APPENDIX C DATA VALIDATION REPORT

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

LDC #15449
September 26, 2006

Windward Environmental, LLC
200 West Mercer Street, Suite 401
Seattle, WA 98119
ATTN: Ms. Marina Mitchell

SUBJECT: Lower Duwamish Waterway Group Fish Tissue Sample Data Validation

Dear Ms. Mitchell,

Enclosed is our final EPA Level IV data validation review of Analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by AXYS Analytical Services, Ltd. Samples were analyzed for HRGC/HRMS Polychlorinated Biphenyl Congeners by modified EPA Method 1668A. Samples are referenced under the following Sample Delivery Group: DPWG19975/WG19626. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed.

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

Sincerely,

Stella S. Cuenco
Project Manager/Senior Chemist

Attachment 1

PDF

LDC #15449 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCB Cong. (1668)																													
Matrix: Water/Tissue				W	T	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	DPWG19975/WG19626	09/05/06	09/26/06	0	6																												
Total	B/SC			0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

CHEMICAL DATA QUALITY REVIEW FOR FISH TISSUE SAMPLES

Lower Duwamish Waterway Group
LDC# 15449

This report details the findings of an EPA Level IV data validation review of analytical chemistry results generated in support of the Lower Duwamish Waterway Group project. The analyses were performed by AXYS Analytical Services, Ltd. Samples were analyzed for HRGC/HRMS Polychlorinated Biphenyl Congeners by modified EPA Method 1668A. Samples are referenced under the following Sample Delivery Group: DPWG19975/WG19626. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed and the Sample Validation Table (Attachment 2) for the sample identifications and analyses.

The QC guidelines used for data qualification are those specified in the EPA Region 10 SOP for the Validation of 1668 Toxic, Dioxin-like PCB Data (Revision 1.0, December 8, 1995). Specific QC criteria used follows the Fish and Crab Collection and Chemical Analyses Quality Assurance Project Plan (August 27, 2004). Where specific guidance is not available, the data has been evaluated in a conservative manner using professional experience.

The following items were evaluated during the review:

- Holding Times
- Sample Preservation
- Cooler Temperatures
- Instrument Calibration
- Blanks
- Matrix Spike/Matrix Spike Duplicates
- Internal Standards
- Laboratory Control Samples
- Target Compound Identifications
- Compound Quantitation and CRQLs
- System Performance
- Field Replicates

Attachment 1

PDF

LDC #15449 (Windward Environmental, LLC - Seattle WA / Lower Duwamish Waterway Group)

LDC	SDG#	DATE REC'D	(3) DATE DUE	PCB Cong. (1668)																															
Matrix: Water/Tissue				W	T	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	DPWG19975/WG19626	09/05/06	09/26/06	0	6																														
Total	B/SC			0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

Shaded cells indicate Level IV validation (all other cells are Level II validation). These sample counts do not include MS/MSD, and DUPs

Attachment 2

SDG#: DPWG19975/WG19626 VALIDATION SAMPLE TABLE **LDC#:** 15449A

Project Name: Lower Duwamish Waterway Group Parameters/Analytical Method Project #04-08-06-22

Client ID #	Lab ID #	Matrix	Date Collected	PCBs Cong. (1668A)											
LDW-05-T2-B-SS-WB-COMP1	L9071-1	tissue	09/01/05	X											
LDW-05-T3-D-SS-WB-COMP1	L9071-2	tissue	08/31/06	X											
LDW-05-T1-M-ES-WB-COMP3	L9071-3	tissue	08/29/06	X											
LDW-05-T2-M-ES-WB-COMP3	L9071-4	tissue	09/01/06	X											
LDW-05-T3-M-ES-WB-COMP2	L9071-5	tissue	09/01/06	X											
LDW-05-T1-B-SS-WB-COMP1	L9071-6	tissue	08/31/06	X											
LDW-05-T3-M-ES-WB-COMP2DUP	L9071-5DUP	tissue	09/01/06	X											

Note: X = Validation was performed.

Only issues which require comment or action are discussed in this report. Data deficiencies are arranged by method. Potential effects of data anomalies have been described where possible.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

- J1 Blank Contamination: Indicates possible high bias and/or false positives.
- J2 Calibration Range exceeded: Indicates possible low bias.
- J3 Holding times not met: Indicates low bias for most analytes.
- J4 Other QC parameters outside control limits: bias not readily determined.
- J5 Other QC parameters outside control limits. The reported results appear to be biased high. The actual value of target compound in the sample may be lower than the value reported by the laboratory.
- J6 Other QC parameters outside control limits. The reported results appear to be biased low. The actual value of target compound in the sample may be higher than the value reported by the laboratory.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

Overall Data Assessment

I. Method Compliance

The ion abundance ratio for PCB-169 in the lowest standard of the initial calibration did meet the method QC limits.

II. Usability

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

HRGC/HRMS Polychlorinated Biphenyl Congeners by modified EPA Method 1668A

I. Technical Holding Times

All technical holding time requirements were met.

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

II. GC/MS Instrument Performance Check

Instrument performance was checked at the required frequency.

