-203	13.1 pg/L	
		PCB-208	11.9 pg/L	
		PCB-206	26.3 pg/L	
		PCB-209	10.2 pg/L	
		Total DiCB	1240 pg/L	
		Total TriCB	331 pg/L	
		Total TetraCB	255 pg/L	
		Total PentaCB	338 pg/L	
		Total HexaCB	105 pg/L	
		Total OctaCB	35.4 pg/L	
		Total NonaCB	38.2 pg/L	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
M-125B	PCB-11	747 pg/L	747U pg/L
	PCB-31	43.0 pg/L	43.0U pg/L
	PCB-20+28	42.6 pg/L	42.6U pg/L
	PCB-52	48.0 pg/L	48.0U pg/L
	PCB-44+47+65	49.3 pg/L	49.3U pg/L
	PCB-70+61+74+76	49.1 pg/L	49.1U pg/L
	PCB-95	136 pg/L	136U pg/L
	PCB-90+101+113	167 pg/L	167U pg/L
	PCB-110+115	233 pg/L	233U pg/L
	PCB-118	138 pg/L	138U pg/L
	PCB-147+149	108 pg/L	108U pg/L
	PCB-153+168	115 pg/L	115U pg/L
	PCB-129+138+163	209 pg/L	209U pg/L
	PCB-198+199	21.1 pg/L	21.1U pg/L
	PCB-203	14.5 pg/L	14.5U pg/L
	PCB-208	12.7 pg/L	12.7U pg/L
	PCB-206	37.8 pg/L	37.8U pg/L
	Total DiCB	747 pg/L	747U pg/L
	Total TriCB	138 pg/L	138U pg/L
	Total TetraCB	146 pg/L	146U pg/L
	Total PentaCB	1040 pg/L	1040U pg/L
	Total OctaCB	48.6 pg/L	48.6U pg/L
	Total NonaCB	61.9 pg/L	61.9U pg/L

*Indicates change as the result of report review.

VI. 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.

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
M-125B	^{13}C-PCB-1 ^{13}C-PCB-3 ^{13}C-PCB-4 ^{13}C-PCB-15 ^{13}C-PCB-19 ^{13}C-PCB-37 ^{13}C-PCB-54 ^{13}C-PCB-104	10 (25-150) 10 (25-150) 13 (25-150) 14 (25-150) 13 (25-150) 22 (25-150) 15 (25-150) 23 (25-150)	PCB-1 thru 39 PCB-40 thru 76 PCB-78 thru 80 PCB-82 thru 104 PCB106 thru 113 PCB-115 thru 117 PCB-119 thru 122 PCB-124+125 PCB-127	J (all detects) UJ (all non-detects)	P
EQ0900269-01	^{13}C-PCB-1 ^{13}C-PCB-3 ^{13}C-PCB-19	22 (25-150) 22 (25-150) 22 (25-150)	PCB-1 thru 3 PCB-16 thru 18 PCB-20 thru 36 PCB-38 thru 39	J (all detects) UJ (all non-detects)	P

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. 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)	A

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903404	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

XII. System Performance

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 Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG R0903404

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903404	M-125B	PCB-1 thru 39 PCB-40 thru 76 PCB-78 thru 80 PCB-82 thru 104 PCB106 thru 113 PCB-115 thru 117 PCB-119 thru 122 PCB-124+125 PCB-127	J (all detects) UJ (all non-detects)	P	Internal standards (%R) (i)
R0903404	M-125B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903404	M-125B	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 R0903404

