Appendix B

Data Validation Reports

616203

LABORATORY DATA CONSULTANTS, INC.
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AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 29, 2014

SUBJECT: Revised CWCM High Volume, LPR, Event #1, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 29736:

SDG #	Fraction
A5114 & A5125	Polychlorinated Biphenyls as Congeners

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to breakthrough exceedance

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page
  -Removed qualifications due to static spike %Rs and breakthrough exceedances

SDG #	Fraction
A5114 & A5125	Dioxins/Dibenzofurans

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to Internal Standard %Rs

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 29736A21_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #1
Collection Date:	December 17 through December 18, 2012
LDC Report Date:	October 28, 2014
Matrix:	Air
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5114

Sample Identification

12I-CE05-T102-BP01
12I-CE05-T102-BM01
12I-CE05-T102-BM02
12I-CE05-T175-AP01
12I-CE05-T175-AM01
12I-CE05-T175-AM02
12I-CE05-T175-XR04
12I-CE05-T175-XR01
12I-CE05-T175-XR02
12I-CE05-TTR2-BP01
12I-CE05-TTR2-BM01
12I-CE05-TTR2-BM02
12I-CE05-TTR2-BQ01
12I-CE05-TTR2-BN01
12I-CE05-TTR2-BN02

Introduction

This data review covers 15 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, September 2006) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
1/30/13 (130130S03)	1,2,3,4,6,7,8-HpCDF	55.2 ng (45-55)	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 MB1_10558	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
1/30/13 (130130S03)	^{13}C-1,2,3,4,7,8-HxCDD	83.5 ng (85-117)	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 MB1_10558	1,2,3,4,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
1/31/13 (130130S24)	1,2,3,4,6,7,8-HpCDF	55.2 ng (45-55)	12I-CE05-T175-AM02 12I-CE05-T175-XR04 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1_10558	1/24/13	OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	2.92 pg 0.625 pg 2.6 pg 0.671 pg 0.625 pg	All samples in SDG A5114

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T102-BM01	1,2,3,4,6,7,8-HpCDF OCDF	1.68 pg 4.4 pg	1.68U pg 4.4U pg
12I-CE05-T102-BM02	OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	12.6 pg 1.09 pg 2.01 pg 1.91 pg	12.6U pg 1.09U pg 2.01U pg 1.91U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T175-AM01	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.25 pg 2.13 pg 2.15 pg	1.25U pg 2.13U pg 2.15U pg
12I-CE05-T175-AM02	1,2,3,4,6,7,8-HpCDF OCDF	2.42 pg 4.9 pg	2.42U pg 4.9U pg
12I-CE05-T175-XR04	OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD	5.06 pg 1.2 pg 5.12 pg 2.47 pg	5.06U pg 1.2U pg 5.12U pg 2.47U pg
12I-CE05-T175-XR01	OCDD Total HpCDD	2.8 pg 2.39 pg	2.8U pg 2.39U pg
12I-CE05-TTR2-BM01	OCDD 1,2,3,4,6,7,8-HpCDF OCDF	12.3 pg 2.89 pg 2.05 pg	12.3U pg 2.89U pg 2.05U pg
12I-CE05-TTR2-BM02	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.74 pg 2.59 pg 2.8 pg	1.74U pg 2.59U pg 2.8U pg
12I-CE05-TTR2-BN01	1,2,3,4,6,7,8-HpCDF	2.51 pg	2.51U pg
12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF OCDF	2.54 pg 4.6 pg	2.54U pg 4.6U pg