Retention time windows were established for all congeners. The chromatographic resolution was less than or equal to 40% for congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration

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

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

The ion abundance ratios for all PCBs were within validation criteria with the following exceptions:

SDG	Date	Compound	Ion Abundance Ratio (Limits)	Associated Samples	Flag	A or P
DPWG19975/ WG19626	5/5/06 (CS0 Standard)	PCB-169	0.99 (1.05-1.43)	LDW-05-T2-B-SS-WB-COMP1 LDW-05-T3-D-SS-WB-COMP1 LDW-05-T1-M-ES-WB-COMP3 LDW-05-T2-M-ES-WB-COMP3	NA	-

N/A = Not applicable

For the result above flagged "Not applicable", since the ion abundance ratio in the continuing calibration was within the method QC limits, this finding did not warrant the qualification of the data.

The minimum S/N ratio for each target compound was greater than or equal to 2.5 and greater than or equal to 10 for each recovery and internal standard compound.

IV. Routine Calibration (Continuing)

Routine calibration was performed at the required frequency.

All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 25.0% for unlabeled compounds and less than or equal to 35.0% for labeled compounds.

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

V. Blanks

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

SDG	Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
DPWG19975/ WG19626	WG19626-101	7/14/06	PCB-18	0.802 ng/Kg	LDW-05-T2-B-SS-WB-COMP1
			PCB-20	1.70 ng/Kg	LDW-05-T3-D-SS-WB-COMP1
			PCB-40	0.638 ng/Kg	LDW-05-T1-M-ES-WB-COMP3
			PCB-44	2.67 ng/Kg	LDW-05-T2-M-ES-WB-COMP3
			PCB-45	0.870 ng/Kg	LDW-05-T3-M-ES-WB-COMP2
			PCB-49	1.66 ng/Kg	LDW-05-T1-B-SS-WB-COMP1
			PCB-50	0.381 ng/Kg	LDW-05-T3-M-ES-WB-COMP2DUP
			PCB-52	2.54 ng/Kg	
			PCB-59	0.362 ng/Kg	
			PCB-60	0.608 ng/Kg	
			PCB-61	2.81 ng/Kg	
			PCB-64	0.414 ng/Kg	
			PCB-66	1.60 ng/Kg	
			PCB-82	0.782 ng/Kg	
			PCB-83	1.81 ng/Kg	
			PCB-86	0.766 ng/Kg	
			PCB-88	0.472 ng/Kg	
			PCB-90	4.46 ng/Kg	
			PCB-92	0.826 ng/Kg	
			PCB-93	4.20 ng/Kg	
			PCB-105	1.07 ng/Kg	
			PCB-109	0.577 ng/Kg	
			PCB-110	2.05 ng/Kg	
			PCB-118	2.28 ng/Kg	
			PCB-128	0.498 ng/Kg	
			PCB-129	2.46 ng/Kg	
			PCB-131	0.440 ng/Kg	
			PCB-132	0.704 ng/Kg	
			PCB-135	1.61 ng/Kg	
			PCB-137	0.424 ng/Kg	
			PCB-141	0.745 ng/Kg	
			PCB-146	1.02 ng/Kg	
			PCB-147	1.72 ng/Kg	
			PCB-153	2.72 ng/Kg	
			PCB-156	1.13 ng/Kg	
			PCB-167	0.392 ng/Kg	
			PCB-170	0.526 ng/Kg	
			PCB-180	1.47 ng/Kg	
			PCB-183	0.412 ng/Kg	
			PCB-187	0.662 ng/Kg	
			PCB-190	0.735 ng/Kg	
			PCB-194	0.757 ng/Kg	
			PCB-198	0.575 ng/Kg	
			PCB-81	0.115 ng/Kg	
			PCB-169	0.079 ng/Kg	
			Total tetrachlorobiphenyls	5.05 ng/Kg	
			Total pentachlorobiphenyls	2.28 ng/Kg	
			Total hexachlorobiphenyls	4.44 ng/Kg	
			Total octachlorobiphenyls	0.757 ng/Kg	
			Total PCBs	12.5 ng/Kg	

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. The percent recoveries (%R) were within the QC limits.

Standard reference material was performed at the required frequencies.

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries were within QC limits.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

XI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

SDG	Sample	Compound	Finding	Criteria	Flag	A or P
DPWG19975/ WG19626	LDW-05-T2-M-ES-WB-COMP3	PCB-118	Sample result exceeded calibration range.	Reported result should be within calibration range.	J2 (all detects)	P

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 Replicates

No field replicates were identified in this SDG.

Lower Duwamish Waterway Group
Polychlorinated Biphenyls - Data Qualification Summary - SDG DPWG19975/WG19626

SDG	Sample	Compound	Flag	A or P	Reason
DPWG19975/ WG19626	LDW-05-T2-M-ES-WB-COMP3	PCB-118	J2 (all detects)	P	Compound quantitation and CRQLs

Lower Duwamish Waterway Group
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG DPWG19975/WG19626

No Sample Data Qualified in this SDG

LDC #: 15449A3 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/13/06
SDG #: DPWG19975/WG19626 Level IV Page: 1 of 1
Laboratory: AXYS Analytical Services, Ltd. Reviewer: 9
2nd Reviewer: 1V

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: 8/29 - 9/1/2005
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A SW	%RSD ≤ 20
IV.	Routine calibration	A	%D ≤ 25/35 (native/labeled)
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates DUP	N/A	
VII.	Laboratory control samples	A	LCS. CRM
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW A	
X.	Target compound identifications	A	
XI.	Compound quantitation and CRQLs	SW A	
XII.	System performance	A	
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:
All Tissues