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
*R0903404	M-125B	PCB-11	747U pg/L	A	bl
		PCB-31	43.0U pg/L		
		PCB-20+28	42.6U pg/L		
		PCB-52	48.0U pg/L		
		PCB-44+47+65	49.3U pg/L		
		PCB-70+61+74+76	49.1U pg/L		
		PCB-95	136U pg/L		
		PCB-84	46.2U pg/L		
		PCB-92	24.0U pg/L		
		PCB-90+101+113	167U pg/L		
		PCB-83+99	73.6U pg/L		
		PCB-86+87+97+108+119+125	122U pg/L		
		PCB-85+116	22.0U pg/L		
		PCB-110+115	223U pg/L		
		PCB-118	138U pg/L		
		PCB-105	66.6U pg/L		
		PCB-136	20.0U pg/L		
		PCB-135+151	39.3U pg/L		
		PCB-147+149	108U pg/L		
		PCB-132	59.9U pg/L		
		PCB-153+168	115U pg/L		
		PCB-141	28.5U pg/L		
		PCB-129+138+163	209U pg/L		
		PCB-158	20.8U pg/L		
		PCB-128+166	40.3U pg/L		
		PCB-167	13.7U pg/L		
		PCB-156+157	58.5U pg/L		
		PCB-187	20.2U pg/L		
		PCB-180+193	49.7U pg/L		
		PCB-198+199	21.1U pg/L		
		PCB-203	14.5U pg/L		
		PCB-194	13.0U pg/L		
		PCB-208	12.7U pg/L		
		PCB-207	11.4U pg/L		
		PCB-206	37.8U pg/L		
		PCB-209	71.2U pg/L		
		Total DiCB	747U pg/L		
		Total TriCB	138U pg/L		
		Total TetraCB	146U pg/L		
		Total PentaCB	1040U pg/L		
		Total HexaCB	756U pg/L		
		Total HeptaCB	141U pg/L		
		Total OctaCB	48.6U pg/L		
		Total NonaCB	61.9U pg/L		
		PCB-170	17.0U pg/L		

*Indicates change as the result of report review.

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG R0903404

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903404	M-125B	PCB-11	747U pg/L	A	bf
		PCB-31	43.0U pg/L		
		PCB-20+28	42.6U pg/L		
		PCB-52	48.0U pg/L		
		PCB-44+47+65	49.3U pg/L		
		PCB-70+61+74+76	49.1U pg/L		
		PCB-95	136U pg/L		
		PCB-90+101+113	167U pg/L		
		PCB-110+115	233U pg/L		
		PCB-118	138U pg/L		
		PCB-147+149	108U pg/L		
		PCB-153+168	115U pg/L		
		PCB-129+138+163	209U pg/L		
		PCB-198+199	21.1U pg/L		
		PCB-203	14.5U pg/L		
		PCB-208	12.7U pg/L		
		PCB-206	37.8U pg/L		
		Total DiCB	747U pg/L		
		Total TriCB	138U pg/L		
		Total TetraCB	146U pg/L		
		Total PentaCB	1040U pg/L		
		Total OctaCB	48.6U pg/L		
		Total NonaCB	61.9U pg/L		

*Indicates change as the result of report review.

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495E3c
SDG #: E0903404
Laboratory: Columbia Analytical Services

Date: 9/24/09
Page: 1 of 1
Reviewer: V
2nd Reviewer:

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: 6/23/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	20/35/0
IV.	Routine calibration/~~ICV~~	A	30/50/V
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	D	
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	FB060409 (20903006), ~~FB070109-SO(R0904076)~~

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	M-125B W	11	20900269-01	21	U21[illegible]	31	
2	M-125BMS	12		22		32	
3	M-125BMSD	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 #: 21495E3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer:

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: 7/20/09 **Blank analysis date:** 7/26/09
Conc. units: pg/L **Associated samples:** All

Compound	Blank ID	Sample Identification								
	FQ0900269-01	1								
PCB 11	810	747/U								
PCBs 18+30	84.0									
PCB 31	80.7	43.0/U								
PCBs 20+28	71.4	42.6/U								
PCBs 21+33	44.5									
PCB 52	95.7	48.0/U								
PCBs 49+69	28.6									
PCBs 44+47+65	68.2	49.3/U								
PCB 64	19.6									
PCBs 70+61+74+76	95.2	49.1/U								
PCB 66	30.0									
PCB 95	166	136/U								
PCBs 88+91	22.9									
PCB 84	55.1	46.2/U								
PCB 92	34.8	24.0/U								
PCBs 90+101+113	198	167/U								
PCBs 83+99	91.6	73.6/U								
PCBs 86+87+97+108+119+125	152	122/U								
PCBs 85+116	24.8	22.0/U								
PCBs 110+115	266	223/U								
PCB 118	154	138/U								