Samples 12I-CE05-T175-XR04, 12I-CE05-T175-XR01, and 12I-CE05-T175-XR02 were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
12I-CE05-T175-XR04	12/18/12	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	1.16 pg 5.06 pg 1.2 pg 5.12 pg 2.47 pg 3.53 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
12I-CE05-T175-XR01	12/18/12	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	1.11 pg 2.08 pg 2.39 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T102-BM01	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.68 pg 4.4 pg 3.39 pg	1.68U pg 4.4U pg 3.39U pg
12I-CE05-T102-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	1.86 pg 12.6 pg 1.09 pg 2.01 pg 4.91 pg 1.91 pg	1.86U pg 12.6U pg 1.09U pg 2.01U pg 4.91U pg 1.91U pg
12I-CE05-T175-AM01	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	5.65 pg 1.25 pg 2.13 pg 11.1 pg 2.15 pg	5.65U pg 1.25U pg 2.13U pg 11.1U pg 2.15U pg
12I-CE05-T175-AM02	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	5.61 pg 2.42 pg 4.9 pg 10.6 pg 4.9 pg	5.61U pg 2.42U pg 4.9U pg 10.6U pg 4.9U pg
12I-CE05-TTR2-BM01	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	3.1 pg 12.3 pg 2.89 pg 2.05 pg 6.21 pg 4.02 pg	3.1U pg 12.3U pg 2.89U pg 2.05U pg 6.21U pg 4.02U pg
12I-CE05-TTR2-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	3.96 pg 25.3 pg 1.74 pg 2.59 pg 9.91 pg 2.8 pg	3.96U pg 25.3U pg 1.74U pg 2.59U pg 9.91U pg 2.8U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-TTR2-BN01	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF Total HpCDD Total HpCDF	3.47 pg 2.51 pg 9.01 pg 3.74 pg	3.47U pg 2.51U pg 9.01U pg 3.74U pg
12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	2.54 pg 4.6 pg 3.6 pg	2.54U pg 4.6U pg 3.6U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5114	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5114	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-T175-XR04 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P	Continuing calibration (concentration) (c)
A5114	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01	1,2,3,4,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Continuing calibration (concentration) (c)
A5114	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-T175-XR04 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (k)

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T102-BM01	1,2,3,4,6,7,8-HpCDF OCDF	1.68U pg 4.4U pg	A	bl
A5114	12I-CE05-T102-BM02	OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	12.6U pg 1.09U pg 2.01U pg 1.91U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-AM01	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.25U pg 2.13U pg 2.15U pg	A	bl
A5114	12I-CE05-T175-AM02	1,2,3,4,6,7,8-HpCDF OCDF	2.42U pg 4.9U pg	A	bl
A5114	12I-CE05-T175-XR04	OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD	5.06U pg 1.2U pg 5.12U pg 2.47U pg	A	bl
A5114	12I-CE05-T175-XR01	OCDD Total HpCDD	2.8U pg 2.39U pg	A	bl
A5114	12I-CE05-TTR2-BM01	OCDD 1,2,3,4,6,7,8-HpCDF OCDF	12.3U pg 2.89U pg 2.05U pg	A	bl
A5114	12I-CE05-TTR2-BM02	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.74U pg 2.59U pg 2.8U pg	A	bl
A5114	12I-CE05-TTR2-BN01	1,2,3,4,6,7,8-HpCDF	2.51U pg	A	bl
A5114	12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF OCDF	2.54U pg 4.6U pg	A	bl

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T102-BM01	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	1.68U pg 4.4U pg 3.39U pg	A	be
A5114	12I-CE05-T102-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	1.86U pg 12.6U pg 1.09U pg 2.01U pg 4.91U pg 1.91U pg	A	be
A5114	12I-CE05-T175-AM01	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	5.65U pg 1.25U pg 2.13U pg 11.1U pg 2.15U pg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-AM02	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	5.61U pg 2.42U pg 4.9U pg 10.6U pg 4.9U pg	A	be
A5114	12I-CE05-TTR2-BM01	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	3.1U pg 12.3U pg 2.89U pg 2.05U pg 6.21U pg 4.02U pg	A	be
A5114	12I-CE05-TTR2-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total HpCDD Total HpCDF	3.96U pg 25.3U pg 1.74U pg 2.59U pg 9.91U pg 2.8U pg	A	be
A5114	12I-CE05-TTR2-BN01	1,2,3,4,6,7,8-HpCDD 1,2,3,4,6,7,8-HpCDF Total HpCDD Total HpCDF	3.47U pg 2.51U pg 9.01U pg 3.74U pg	A	be
A5114	12I-CE05-TTR2-BN02	1,2,3,4,6,7,8-HpCDF OCDF Total HpCDF	2.54U pg 4.6U pg 3.6U pg	A	be