1	LDW-05-T2-B-SS-WB-COMP1	11	WG19626-101	21		31	
2	LDW-05-T3-D-SS-WB-COMP1	12		22		32	
3	LDW-05-T1-M-ES-WB-COMP3	13		23		33	
4	LDW-05-T2-M-ES-WB-COMP3	14		24		34	
5	LDW-05-T3-M-ES-WB-COMP2	15		25		35	
6	LDW-05-T1-B-SS-WB-COMP1	16		26		36	
7	LDW-05-T3-M-ES-WB-COMP2DUP	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 16449A3
SDG #: DPWG19975

VALIDATION FINDINGS CHECKLIST

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

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) ≤ ~~25%~~ 20% for unlabeled standards and ~~≤ 30% for~~ labeled standards?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?		✓		
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IV. Continuing calibration				
Was a routine calibration performed at the beginning of each 12 hour period?	✓			
Were all percent differences (%D) ~~< 40%~~ 20/50.10 & 35 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.		✓		DUP
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 #: 15449A3
SDG #: OPW61997S

VALIDATION FINDINGS CHECKLIST

Reviewer: K
2nd Reviewer: K

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 #: 15149A3
SDG #: DPW6199TS

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

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 Was the initial calibration performed at 5 concentration levels?
Y N N/A Were all percent relative standard deviations (%RSD) ≤ ~~35%~~ 20% for unlabeled standards and labeled standards?
Y N N/A Did all calibration standards meet the Ion Abundance Ratio criteria?
Y N N/A Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?

#	Date	Standard ID	Compound	Finding %RSD	Finding Ion Abundace Ratio	Associated Samples	Qualifications
	5/5/06	DT63-123B (CS0)	PCB169		0.99 (1.05-1.43)	1-4, Blk	NA ~~FOR~~ No Cal'd CCCV in)

	Halogen	Selected Ions (m/z)	Ion Abundace Ratio
	1 Cl	M/M+2	2.66-3.60
	2 Cl	M/M+2	1.33-1.81
	3 Cl	M/M+2	0.88-1.20
	4 Cl	M/M+2	0.65-0.89
	5 Cl	M+2/M+4	1.32-1.78
	6 Cl	M/M+2	0.43-0.59
	6 Cl	M+2/M+4	1.05-1.43

	Halogen	Selected Ions (m/z)	Ion Abundace Ratio
	7 Cl	M/M+2	0.37-0.51
	7 Cl	M+2/M+4	0.88-1.20
	8 Cl	M+2/M+4	0.76-1.02
	9 Cl	M/M+2	1.14-1.54
	9 CL	M/M-2	0.66-0.90
	10 CL	M/M+2	0.99-1.35

LDC #: 16449A3
SDG #: DPIN61997S

VALIDATION FINDINGS WORKSHEET
Blanks

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 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 method blank contamination less < CRQL for all target compounds?

Blank extraction date: 7/14/06 **Blank analysis date:** 7/24/06

Conc. units: pg/Ks **Associated samples:** All

Compound	Blank ID	Sample Identification								
IUPAC	19626-101	All								
See attachment		5X								

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".

AXYS METHOD MLA-010 Rev 08

Form 1A

PCB CONGENER ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
P.O. Box 2219, 2045 MILLS RD. WEST, SIDNEY, B.C., CANADA
V8L 3S8 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4033	Project No.	N/A
Matrix:	CORN OIL	Lab Sample I.D.:	WG19626-101
Sample Receipt Date:	N/A	Sample Size:	5.00 g
Extraction Date:	14-Jul-2006	Initial Calibration Date:	05-Jun-2006
Analysis Date:	24-Jul-2006 Time: 11:52:21	Instrument ID:	HR GC/MS
Extract Volume (uL):	400	GC Column ID:	SPB OCTYL
Injection Volume (uL):	1.0	Sample Data Filename:	PB6C_327 S: 5
Dilution Factor:	20	Blank Data Filename:	PB6C_327 S: 5
Concentration Units:	ng/kg	Cal. Ver. Data Filename:	PB6C_327 S: 1

COMPOUND	IUPAC NO.	CO-ELUTIONS	SX	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT	ION ABUND. RATIO	RRT
2-MoCB	1			U D		0.472		
3-MoCB	2			U D		0.546		
4-MoCB	3			U D		0.664		
2,2'-DiCB	4			U D		2.97		
2,3-DiCB	5			U D		2.46		
2,3'-DiCB	6			U D		2.26		
2,4-DiCB	7			U D		2.32		
2,4'-DiCB	8			U D		2.14		
2,5-DiCB	9			U D		2.24		
2,6-DiCB	10			U D		2.31		
3,3'-DiCB	11			U D		2.37		
3,4-DiCB	12	12 + 13		C U D		2.47		
3,4'-DiCB	13	12 + 13		C12				
3,5-DiCB	14			U D		2.31		
4,4'-DiCB	15			U D		3.15		
2,2',3-TriCB	16			U D		1.09		
2,2',4-TriCB	17			U D		0.922		
2,2',5-TriCB	18	18 + 30	4.01	C K D J	0.802	0.771	1.51	1.112
2,2',6-TriCB	19			U D		1.07		
2,3,3'-TriCB	20	20 + 28	8.50	C K D J	1.70	0.982	0.83	0.848
2,3,4-TriCB	21	21 + 33		C U D		0.955		
2,3,4'-TriCB	22			U D		1.07		
2,3,5-TriCB	23			U D		1.02		
2,3,6-TriCB	24			U D		0.693		
2,3',4-TriCB	25			U D		0.879		
2,3',5-TriCB	26	26 + 29		C U D		0.980		
2,3',6-TriCB	27			U D		0.634		
2,4,4'-TriCB	28	20 + 28		C20				
2,4,5-TriCB	29	26 + 29		C26				
2,4,6-TriCB	30	18 + 30		C18				
2,4',5-TriCB	31			U D		0.934		
2,4',6-TriCB	32			U D		0.962		
2',3,4-TriCB	33	21 + 33		C21				
2',3,5-TriCB	34			U D		0.999		
3,3',4-TriCB	35			U D		1.10		
3,3',5-TriCB	36			U D		0.987		
3,4,4'-TriCB	37			U D		1.18		
3,4,5-TriCB	38			U D		1.03		