PCB 105	68.8	66.6/U								
PCB 136	19.3	20.0/U								
PCBs 135+151	45.7	39.3/U								
PCBs 147+149	119	108/U								
PCB 132	73.5	59.9/U								
PCB 146	20.9									
PCBs 153+168	129	115/U								
PCB 141	32.3	28.5/U								
PCB 137	17.4									
PCB 164	11.1									
PCBs 129+138+163	247	209/U								
PCB 158	24.7	20.8/U								
PCBs 128+166	41.8	40.3/U								
PCB 167	9.04	13.7/U								
PCBs 156+157	38.2	58.5/U								
PCB 179	6.33									
PCB 187	20.1	20.2/U								
PCB 174	17.5									
PCBs 180+193	36.2	49.7/U								
PCB 170	24.5	17.0/U								
PCB 202	5.23									
PCBs 198+199	24.4	21.1/U								
PCB 203	11.3	14.5/U								
PCB 194	11.2	13.0/U								
PCB 208	14.2	12.7/U								
PCB 207	4.80	11.4/U								
PCB 206	37.2	37.8/U								
PCB 209	14.7	71.2/U								
Total DiCB	810	747/U								
Total TriCB	281	138/U								
Total TetraCB	337	146/U								

Total PentaCB	1230	1040/U								
Total HexaCB	830	756/U								
Total HeptaCB	105	141/U								
Total OctaCB	52.1	48.6/U								
Total NonaCB	56.1	61.9/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".

LDC #: 21495C3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9
2nd Reviewer:

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: Associated Samples: ALL

Compound	Blank ID	Sample Identification								
	FB060409	1								
PCB 11	1240	747/U		other	cpds	>5x or NB				
PCBs 18+30	84.0									
PCB 31	92.5	43.0/U								
PCBs 20+28	91.6	42.6/U								
PCBs 21+33	63.2									
PCB 52	105	48.0/U								
PCBs 44+47+65	78.0	49.3/U								
PCBs 70+61+74+76	71.5	49.1/U								
PCB 95	95.6	136/U								
PCBs 90+101+113	84.3	167/U								
PCBs 110+115	106	233/U								
PCB 118	51.7	138/U								
PCBs 147+149	36.7	108/U								
PCBs 153+168	25.3	115/U								
PCBs 129+138+163	43.3	209/U								
PCBs 198+199	22.4	21.1/U								
PCB 203	13.1	14.5/U								
PCB 208	11.9	12.7/U								
PCB 206	26.3	37.8/U								
PCB 209	10.2	-								
Total DiCB	1240	747/U								
Total TriCB	331	138/U								
Total TetraCB	255	146/U								

Total PentaCB	338	1040/U								
Total HexaCB	105	-								
Total OctaCB	35.4	48.6/U								
Total NonaCB	38.2	61.9/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".

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LDC #: 24952302
SDG #: See Cover

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

VALIDATION FINDINGS WORKSHEET
Internal Standards

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 (Code = 1)
		1	13C-PCB 1	10	(25-150)	J/UJ/P (PCB 1—39
			3	10	( )	(PCB 40-76,
			4	13	( )	78-80, 82-104
			15	14	( )	106-113, 115-117
			19	13	( )	119-122, 124-125
			37	22	( )	127)
			54	15	( )	
			104	23	( )	
					( )	
					( )	
		ZR0900269-01	13C-PCB 1	22	( )	J/UJ/P (PCB 1-3,
			3	22	( )	PCB 16-18, 20-36
			19	22	( )	38-39)
					( )	
					( )	
		2 (MS)	IS out for same	—	(—)	No Qual
		3 (MSD)	~~[illegible]~~	—	(—)	
					( )	
					( )	
					( )	

	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	

INTST.16A

LDC #: 24952x
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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 Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N N/A Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		All	Recalculated 2MPC	All	J+ (K)