LDC #: 29736A21
SDG #: A5114
Laboratory: SGS Analytical Perspective

VALIDATION COMPLETENESS WORKSHEET
Full

Date: 5-21-13
Page: 1 of 1
Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 12/17/12 → 12/18/12
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Routine calibration/~~ICV~~	SW	QC limits
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	Client
VII.	Laboratory control samples	A	BCS_3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	Dynamic + Static
X.	Target compound identifications	~~A~~ SW	[initials] 10/27/14
XI.	Compound quantitation/~~RL/LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW ~~A~~	EB = 7,8,9 (9 = ND)

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: 5 filters / 10 PUF's

1	12I-CE05-T102-BP01	11	12I-CE05-TTR2-BM01	21		31	
2	12I-CE05-T102-BM01	12	12I-CE05-TTR2-BM02	22		32	
3	12I-CE05-T102-BM02	13	12I-CE05-TTR2-BQ01	23		33	
4	12I-CE05-T175-AP01	14	12I-CE05-TTR2-BN01	24		34	
5	12I-CE05-T175-AM01	15	12I-CE05-TTR2-BN02	25		35	
6	12I-CE05-T175-AM02	16		26		36	
7	12I-CE05-T175-XR04	17		27		37	
8	12I-CE05-T175-XR01	18		28		38	
9	12I-CE05-T175-XR02	19		29		39	
10	12I-CE05-TTR2-BP01	20		30	MB1-10558	40	

Notes:

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

Reviewer: gm
2nd Reviewer: g

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

(c)

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	01/30/13	130130S03	O	55.2 (45-55)		1-5, MB1_10558	Jdets/P (O, Y)
			13C-C	83.5 (85-117)			J/UJ/P (C, T)
	01/31/13	130130S24	O	55.2 (45-55)		6-15	Jdets/P (O, Y)

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Blanks

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 01/24/13 **Blank analysis date:** 01/30/13 **Associated samples:** All U (bl)
Conc. units: pg

Compound	Blank ID	Sample Identification								
	MB1 10558	5x	2	3	5	6	7	8	11	12
G	2.92	14.6		12.6			5.06	2.8	12.3	
O	0.625	3.125	1.68	1.09*	1.25	2.42*	1.2*		2.89	1.74
Q	2.6*	13	4.4*	2.01	2.13	4.9	5.12		2.05	2.59
U	0.671*	3.355					2.47	2.39*		
Y	0.625	3.125		1.91*	2.15*					2.8*

*EMPC

Blank extraction date: 01/24/13 **Blank analysis date:** 01/30/13 **Associated samples:** All
Conc. units: pg

Compound	Blank ID	Sample Identification								
	MB1 10558	5x	14	15						
G	2.92	14.6								
O	0.625	3.125	2.51	2.54*						
Q	2.6*	13		4.6						
U	0.671*	3.355								
Y	0.625	3.125								

*EMPC

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: gm
2nd Reviewer: a

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 12/18/12
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification								
	12I-CE05-T175-XR04	5X	2	3	5	6	11	12	14	15
F	1.16	5.8		1.86*	5.65	5.61	3.1	3.96*	3.47*	
G	5.06	25.3		12.6			12.3	25.3		
O	1.2*	6	1.68	1.09*	1.25	2.42*	2.89	1.74	2.51	2.54*
Q	5.12	25.6	4.4*	2.01	2.13	4.9	2.05	2.59		4.6
U	2.47	12.35		4.91*	11.1	10.6	6.21	9.91*	9.01*	
Y	3.53*	17.65	3.39	1.91*	2.15*	4.9*	4.02	2.8*	3.74*	3.6*

* EMPC

12I-CE05-T175-XR04 (A5114)

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:\Field Blanks\29736A21_12I-CE05-T175-XR04.wpd4

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: 2

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 12/18/12
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification								
	12I-CE05-T175-XR01	5X	3	5	6	11	12	14		
F	1.11*	5.55	1.86*			3.1	3.96*	3.47*		
G	2.08	10.4								
U	2.39*	11.95	4.91*	11.1	10.6	6.21	9.91*	9.01*		

* EMPC

12I-CE05-T175-XR01 (A5114)

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 #: 29736A21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: CM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	† all except 3, 5, 14	TEXT
			concentration of detected native compounds except X in secondary PUF >20% of primary PUF	5	
			concentration of detected native compounds except W in secondary PUF >20% of primary PUF	3	
			concentration of detected native compounds except T in secondary PUF >20% of primary PUF	14	
				* 2, 3, 5, 6, 8, 9, 11, 12, 14, 15	

Notes: See Attached

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer:
2nd Reviewer:

METHOD: GC/MS Dioxins/Dibenzofurans (Method 1613B)

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 RLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			EMPC	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Dioxins/Dibenzofurans (Method 1613B)

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 RLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			The Lab noted that the ICAL used to quantify the RRF for calculating the recovery of the		
			dynamic standard (FS) for the samples was analyzed two weeks after the samples were acquired.		
			This deviates form normal procedure of injecting the ICAL prior to the continuing calibration and samples in question.		