COMPOUND	IUPAC NO.	CO-ELUTIONS	5X	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT	ION ABUND. RATIO	RRT
3,4',5-TriCB	39			UD		1.02		
2,2',3,3'-TeCB	40	40 + 41 + 71	3.19	CDJ	0.638	0.269	0.70	1.334
2,2',3,4-TeCB	41	40 + 41 + 71		C40				
2,2',3,4'-TeCB	42			UD		0.282		
2,2',3,5-TeCB	43			UD		0.328		
2,2',3,5'-TeCB	44	44 + 47 + 65	13.35	CKDJ	2.67	0.245	0.63	1.285
2,2',3,6-TeCB	45	45 + 51	4.35	CKDJ	0.870	0.274	1.08	1.145
2,2',3,6'-TeCB	46			UD		0.316		
2,2',4,4'-TeCB	47	44 + 47 + 65		C44				
2,2',4,5-TeCB	48			UD		0.274		
2,2',4,5'-TeCB	49	49 + 69	8.3	CKDJ	1.66	0.229	0.58	1.258
2,2',4,6-TeCB	50	50 + 53	1.905	CKDJ	0.381	0.266	3.90	1.110
2,2',4,6'-TeCB	51	45 + 51		C45				
2,2',5,5'-TeCB	52		12.7	KDJ	2.54	0.258	1.24	1.233
2,2',5,6'-TeCB	53	50 + 53		C50				
2,2',6,6'-TeCB	54			UD		0.244		
2,3,3',4-TeCB	55			UD		0.533		
2,3,3',4'-TeCB	56			UD		0.518		
2,3,3',5-TeCB	57			UD		0.494		
2,3,3',5'-TeCB	58			UD		0.507		
2,3,3',6-TeCB	59	59 + 62 + 75	1.81	CKDJ	0.362	0.204	0.96	1.300
2,3,4,4'-TeCB	60		3.04	KDJ	0.608	0.535	1.24	0.912
2,3,4,5-TeCB	61	61 + 70 + 74 + 76	14.05	CDJ	2.81	0.492	0.73	0.875
2,3,4,6-TeCB	62	59 + 62 + 75		C59				
2,3,4',5-TeCB	63			UD		0.476		
2,3,4',6-TeCB	64		2.07	KDJ	0.414	0.196	3.38	1.347
2,3,5,6-TeCB	65	44 + 47 + 65		C44				
2,3',4,4'-TeCB	66		8.0	DJ	1.60	0.499	0.82	0.885
2,3',4,5-TeCB	67			UD		0.431		
2,3',4,5'-TeCB	68			UD		0.477		
2,3',4,6-TeCB	69	49 + 69		C49				
2,3',4',5-TeCB	70	61 + 70 + 74 + 76		C61				
2,3',4',6-TeCB	71	40 + 41 + 71		C40				
2,3',5,5'-TeCB	72			UD		0.469		
2,3',5',6-TeCB	73			UD		0.199		
2,4,4',5-TeCB	74	61 + 70 + 74 + 76		C61				
2,4,4',6-TeCB	75	59 + 62 + 75		C59				
2',3,4,5-TeCB	76	61 + 70 + 74 + 76		C61				
3,3',4,4'-TeCB	77			UD		0.534		
3,3',4,5-TeCB	78			UD		0.532		
3,3',4,5'-TeCB	79			UD		0.437		
3,3',5,5'-TeCB	80			UD		0.463		
3,4,4',5-TeCB	81			X				
2,2',3,3',4-PeCB	82		3.91	KDJ	0.782	0.464	0.62	0.934
2,2',3,3',5-PeCB	83	83 + 99	9.05	CKDJ	1.81	0.421	0.73	0.885
2,2',3,3',6-PeCB	84			UD		0.471		
2,2',3,4,4'-PeCB	85	85 + 116 + 117		CUD		0.345		
2,2',3,4,5-PeCB	86	86 + 87 + 97 + 108 + 119 + 125	3.83	CKDJ	0.766	0.358	1.87	0.899
2,2',3,4,5'-PeCB	87	86 + 87 + 97 + 108 + 119 + 125		C86				
2,2',3,4,6-PeCB	88	88 + 91	2.36	CKDJ	0.472	0.417	0.38	1.151
2,2',3,4,6'-PeCB	89			UD		0.436		
2,2',3,4',5-PeCB	90	90 + 101 + 113	22.3	CKDJ	4.46	0.363	1.28	0.869
2,2',3,4',6-PeCB	91	88 + 91		C88				
2,2',3,5,5'-PeCB	92		4.13	KDJ	0.826	0.421	2.34	0.853
2,2',3,5,6-PeCB	93	93 + 95 + 98 + 100 + 102	21	CKDJ	4.20	0.404	1.82	1.123
2,2',3,5,6'-PeCB	94			UD		0.455		
2,2',3,5',6-PeCB	95	93 + 95 + 98 + 100 + 102		C93				
2,2',3,6,6'-PeCB	96			UD		0.247		
2,2',3',4,5-PeCB	97	86 + 87 + 97 + 108 + 119 + 125		C86				
2,2',3',4,6-PeCB	98	93 + 95 + 98 + 100 + 102		C93				
2,2',4,4',5-PeCB	99	83 + 99		C83				
2,2',4,4',6-PeCB	100	93 + 95 + 98 + 100 + 102		C93				
2,2',4,5,5'-PeCB	101	90 + 101 + 113		C90				
2,2',4,5,6'-PeCB	102	93 + 95 + 98 + 100 + 102		C93				