Comments: See sample calculation verification worksheet for recalculations

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada
Collection Date:	June 10, 2009
LDC Report Date:	October 7, 2009
Matrix:	Soil
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Stage 2B
Laboratory:	Columbia Analytical Services, Inc.
Sample Delivery Group (SDG):	R0903184

Sample Identification

SA56-0.5B
SA166-0.5B

Introduction

This data review covers 2 soil 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 Stage 4 review. Stage 2B review was performed on all of the 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. 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
EQ0900219-01	6/18/09	PCB-8	8.70 ng/Kg	All samples in SDG R0903184
		PCB-11	131 ng/Kg	
		PCB-18+30	9.69 ng/Kg	
		PCB-17	4.45 ng/Kg	
		PCB-24	3.13 ng/Kg	
		PCB-31	9.64 ng/Kg	
		PCB-20+28	9.75 ng/Kg	
		PCB-21+33	6.14 ng/Kg	
		PCB-52	12.5 ng/Kg	
		PCB-49 + 69	5.37 ng/Kg	
		PCB-44+47+65	11.3 ng/Kg	
		PCB-42	2.32 ng/Kg	
		PCB-64	3.87 ng/Kg	
		PCB-70+61+74+76	10.3 ng/Kg	
		PCB-66	4.96 ng/Kg	
		PCB-56	2.26 ng/Kg	
		PCB-95	11.2 ng/Kg	
		PCB-88+91	1.80 ng/Kg	
		PCB-84	3.35 ng/Kg	
		PCB-92	1.31 ng/Kg	
		PCB-90+101+113	9.76 ng/Kg	
		PCB-83+99	3.91 ng/Kg	
		PCB-86+87+97+108+119+125	7.06 ng/Kg	
		PCB-85+116	1.23 ng/Kg	
		PCB-110+115	11.1 ng/Kg	
		PCB-118	5.99 ng/Kg	
		PCB-105	2.83 ng/Kg	
		PCB-147+149	5.74 ng/Kg	
		PCB-132	2.67 ng/Kg	
		PCB-153+168	4.44 ng/Kg	
		PCB-129+138+163	6.30 ng/Kg	
		PCB-180+193	2.23 ng/Kg	
		PCB-202	1.50 ng/Kg	
		PCB-198+199	4.97 ng/Kg	
		PCB-203	2.83 ng/Kg	
		PCB-194	1.43 ng/Kg	
		PCB-208	4.50 ng/Kg	
		PCB-207	1.62 ng/Kg	
		PCB-206	12.1 ng/Kg	
		PCB-209	6.90 ng/Kg	
		Total DiCB	140 ng/Kg	
		Total TriCB	42.8 ng/Kg	
		Total TetraCB	52.9 ng/Kg	
		Total PentaCB	59.5 ng/Kg	
		Total HexaCB	19.1 ng/Kg	
		Total HeptaCB	2.23 ng/Kg	
		Total OctaCB	10.7 ng/Kg	
		Total NonaCB	18.2 ng/Kg	

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
SA56-0.5B	PCB-11	283 ng/Kg	283U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
SA166-0.5B	PCB-8	9.26 ng/Kg	9.26U ng/Kg
	PCB-11	176 ng/Kg	176U ng/Kg
	PCB-18+30	14.7 ng/Kg	14.7U ng/Kg
	PCB-17	5.95 ng/Kg	5.95U ng/Kg
	PCB-31	18.0 ng/Kg	18.0U ng/Kg
	PCB-20+28	25.8 ng/Kg	25.8U ng/Kg
	PCB-21+33	9.16 ng/Kg	9.16U ng/Kg
	PCB-49 + 69	24.2 ng/Kg	24.2U ng/Kg
	Total DiCB	331 ng/Kg	331U ng/Kg
	Total TriCB	163 ng/Kg	163U ng/Kg

Sample FB072109-SO (from SDG R0904016) was identified as a field blank. No polychlorinated dioxin/dibenzofuran contaminants were found in this blank with the following exceptions:

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072109-SO	7/21/09	PCB-1	24.6 pg/L	All samples in SDG R0903184
		PCB-3	22.7 pg/L	
		PCB-8	101 pg/L	
		PCB-11	909 pg/L	
		PCB-18+30	102 pg/L	
		PCB-17	41.8 pg/L	
		PCB-16	61.8 pg/L	
		PCB-32	26.3 pg/L	
		PCB-26+29	29.3 pg/L	
		PCB-31	139 pg/L	
		PCB-20+28	137 pg/L	
		PCB-21+33	82.9 pg/L	
		PCB-22	59.0 pg/L	
		PCB-37	50.4 pg/L	
		PCB-50+53	16.8 pg/L	
		PCB-45+51	29.4 pg/L	
		PCB-52	187 pg/L	
		PCB-49+69	84.0 pg/L	
		PCB-48	33.7 pg/L	
		PCB-44+47+65	183 pg/L	
		PCB-42	50.3 pg/L	
		PCB-41+71+40	123 pg/L	
		PCB-64	88.9 pg/L	
		PCB-70+61+74+76	354 pg/L	
		PCB-66	228 pg/L	
		PCB-56	122 pg/L	
		PCB-60	70.5 pg/L	
		PCB-77	22.8 pg/L	
		PCB-95	126 pg/L	
		PCB-88+91	22.2 pg/L	
		PCB-84	61.2 pg/L	
		PCB-92	19.7 pg/L	
		PCB-90+101+113	115 pg/L	
		PCB-83+99	67.6 pg/L	
		PCB-86+87+97+108+119+125	119 pg/L	
		PCB-117	6.25 pg/L	
		PCB-85+116	32.8 pg/L	
		PCB-110+115	181 pg/L	
		PCB-82	42.0 pg/L	

Field Blank ID	Sampling Date	Compound	Concentration	Associated Samples
FB072109-SO	7/21/09	PCB-107+124	6.87 pg/L	All samples in SDG R0903184
		PCB-109	5.73 pg/L	
		PCB-118	102 pg/L	
		PCB-105	77.4 pg/L	
		PCB-136	10.4 pg/L	
		PCB-135+151	23.8 pg/L	
		PCB-147+149	44.5 pg/L	
		PCB-132	22.4 pg/L	
		PCB-146	5.35 pg/L	
		PCB-153+168	47.1 pg/L	
		PCB-141	10.1 pg/L	
		PCB-129+138+163	73.8 pg/L	
		PCB-158	7.04 pg/L	
		PCB-128+166	13.1 pg/L	
		PCB-156+157	7.61 pg/L	
		PCB-179	4.74 pg/L	
		PCB-187	14.4 pg/L	
		PCB-183	3.93 pg/L	
		PCB-174	10.6 pg/L	
		PCB-177	4.84 pg/L	
		PCB-180+193	20.0 pg/L	
		PCB-170	10.6 pg/L	
		PCB-202	5.31 pg/L	
		PCB-198+199	17.1 pg/L	
		PCB-203	9.54 pg/L	
		PCB-194	8.93 pg/L	
		PCB-208	10.6 pg/L	
		PCB-206	27.8 pg/L	
		PCB-209	9.93 pg/L	
		Total MonoCB	47.3 pg/L	
		Total DiCB	1010 pg/L	
		Total TriCB	730 pg/L	
		Total TetraCB	1590 pg/L	
		Total PentaCB	984 pg/L	
		Total HexaCB	265 pg/L	
		Total HeptaCB	69.2 pg/L	
		Total OctaCB	40.9 pg/L	
		Total NonaCB	38.4 pg/L	

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

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.

X. Target Compound Identifications

Raw data were not reviewed for this SDG.

XI. Project Quantitation Limit

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

Sample	Compound	Finding	Criteria	Flag	A or P
SA56-0.5B	PCB-95 PCB-110+115 PCB-147+149 PCB-153+168 PCB-129+138+163 PCB-180+193 PCB-209	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

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

All compounds reported as EMPC were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG R0903184	All compounds reported as estimated maximum possible concentration (EMPC).	JK (all detects)	A

Raw data were not reviewed for this SDG.