Comments: See sample calculation verification worksheet for recalculations

LDC #: 29736A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: SM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	ICAL	11-29-12	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.09	1.09	1.10	1.10	6.9	7.0
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.27	1.27	1.34	1.34	9.6	9.6
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.02	1.02	1.00	1.00	2.9	2.9
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.01	1.01	1.00	1.00	2.2	2.1
			OCDF (^{13}C-OCDF)	0.98	0.98	0.98	0.98	3.7	3.7
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 29736A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130130S03	1-30-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	10.2	10.2	2	2
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.7	10.7	7	7
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	58	58	16	16
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	49.9	50	0	0.2
			OCDF (^{13}C-OCDF)	100	111	111	11	11
2	130130S12	1-30-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	9.71	9.72	-3	3
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10	10	0	0
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	56.9	56.9	14	14
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	51.3	51.5	3	3
			OCDF (^{13}C-OCDF)	100	109	109	9	9
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				

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 #: 24736A21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 6, P:

Conc. = $\frac{(1.99e4)(2000)(1)}{(1.86e7)(1.39)(1)(\ )}$

= 1.54pg

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5114
LAB: SGS-Analytical Perspectives
SITE: CWCM High Volume

1.0 Data Completeness and Deliverables

		YES	NO	N/A
1.1	Does the Traffic Report or Field Chain of Custody list all samples?	✓		
1.2	Is the Case Narrative present?	✓		
1.3	Are the Case Number and SDG numbers contained in the case narrative?	✓		
1.4	Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data?		✓	

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

	YES	NO	N/A
a. Sample Data Summary (Form I CDD-1)	✓		
b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2)	✓		
c. Second Column Confirmation Summary (Form I, CDD-3)			✓
d. Total Homologue Concentration Summary (Form II CDD)	✓		
e. CDD/CDF Spiked Sample Summary (Form III CDD-1)	✓		
f. CDD/CDF Duplicate Sample Summary (Form III CDD-2)	✓		

	YES	NO	N/A
g. CDD/CDF Method Blank Summary (Form IV-CDD)	✓		
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	✓		
I. Chromatographic Resolution Summary (Form V CDD-2)	✓		
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	✓		
k. Initial Calibration (Form VI, CDD-1, CDD-2)	✓		
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	✓		

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

	YES	NO	N/A
a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis: the file name; sample number; and instrument I.D. number	✓		
b. Percent peak resolution valley	✓		
c. Window Defining Mixture raw data	✓		
d. SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	✓		
e. Integrated area and peak height must be listed for all peaks 2.5 times above background	✓		

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

	YES	NO	N/A
a. Chain of Custody Records	✓		
b. Sample Shipment Records	✓		
c. Sample log-in sheets	✓		
d. GC/MS Standard and Sample Run Log in chronological order	✓		
e. Sample Extraction Log	✓		

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals

YES NO N/A

or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [/] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [ ] ___ [/]

b. For soil/sediment samples, 30 days from VTSR to extraction? [/] ___ ___

c. For fish and tissue samples, one (1) year from VTSR to extraction? [ ] ___ [/]

d. For all samples 45 days from time of extraction to time of analysis? [/] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: **The data reviewer must note <u>whether or not</u> technical and contractual holding times were met.**

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 <u>Window Defining Solution/ Isomer Specificity Test Standards</u>

The Window Defining **Solution** must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning

YES NO N/A

of every 12 hour period. Was this performed accordingly? [✓] ___ ___

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] ___ ___

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] ___ ___

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining Solution and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9- HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent

YES NO N/A

coefficient of variation must be ≤ 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be ≤ 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2.3.7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [ ] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2.3,7.8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1.2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP. including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

YES NO N/A

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [ ] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [ ] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in **Table 8** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:

YES NO N/A

For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{(A_{l1} + A_{l2}) \times Q_n}$$

For labeled analytes. Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2.3.7.8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [ ] [✓] ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1.2,3,4- TCDD and $^{13}C_{12}$1.2,3.7.8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

	YES	NO	N/A
6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2)	[✓]		
6.2 Isomer Specificity Test Standard			
6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613B, Section 15.4.2.2)	[✓]		
6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis.	[ ]		✓

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 Were the following MS/DS conditions used?