COMPOUND	IUPAC NO.	CO-ELUTIONS	5X LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT	ION ABUND. RATIO	RRT
2,2',4,5',6-PeCB	103		U D		0.378		
2,2',4,6,6'-PeCB	104		U D		0.277		
2,3,3',4,4'-PeCB	105		5.35 K D J	1.07	0.458	2.47	1.000
2,3,3',4,5-PeCB	106		U D		0.415		
2,3,3',4',5-PeCB	107	107 + 124	C U D		0.428		
2,3,3',4,5'-PeCB	108	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3,3',4,6-PeCB	109		2.885 K D J	0.577	0.384	3.41	0.997
2,3,3',4',6-PeCB	110	110 + 115	10.25 C K D J	2.05	0.303	2.24	0.925
2,3,3',5,5'-PeCB	111		U D		0.312		
2,3,3',5,6-PeCB	112		U D		0.303		
2,3,3',5',6-PeCB	113	90 + 101 + 113	C90				
2,3,4,4',5-PeCB	114		U D		0.414		
2,3,4,4',6-PeCB	115	110 + 115	C110				
2,3,4,5,6-PeCB	116	85 + 116 + 117	C85				
2,3,4',5,6-PeCB	117	85 + 116 + 117	C85				
2,3',4,4',5-PeCB	118		11.4 D J	2.28	0.428	1.60	1.000
2,3',4,4',6-PeCB	119	86 + 87 + 97 + 108 + 119 + 125	C86				
2,3',4,5,5'-PeCB	120		U D		0.295		
2,3',4,5',6-PeCB	121		U D		0.317		
2',3,3',4,5-PeCB	122		U D		0.451		
2',3,4,4',5-PeCB	123		U D		0.561		
2',3,4,5,5'-PeCB	124	107 + 124	C107				
2',3,4,5,6'-PeCB	125	86 + 87 + 97 + 108 + 119 + 125	C86				
3,3',4,4',5-PeCB	126		X				
3,3',4,5,5'-PeCB	127		U D		0.440		
2,2',3,3',4,4'-HxCB	128	128 + 166	2.49 C K D J	0.498	0.253	5.15	0.959
2,2',3,3',4,5-HxCB	129	129 + 138 + 160 + 163	12.3 C K D J	2.46	0.254	0.93	0.929
2,2',3,3',4,5'-HxCB	130		U D		0.317		
2,2',3,3',4,6-HxCB	131		2.2 K D J	0.440	0.301	1.52	1.160
2,2',3,3',4,6'-HxCB	132		3.52 K D J	0.704	0.315	0.51	1.174
2,2',3,3',5,5'-HxCB	133		U D		0.289		
2,2',3,3',5,6-HxCB	134	134 + 143	C U D		0.297		
2,2',3,3',5,6'-HxCB	135	135 + 151 + 154	8.05 C K D J	1.61	0.338	0.96	1.102
2,2',3,3',6,6'-HxCB	136		U D		0.264		
2,2',3,4,4',5-HxCB	137		2.12 K D J	0.424	0.291	0.21	0.918
2,2',3,4,4',5'-HxCB	138	129 + 138 + 160 + 163	C129				
2,2',3,4,4',6-HxCB	139	139 + 140	C U D		0.265		
2,2',3,4,4',6'-HxCB	140	139 + 140	C139				
2,2',3,4,5,5'-HxCB	141		3.72 C K D J	0.745	0.273	0.88	0.904
2,2',3,4,5,6-HxCB	142		U D		0.307		
2,2',3,4,5,6'-HxCB	143	134 + 143	C134				
2,2',3,4,5',6-HxCB	144		U D		0.347		
2,2',3,4,6,6'-HxCB	145		U D		0.277		
2,2',3,4',5,5'-HxCB	146		5.1 K D J	1.02	0.249	1.03	0.885
2,2',3,4',5,6-HxCB	147	147 + 149	8.6 C D J	1.72	0.262	1.20	1.133
2,2',3,4',5,6'-HxCB	148		U D		0.356		
2,2',3,4',5',6-HxCB	149	147 + 149	C147				
2,2',3,4',6,6'-HxCB	150		U D		0.265		
2,2',3,5,5',6-HxCB	151	135 + 151 + 154	C135				
2,2',3,5,6,6'-HxCB	152		U D		0.257		
2,2',4,4',5,5'-HxCB	153	153 + 168	13.6 C D J	2.72	0.222	1.21	0.899
2,2',4,4',5,6'-HxCB	154	135 + 151 + 154	C135				
2,2',4,4',6,6'-HxCB	155		U D		0.248		
2,3,3',4,4',5-HxCB	156	156 + 157	5.65 C K D J	1.13	0.294	0.88	1.000
2,3,3',4,4',5'-HxCB	157	156 + 157	C156				
2,3,3',4,4',6-HxCB	158		U D		0.198		
2,3,3',4,5,5'-HxCB	159		U D		0.218		
2,3,3',4,5,6-HxCB	160	129 + 138 + 160 + 163	C129				
2,3,3',4,5',6-HxCB	161		U D		0.209		
2,3,3',4',5,5'-HxCB	162		U D		0.222		
2,3,3',4',5,6-HxCB	163	129 + 138 + 160 + 163	C129				
2,3,3',4',5',6-HxCB	164		U D		0.212		
2,3,3',5,5',6-HxCB	165		U D		0.233		
2,3,4,4',5,6-HxCB	166	128 + 166	C128				