XII. System Performance

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 Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG R0903184

SDG	Sample	Compound	Flag	A or P	Reason (Code)
R0903184	SA56-0.5B	PCB-95 PCB-110+115 PCB-147+149 PCB-153+168 PCB-129+138+163 PCB-180+193 PCB-209	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Project Quantitation Limit (e)
R0903184	SA56-0.5B SA166-0.5B	All compounds reported below the PQL.	J (all detects)	A	Project Quantitation Limit (sp)
R0903184	SA56-0.5B SA166-0.5B	All compounds reported as EMPC	JK (all detects)	A	Project Quantitation Limit (k)

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG R0903184

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
R0903184	SA56-0.5B	PCB-11	283U ng/Kg	A	bl
R0903184	SA166-0.5B	PCB-8 PCB-11 PCB-18+30 PCB-17 PCB-31 PCB-20+28 PCB-21+33 PCB-49 + 69 Total DiCB Total TriCB	9.26U ng/Kg 176U ng/Kg 14.7U ng/Kg 5.95U ng/Kg 18.0U ng/Kg 25.8U ng/Kg 9.16U ng/Kg 24.2U ng/Kg 331U ng/Kg 163U ng/Kg	A	bl

Tronox LLC Facility, 2009 Phase B Investigation, Henderson, Nevada Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG R0903184

No Sample Data Qualified in this SDG

Tronox Northgate Henderson
VALIDATION COMPLETENESS WORKSHEET
Stage 2B

LDC #: 21495F3c
SDG #: E0903184
Laboratory: Columbia Analytical Services

Date: 9/18/09
Page: 1 of 1
Reviewer: Q
2nd Reviewer: F

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: 6/10/09
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	20/35%
IV.	Routine calibration/~~ICV~~	A	20/50%
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client specified
VII.	Laboratory control samples	A	LCS/D
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	SW N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	FB072109-SO (R0904D16)

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	SA56-0.5B S	11	E0900219-01	21	U-19558	31	
2	SA166-0.5B ↓	12		22		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 #: 21495F3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9
2nd Reviewer:

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: 6/18/09 **Blank analysis date:** 6/28/09
Conc. units: ng/Kg **Associated samples:** All

Compound	Blank ID	Sample Identification								
	FQ0900219-01	1	2							
PCB 8	8.70		9.26/U							
PCB 11	131	283/U	176/U							
PCBs 18+30	9.69		14.7/U							
PCB 17	4.45		5.95/U							
PCB 24	3.13									
PCB 31	9.64		18.0/U							
PCBs 20+28	9.75		25.8/U							
PCBs 21+33	6.14		9.16/U							
PCB 52	12.5									
PCBs 49 + 69	5.37		24.2/U							
PCBs 44+47+65	11.3									
PCB 42	2.32									
PCB 64	3.87									
PCBs 70+61+74+76	10.3									
PCB 66	4.96									
PCB 56	2.26									
PCB 95	11.2									
PCBs 88+91	1.80									
PCB 84	3.35									
PCB 92	1.31									
PCBs 90+101+113	9.76									

PCBs 83+99	3.91									
PCBs 86+87+97+108+119+125	7.06									
PCBs 85+116	1.23									
PCBs 110+115	11.1									
PCB 118	5.99									
PCB 105	2.83									
PCBs 147+149	5.74									
PCB 132	2.67									
PCBs 153+168	4.44									
PCBs 129+138+163	6.30									
PCBs 180+193	2.23									
PCB 202	1.50									
PCBs 198+199	4.97									
PCB 203	2.83									
PCB 194	1.43									
PCB 208	4.50									
PCB 207	1.62									
PCB 206	12.1									
PCB 209	6.90									
Total DiCB	140		331/U							
Total TriCB	42.8		163/U							
Total TetraCB	52.9									
Total PentaCB	59.5									
Total HexaCB	19.1									
Total HeptaCB	2.23									
Total OctaCB	10.7									
Total NonaCB	18.2									