		YES	NO	N/A
7.1.1	SIM data were acquired for each of the ions listed in Table 8 (see analytical method) including diphenylether interfering ions.	[✓]		
7.2	Were the following identification criteria met?			
7.2.1	For the 2.3.7.8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract. must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]		
7.2.2	For non-2.3.7.8 substituted compounds (tetra through octa) found present. the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B. Section 16.4)	[✓]		
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte. the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B. Section 16.1)	[✓]		
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]		
7.2.5	The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B. Section 16.2)	[✓]		
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or ± 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[✓]		
7.2.7	The relative retention time of the unlabeled 2.3.7.8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]		
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup. and internal standard must be met (Table 9 - Method 1613B).	[✓]		
7.2.9	The analyte concentration must be within the calibration range. If not. dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]		

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive. high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]		

ACTION: 1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

YES NO N/A

2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

   A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

   B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6, and 7.2.7, (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_l}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$$V \times (A_{l1} + A_{l2}) \times RR$$

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_l = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range listed on Table 6 of the Analytical method? [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [ ] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the

	YES	NO	N/A
Initial Precision and Recovery samples as required by the method?	[✓]		

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present?	[✓]		

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria?	[✓]		

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$EMPC\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_i \times D}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water:

$$EMPC\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_i \times D}{V \times (A_{l1} + A_{l2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 **or above one third the regulatory compliance level.**. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in

YES NO N/A

the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [ ] ___ [✓]

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non-detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1.2.3.7.8.9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

YES NO N/A

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [ ] ___ ___

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [ ] ___ ___

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [ ] ___ ___

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [ ] ___ ___

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses

YES NO N/A

and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section 9.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table 6 of the method? [✓] ___ ___

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the Ongoing Precision and Recovery (~~OPR~~ BCS3) standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in Table 6 of the method? [✓] ___ ___

YES NO N/A

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 µg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 µg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [ ] ___ ✓

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 µg/L or any other analyte at levels > 1 µg/L? [ ] ___ ✓

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

YES NO N/A

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [ ] ___ ___

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [ ] ___ ___

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10. Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [ ] ___ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [ ] ___ ___

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

20.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ___ ___

20.2 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent? [ ] ___ ___

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3 Was a matrix spike duplicate analyzed as per section 11.1 and 11.2? [ ] ___ ___

YES NO N/A

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ /

21.2 Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes? [ ] ___ /

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills", Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision B- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October 1994

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin". 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF". National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016. Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data". American Laboratory, 15: 56-83, 1983

YES NO N/A

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 29, 2014

SUBJECT: Revised CWCM High Volume, LPR, Event #1, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 29736:

SDG #	Fraction
A5114 & A5125	Polychlorinated Biphenyls as Congeners

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to breakthrough exceedance

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page
  -Removed qualifications due to static spike %Rs and breakthrough exceedances

SDG #	Fraction
A5114 & A5125	Dioxins/Dibenzofurans

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to Internal Standard %Rs

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 29736A31_RV2

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #1
Collection Date	December 17 through December 18, 2012
LDC Report Date:	October 28, 2014
Matrix:	Air
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5114

Sample Identification

12I-CE05-T102-BP01
12I-CE05-T102-BM01
12I-CE05-T102-BM02
12I-CE05-T175-AP01
12I-CE05-T175-AM01
12I-CE05-T175-AM02
12I-CE05-T175-XR04
12I-CE05-T175-XR01
12I-CE05-T175-XR02
12I-CE05-TTR2-BP01
12I-CE05-TTR2-BM01
12I-CE05-TTR2-BM02
12I-CE05-TTR2-BQ01
12I-CE05-TTR2-BN01
12I-CE05-TTR2-BN02

Introduction

This data review covers 15 air samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls (PCB) as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2) and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue, and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 Toxic/LOC and labeled compounds were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing 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 PCBs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