COMPOUND	IUPAC NO.	CO-ELUTIONS	5X	LAB FLAG [1]	CONC. FOUND	REPORTING LIMIT	ION ABUND. RATIO	RRT
2,3',4,4',5,5'-HxCB	167		1.96	KDJ	0.392	0.210	0.54	1.001
2,3',4,4',5',6-HxCB	168	153 + 168		C153				
3,3',4,4',5,5'-HxCB	169			X				
2,2',3,3',4,4',5-HpCB	170		2.63	KDJ	0.526	0.407	2.94	0.936
2,2',3,3',4,4',6-HpCB	171	171 + 173		CUD		0.389		
2,2',3,3',4,5,5'-HpCB	172			UD		0.393		
2,2',3,3',4,5,6-HpCB	173	171 + 173		C171				
2,2',3,3',4,5,6'-HpCB	174			UD		0.356		
2,2',3,3',4,5',6-HpCB	175			UD		0.343		
2,2',3,3',4,6,6'-HpCB	176			UD		0.262		
2,2',3,3',4',5,6-HpCB	177			UD		0.370		
2,2',3,3',5,5',6-HpCB	178			UD		0.365		
2,2',3,3',5,6,6'-HpCB	179			UD		0.255		
2,2',3,4,4',5,5'-HpCB	180	180 + 193	7.35	CKDJ	1.47	0.309	2.04	0.910
2,2',3,4,4',5,6-HpCB	181			UD		0.367		
2,2',3,4,4',5,6'-HpCB	182			UD		0.336		
2,2',3,4,4',5',6-HpCB	183	183 + 185	2.06	CKDJ	0.412	0.349	0.65	1.127
2,2',3,4,4',6,6'-HpCB	184			UD		0.254		
2,2',3,4,5,5',6-HpCB	185	183 + 185		C183				
2,2',3,4,5,6,6'-HpCB	186			UD		0.271		
2,2',3,4',5,5',6-HpCB	187		3.315	KDJ	0.663	0.326	0.43	1.109
2,2',3,4',5,6,6'-HpCB	188			UD		0.267		
2,3,3',4,4',5,5'-HpCB	189			UD		0.529		
2,3,3',4,4',5,6-HpCB	190		3.675	KDJ	0.735	0.302	1.52	0.947
2,3,3',4,4',5',6-HpCB	191			UD		0.291		
2,3,3',4,5,5',6-HpCB	192			UD		0.316		
2,3,3',4',5,5',6-HpCB	193	180 + 193		C180				
2,2',3,3',4,4',5,5'-OcCB	194		3.785	DJ	0.757	0.572	0.92	0.992
2,2',3,3',4,4',5,6-OcCB	195			UD		0.595		
2,2',3,3',4,4',5,6'-OcCB	196			UD		0.445		
2,2',3,3',4,4',6,6'-OcCB	197	197 + 200		CUD		0.317		
2,2',3,3',4,5,5',6-OcCB	198	198 + 199	2.875	CKDJ	0.575	0.461	2.04	1.115
2,2',3,3',4,5,5',6'-OcCB	199	198 + 199		C198				
2,2',3,3',4,5,6,6'-OcCB	200	197 + 200		C197				
2,2',3,3',4,5',6,6'-OcCB	201			UD		0.313		
2,2',3,3',5,5',6,6'-OcCB	202			UD		0.403		
2,2',3,4,4',5,5',6-OcCB	203			UD		0.430		
2,2',3,4,4',5,6,6'-OcCB	204			UD		0.315		
2,3,3',4,4',5,5',6-OcCB	205			UD		0.472		
2,2',3,3',4,4',5,5',6-NoCB	206			UD		2.12		
2,2',3,3',4,4',5,6,6'-NoCB	207			UD		1.48		
2,2',3,3',4,5,5',6,6'-NoCB	208			UD		1.69		
2,2',3,3',4,4',5,5',6,6'-DeCB	209			UD		0.705		

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; D = dilution data; J = concentration less than LMCL; C = co-eluting congener; X = result reported separately.