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 #: 21495F3C
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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:** ng/Kg
Field blank type: (circle one) (Field Blank) Rinsate / Other: Associated Samples: All (>5x)

Compound	Blank ID	Sample Identification								
	FB072109-SO									
PCB 1	24.6	0.123								
PCB 3	22.7	0.1135								
PCB 8	101	0.505								
PCB 11	909	4.545								
PCBs 18+30	102	0.51								
PCB 17	41.8	0.209								
PCB 16	61.8	0.309								
PCB 32	26.3	0.1315								
PCBs 26+29	29.3	0.1465								
PCB 31	139	0.695								
PCBs 20+28	137	0.685								
PCBs 21+33	82.9	0.4145								
PCB 22	59.0	0.295								
PCB 37	50.4	0.252								
PCBs 50+53	16.8	0.084								
PCBs 45+51	29.4	0.147								
PCB 52	187	0.935								
PCBs 49+69	84.0	0.42								
PCB 48	33.7	0.1685								
PCBs 44+47+65	183	0.915								
PCB 42	50.3	0.2515								
PCBs 41+71+40	123	0.615								
PCB 64	88.9	0.4445								

PCBs 70+61+74+76	354	1.77								
PCB 66	228	1.14								
PCB 56	122	0.61								
PCB 60	70.5	0.3525								
PCB 77	22.8	0.114								
PCB 95	126	0.63								
PCBs 88+91	22.2	0.111								
PCB 84	61.2	0.306								
PCB 92	19.7	0.0985								
PCBs 90+101+113	115	0.575								
PCBs 83+99	67.6	0.338								
PCBs 86+87+97+108+119+125	119	0.595								
PCB 117	6.25	0.03125								
PCBs 85+116	32.8	0.164								
PCBs 110+115	181	0.905								
PCB 82	42.0	0.21								
PCBs 107+124	6.87	0.03435								
PCB 109	5.73	0.02865								
PCB 118	102	0.51								
PCB 105	77.4	0.387								
PCB 136	10.4	0.052								
PCBs 135+151	23.8	0.119								
PCBs 147+149	44.5	0.2225								
PCB 132	22.4	0.112								
PCB 146	5.35	0.02675								
PCBs 153+168	47.1	0.2355								
PCB 141	10.1	0.0505								
PCBs 129+138+163	73.8	0.369								
PCB 158	7.04	0.0352								
PCBs 128+166	13.1	0.0655								

PCBs 156+157	7.61	0.03805								
PCB 179	4.74	0.0237								
PCB 187	14.4	0.072								
PCB 183	3.93	0.01965								
PCB 174	10.6	0.053								
PCB 177	4.84	0.0242								
PCBs 180+193	20.0	0.1								
PCB 170	10.6	0.053								
PCB 202	5.31	0.02655								
PCBs 198+199	17.1	0.0855								
PCB 203	9.54	0.0477								
PCB 194	8.93	0.04465								
PCB 208	10.6	0.053								
PCB 206	27.8	0.139								
PCB 209	9.93	0.04965								
Total MonoCB	47.3	0.2365								
Total DiCB	1010	5.05								
Total TriCB	730	3.65								
Total TetraCB	1590	7.95								
Total PentaCB	984	4.92								
Total HexaCB	265	1.325								
Total HeptaCB	69.2	0.346								
Total OctaCB	40.9	0.2045								
Total NonaCB	38.4	0.192								

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\FB_SO.wpd

LDC #: 24495F3c
SDG #: See Cover

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: Q
2nd Reviewer: e

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) Were the correct internal standard (IS), quantitation ions and relative response factors (RRF) used to quantitate the compound?
Y N (N/A) Compound quantitation and CRQLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding (cpds > calib range)	Associated Samples	Qualifications
		1	PCB 95, 110+115, 147+149, 153+168, 129+138+163, 180+193, 209	1	J dets/P (e)
		All	EMPC results	All	JK (f)

Comments: See sample calculation verification worksheet for recalculations