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
MB1_10558	1/24/13	PCB-105	9.97 pg	All samples in SDG A5114
		PCB-118	19.3 pg	
		Mono-CBs	222 pg	
		Di-CBs	1630 pg	
		Tri-CBs	1380 pg	
		Tetra-CBs	678 pg	
		Penta-CBs	264 pg	
		Hexa-CBs	102 pg	
		Hepta-CBs	10.9 pg	
		PCB-1	82.9 pg	
		PCB-2	58.2 pg	
		PCB-3	80.7 pg	
		PCB-4	201 pg	
		PCB-6	92.7 pg	
		PCB-8	359 pg	
		PCB-11	905 pg	
		PCB-15	71.3 pg	
		PCB-19	43.5 pg	
		PCB-30/18	283 pg	
		PCB-17	137 pg	
		PCB-27	19.8 pg	
		PCB-16	136 pg	
		PCB-32	78.2 pg	
		PCB-26/29	42.7 pg	
		PCB-25	20.6 pg	
		PCB-31	195 pg	
		PCB-28/20	206 pg	
		PCB-21/33	122 pg	
		PCB-22	70 pg	
		PCB-37	23 pg	
		PCB-50/53	19.5 pg	
		PCB-45	27.7 pg	
		PCB-51	12.6 pg	
		PCB-46	9.39 pg	
		PCB-52	154 pg	
		PCB-69/49	61.7 pg	
		PCB-48	28.6 pg	
		PCB-44/47/65	110 pg	
		PCB-42	24.3 pg	
		PCB-41	11.1 pg	
		PCB-71/40	35.8 pg	
		PCB-64	34.7 pg	
		PCB-61/70/74/76	89.6 pg	
		PCB-66	30.4 pg	
		PCB-56	16.8 pg	
		PCB-60	11.3 pg	
		PCB-95	60.1 pg	
		PCB-91	7.58 pg	
		PCB-84	19.6 pg	
		PCB-113/90/101	50.6 pg	
		PCB-99	21.3 pg	
		PCB-108/119/86/97/125/87	33.5 pg	
		PCB-110	41.7 pg	
		PCB-136	7.68 pg	
		PCB-151/135	13.1 pg	
		PCB-147/149	23.8 pg	
		PCB-132	11.6 pg	
		PCB-153/168	18.7 pg	
		PCB-163/138/129	27.3 pg	
		PCB-180/193	10.9 pg	