Approved by: _____Teresa Rawsthorne_____ QA/QC Chemist

AXYS METHOD MLA-010 Rev 08

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

Form 1A
PCB CONGENER ANALYSIS REPORT

AXYS ANALYTICAL SERVICES
P.O. Box 2219, 2045 MILLS RD. WEST, SIDNEY, B.C., CANADA
V8L 3S8 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4033	Project No.	N/A
Matrix:	CORN OIL	Lab Sample I.D.:	WG19626-101
Sample Receipt Date:	N/A	Sample Size:	5.00 g
Extraction Date:	14-Jul-2006	Initial Calibration Date:	08-May-2006
Analysis Date:	01-Aug-2006 Time: 01:12:21	Instrument ID:	HR GC/MS
Extract Volume (uL):	20	GC Column ID:	DB1
Injection Volume (uL):	2.0	Sample Data Filename:	DT63_189B S: 4
Dilution Factor:	N/A	Blank Data Filename:	DT63_189B S: 4
Concentration Units:	ng/kg	Cal. Ver. Data Filename:	DT63_189B S: 1

COMPOUND	IUPAC NO.	CO-ELUTIONS 5X	LAB FLAG[1]	CONC. FOUND	REPORTING LIMIT	ION ABUND. RATIO	RRT
3,3',4,4'-TeCB	77		X				
3,4,4',5-TeCB	81	0.575	KJ	0.115	0.0634	23.96	1.000
2,3,3',4,4'-PeCB	105		X				
2,3,4,4',5-PeCB	114		X				
2,3',4,4',5-PeCB	118		X				
2',3,4,4',5-PeCB	123		X				
3,3',4,4',5-PeCB	126		U		0.157		
2,3,3',4,4',5-HxCB	156		X				
2,3,3',4,4',5'-HxCB	157		X				
2,3',4,4',5,5'-HxCB	167		X				
3,3',4,4',5,5'-HxCB	169	0.393	KJ	0.079	0.0427	0.92	1.000
2,2',3,3',4,4',5-HpCB	170		X				
2,2',3,4,4',5,5'-HpCB	180		X				
2,3,3',4,4',5,5'-HpCB	189		X				

(1) Where applicable, custom lab flags have been used on this report; U = not detected; K = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration; J = concentration less than LMCL; X = result reported separately.

Approved by: Teresa Rawsthorne QA/QC Chemist

For Axys Internal Use Only [XSL Template: Form16681A.xsl; Created: 28-Aug-2006 10:02:45; Application: XMLTransformer-1.7.9; Report Filename: 1668_PCB1668_DB1_WG19626-101_Form1A_SJ579853.html; Workgroup: WG19626; Design ID: 240]

These pages are part of a larger report that may contain information necessary for full data evaluation.

AXYS METHOD MLA-010 Rev 08

Form 1A

HOMOLOGUE TOTAL PCB ANALYSIS REPORT

CLIENT SAMPLE NO.
Lab Blank
Sample Collection:
N/A

AXYS ANALYTICAL SERVICES
P.O. Box 2219, 2045 MILLS RD. WEST, SIDNEY, B.C., CANADA
V8L 3S8 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4033	Project No.	N/A
Matrix:	CORN OIL	Lab Sample I.D.:	WG19626-101
Sample Receipt Date:	N/A	Sample Size:	5.00 g
Extraction Date:	14-Jul-2006	Initial Calibration Date:	05-Jun-2006
Analysis Date:	24-Jul-2006 Time: 11:52:21	Instrument ID:	HR GC/MS
Extract Volume (uL):	400	GC Column ID:	DB1, SPB OCTYL
Injection Volume (uL):	1.0	Sample Data Filename(s):	DT63_189B S: 4, PB6C_327 S: 5
Dilution Factor:	20	Blank Data Filename:	PB6C_327 S: 5
Concentration Units:	ng/kg	Cal. Ver. Data Filename:	PB6C_327 S: 1

PCB HOMOLOGUE GROUP	LAB FLAG[1]	CONC. FOUND	5X
Total Monochloro Biphenyls	U		
Total Dichloro Biphenyls	U		
Total Trichloro Biphenyls	U		
Total Tetrachloro Biphenyls		5.05	25.25
Total Pentachloro Biphenyls		2.28	11.4
Total Hexachloro Biphenyls		4.44	22.2
Total Heptachloro Biphenyls	U		
Total Octachloro Biphenyls		0.757	3.785
Total Nonachloro Biphenyls	U		
Decachloro Biphenyl	U		
TOTAL PCBs		12.5	62.5

(1) Where applicable, custom lab flags have been used on this report; U = not detected.
(2) All header information pertains to the initial instrumental analysis of the sample extract. Additional sample datafiles listed refer to secondary analysis of the sample extract.

Approved by: Teresa Rawsthorne QA/QC Chemist

For Axys Internal Use Only [XSL Template: .xsl; Created: 28-Aug-2006 10:04:12; Application: XMLTransformer-1.7.9;
Report Filename: 1668_PCB1668_HomTotals-TEQs_WG19626-101_Form1AHT_SJ575956.html; Workgroup: WG19626; Design ID: 240]

LDC #: 52449A2
SDG #: DWPWG19975/WG19625

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

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

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

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

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
		4	PCB 118 > calib range		J2 det/P

Comments: See sample calculation verification worksheet for recalculations

LDC #: 15419A3
SDG #: OPNS19975

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: 1

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, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard
S = Standard deviation of the RRFs, 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	ICAL	~~5/30/06~~ 5/30/06	PCB-77 (^{13}C-PCB-77)	1.04	1.04	1.11	1.10	3.72	3.85
			PCB-105 (^{13}C-PCB-105)	0.94	0.94	1.00	1.00	5.08	4.91
			PCB-156 (^{13}C-PCB-156)	0.96	0.96	1.04	1.03	4.53	4.81
			PCB-180 (^{13}C-PCB-180)	0.93	0.93	0.99	0.98	3.81	3.93
2	ICAL	5/8/06	PCB-~~77~~ 81 (^{13}C-PCB-~~77~~ 81)	0.88	0.88	0.94	0.94	4.01	3.96
			PCB-~~105~~ 126 (^{13}C-PCB-~~105~~) (126)	0.91	0.91	1.00	1.00	7.64	7.42
			PCB-~~156~~ 169 (^{13}C-PCB-156) (169)	0.86	0.86	0.92	0.92	5.00	4.84
			PCB-180 (^{13}C-PCB-180)						
3	~~ICAL~~	~~5/30/06~~	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 #: 15449A3
SDG #: DPW419975

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

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

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 (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	~~PB6C-337~~ 5:1 6/5	7/24/06	PCB-77 (^{13}C-PCB-77)	1.04	47.3	47.2		
			PCB-105 (^{13}C-PCB-105)	0.94	51.5	51.5		
			PCB-156 (^{13}C-PCB-156)	0.96	104	104		
			PCB-180 (^{13}C-PCB-180)	0.93	47.7	47.9		
2	~~DT63_1893~~ 5:1 5/8	8/	PCB-~~77~~ 81 (^{13}C-PCB-~~77~~ 81)	0.88	49.6	49.8		
			PCB-~~105~~ 156 (^{13}C-PCB-~~105~~ 156)	0.91	42.7	42.6		
			PCB-~~156~~ 169 (^{13}C-PCB-~~156~~ 169)	0.86	49.3	49.6		
			PCB-180 (^{13}C-PCB-180)					
3	~~PB6C-330~~ 5:1 5/30	7/26/06	PCB-77 (^{13}C-PCB-77)	1.04	47.4	47.3		
			PCB-105 (^{13}C-PCB-105)	0.94	52.8	53.0		
			PCB-156 (^{13}C-PCB-156)	0.96	107	107		
			PCB-180 (^{13}C-PCB-180)	0.93	49.3	49.6		

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 #: 15446A3
SDG #: DPNG19975

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

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~~ Amt (CC)	Recalculated ~~RRF~~ Amt (CC)	Reported %D	Recalculated %D
1	~~PB6C3-38A~~ S=2 6/=	7/24/06	PCB-77 (^{13}C-PCB-77)	~~1.04~~	~~47.1~~			
			PCB-105 (^{13}C-PCB-105)	0.94	~~58.9~~			
			PCB-156 (^{13}C-PCB-156)	0.96	~~107~~			
			PCB-180 (^{13}C-PCB-180)	0.93	~~48.5~~			
2	PB6C-33C S=1	7/27/06	PCB-77 (^{13}C-PCB-77)	1.04	46.9	46.9		
			PCB-105 (^{13}C-PCB-105)	0.94	52.6	52.7		
			PCB-156 (^{13}C-PCB-156)	0.96	106	106		
			PCB-180 (^{13}C-PCB-180)	0.93	48.2	48.4		
3	~~PB6C-38A~~ S=2	7/24/06	PCB-77 (^{13}C-PCB-77)	1.04	46.6	46.7		
			PCB-105 (^{13}C-PCB-105)	0.94	53.9	54.0		
			PCB-156 (^{13}C-PCB-156)	0.96	106	106		
			PCB-180 (^{13}C-PCB-180)	0.93	47.8	48.0		

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 #: 15449A3
SDG #: DPWF199T5

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 9
2nd Reviewer: A

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 = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: WF19626-103

Compound	Spike Added (ng/mL)		Spiked Sample Concentration (ng/mL)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PCB-77	100	RR	97.0		97.0	97.0				
PCB-81	↓		101		101	101				
PCB-105			99.9		99.9	99.9				
PCB-114			104		104	104				
PCB-118			104		104	104				
PCB-123			104		104	104				
PCB-126			108		108	108				
PCB-156	200		218		109	109				
~~PCB-157~~										
PCB-167	100		105		105	105				
PCB-169	↓		101		101	101				
~~PCB-170~~										
~~PCB-180~~										
PCB-189	100		97.5		97.5	97.5				

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.

Ions Monitored for HRGC/HRMS Analysis of Polychlorinated Biphenyls

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

S = Internal/recovery standard

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

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

C:\WPDOCS\WRK\PCB\TCI.16A

LDC #: 15119A3
SDG #: DPW919975

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Q
2nd reviewer: R

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?

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

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. 1, #OBTT:

Conc. = (6.86E+06)(4000)( )
(662+00)(1.04)(3.20)( )

= 1245.5 ng/kg

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