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T102-BM01	Mono-CBs	1040 pg	1040U pg
	PCB-2	54.9 pg	54.9U pg
	PCB-3	147 pg	147U pg
	PCB-11	2320 pg	2320U pg
12I-CE05-T102-BM02	Mono-CBs	451 pg	451U pg
	PCB-1	351 pg	351U pg
	PCB-2	33.7 pg	33.7U pg
	PCB-3	66.2 pg	66.2U pg
	PCB-6	387 pg	387U pg
	PCB-8	979 pg	979U pg
	PCB-11	1060 pg	1060U pg
12I-CE05-T175-AP01	Mono-CBs	492 pg	492U pg
	PCB-1	187 pg	187U pg
	PCB-2	84.1 pg	84.1U pg
	PCB-9	109 pg	109U pg
	PCB-8	1180 pg	1180U pg
	PCB-11	3040 pg	3040U pg
12I-CE05-T175-AM01	Mono-CBs	1110 pg	1110U pg
	PCB-2	66.7 pg	66.7U pg
	PCB-3	137 pg	137U pg
	PCB-6	453 pg	453U pg
	PCB-8	1080 pg	1080U pg
	PCB-11	1320 pg	1320U pg
	PCB-21/33	596 pg	596U pg
12I-CE05-T175-AM02	PCB-2	108 pg	108U pg
	PCB-3	245 pg	245U pg
	PCB-11	2790 pg	2790U pg
12I-CE05-T175-XR04	PCB-105	9.2 pg	9.2U pg
	PCB-118	15.3 pg	15.3U pg
	PCB-11	65.8 pg	65.8U pg
	PCB-30/18	13.2 pg	13.2U pg
	PCB-31	12.8 pg	12.8U pg
	PCB-28/20	20.5 pg	20.5U pg
	PCB-52	12.2 pg	12.2U pg
	PCB-61/70/74/76	22.6 pg	22.6U pg
	PCB-95	15.8 pg	15.8U pg
	PCB-113/90/101	16.4 pg	16.4U pg
	PCB-110	13.4 pg	13.4U pg
	PCB-151/135	17.2 pg	17.2U pg
	PCB-147/149	18 pg	18U pg
	PCB-153/168	16.9 pg	16.9U pg
	PCB-163/138/129	23.5 pg	23.5U pg
	PCB-180/193	22.2 pg	22.2U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T175-XR01	PCB-105	25 pg	25U pg
	PCB-118	44.3 pg	44.3U pg
	Mono-CBs	117 pg	117U pg
	PCB-1	41.5 pg	41.5U pg
	PCB-2	37.6 pg	37.6U pg
	PCB-3	38.4 pg	38.4U pg
	PCB-4	131 pg	131U pg
	PCB-6	67.6 pg	67.6U pg
	PCB-8	265 pg	265U pg
	PCB-11	676 pg	676U pg
	PCB-15	68.8 pg	68.8U pg
	PCB-19	31.5 pg	31.5U pg
	PCB-30/18	217 pg	217U pg
	PCB-17	98 pg	98U pg
	PCB-27	13.4 pg	13.4U pg
	PCB-16	117 pg	117U pg
	PCB-32	63.2 pg	63.2U pg
	PCB-26/29	35 pg	35U pg
	PCB-25	14.4 pg	14.4U pg
	PCB-31	170 pg	170U pg
	PCB-28/20	188 pg	188U pg
	PCB-21/33	105 pg	105U pg
	PCB-22	70.9 pg	70.9U pg
	PCB-37	40.7 pg	40.7U pg
	PCB-50/53	20.3 pg	20.3U pg
	PCB-45	15.8 pg	15.8U pg
	PCB-51	21.3 pg	21.3U pg
	PCB-52	153 pg	153U pg
	PCB-69/49	61.1 pg	61.1U pg
	PCB-48	23.4 pg	23.4U pg
	PCB-44/47/65	144 pg	144U pg
	PCB-42	20 pg	20U pg
	PCB-41	16.1 pg	16.1U pg
	PCB-71/40	38.8 pg	38.8U pg
	PCB-64	37.5 pg	37.5U pg
	PCB-61/70/74/76	119 pg	119U pg
	PCB-66	62.4 pg	62.4U pg
	PCB-56	30.8 pg	30.8U pg
	PCB-60	12.2 pg	12.2U pg
	PCB-95	105 pg	105U pg
	PCB-84	27.8 pg	27.8U pg
	PCB-113/90/101	91.3 pg	91.3U pg
	PCB-99	27.1 pg	27.1U pg
	PCB-108/119/86/97/125/87	53.2 pg	53.2U pg
	PCB-110	76.7 pg	76.7U pg
	PCB-136	20.3 pg	20.3U pg
	PCB-151/135	47.9 pg	47.9U pg
	PCB-147/149	102 pg	102U pg
	PCB-132	28.3 pg	28.3U pg
	PCB-153/168	68.9 pg	68.9U pg
	PCB-163/138/129	78.3 pg	78.3U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T175-XR02	PCB-105	21.3 pg	21.3U pg
	PCB-118	39.4 pg	39.4U pg
	Mono-CBs	82.6 pg	82.6U pg
	PCB-1	29.5 pg	29.5U pg
	PCB-2	25.8 pg	25.8U pg
	PCB-3	27.3 pg	27.3U pg
	PCB-4	49.3 pg	49.3U pg
	PCB-6	43.6 pg	43.6U pg
	PCB-8	129 pg	129U pg
	PCB-11	391 pg	391U pg
	PCB-19	13.6 pg	13.6U pg
	PCB-30/18	103 pg	103U pg
	PCB-17	38.3 pg	38.3U pg
	PCB-16	52.9 pg	52.9U pg
	PCB-32	30.8 pg	30.8U pg
	PCB-26/29	15.4 pg	15.4U pg
	PCB-25	7.97 pg	7.97U pg
	PCB-31	75.4 pg	75.4U pg
	PCB-28/20	84 pg	84U pg
	PCB-21/33	44.2 pg	44.2U pg
	PCB-22	32.2 pg	32.2U pg
	PCB-37	18.1 pg	18.1U pg
	PCB-50/53	10.2 pg	10.2U pg
	PCB-45	7.51 pg	7.51U pg
	PCB-51	15.9 pg	15.9U pg
	PCB-52	76.8 pg	76.8U pg
	PCB-69/49	27.7 pg	27.7U pg
	PCB-44/47/65	79.2 pg	79.2U pg
	PCB-42	10.9 pg	10.9U pg
	PCB-71/40	17.2 pg	17.2U pg
	PCB-64	18 pg	18U pg
	PCB-61/70/74/76	54 pg	54U pg
	PCB-66	25.8 pg	25.8U pg
	PCB-56	13.5 pg	13.5U pg
	PCB-95	51.5 pg	51.5U pg
	PCB-113/90/101	51.8 pg	51.8U pg
	PCB-99	11.8 pg	11.8U pg
	PCB-108/119/86/97/125/87	27.1 pg	27.1U pg
	PCB-110	43.3 pg	43.3U pg
	PCB-136	14.5 pg	14.5U pg
	PCB-151/135	33.5 pg	33.5U pg
	PCB-147/149	72.9 pg	72.9U pg
	PCB-132	31 pg	31U pg
	PCB-153/168	76.8 pg	76.8U pg
	PCB-163/138/129	109 pg	109U pg
12I-CE05-TTR2-BM01	Mono-CBs	774 pg	774U pg
	PCB-2	71 pg	71U pg
	PCB-3	117 pg	117U pg
	PCB-8	1550 pg	1550U pg
	PCB-11	1360 pg	1360U pg
12I-CE05-TTR2-BM02	PCB-2	180 pg	180U pg
	PCB-3	340 pg	340U pg
12I-CE05-TTR2-BN01	PCB-2	126 pg	126U pg
	PCB-3	250 pg	250U pg
	PCB-11	1930 pg	1930U pg
12I-CE05-TTR2-BN02	PCB-2	169 pg	169U pg
	PCB-3	318 pg	318U pg

Samples 12I-CE05-T175-XR04, 12I-CE05-T175-XR01, and 12I-CE05-T175-XR02 were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
12I-CE05-T175-XR04	12/18/12	PCB-105 PCB-118 Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs PCB-11 PCB-30/18 PCB-31 PCB-28/20 PCB-52 PCB-61/70/74/76 PCB-95 PCB-113/90/101 PCB-110 PCB-151/135 PCB-147/149 PCB-153/168 PCB-163/138/129 PCB-180/193 PCB-170	9.2 pg 15.3 pg 65.8 pg 46.4 pg 34.7 pg 70.1 pg 75.6 pg 37.2 pg 65.8 pg 13.2 pg 12.8 pg 20.5 pg 12.2 pg 22.6 pg 15.8 pg 16.4 pg 13.4 pg 17.2 pg 18 pg 16.9 pg 23.5 pg 22.2 pg 15 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02
12I-CE05-T175-XR01	12/18/12	PCB-105 PCB-118 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs PCB-1 PCB-2 PCB-3 PCB-4 PCB-9 PCB-6 PCB-8 PCB-11 PCB-15 PCB-19 PCB-30/18 PCB-17 PCB-27 PCB-16 PCB-32 PCB-26/29 PCB-25 PCB-31 PCB-28/20 PCB-21/33 PCB-22	25 pg 44.3 pg 117 pg 1230 pg 1160 pg 775 pg 450 pg 394 pg 264 pg 40.7 pg 41.5 pg 37.6 pg 38.4 pg 131 pg 26.5 pg 67.6 pg 265 pg 676 pg 68.8 pg 31.5 pg 217 pg 98 pg 13.4 pg 117 pg 63.2 pg 35 pg 14.4 pg 170 pg 188 pg 105 pg 70.9 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
12I-CE05-T175-XR01 (Continued)	12/18/12	PCB-37 PCB-50/53 PCB-45 PCB-51 PCB-52 PCB-69/49 PCB-48 PCB-44/47/65 PCB-42 PCB-41 PCB-71/40 PCB-64 PCB-61/70/74/76 PCB-66 PCB-56 PCB-60 PCB-95 PCB-84 PCB-113/90/101 PCB-99 PCB-108/119/86/97/125/87 PCB-110 PCB-136 PCB-151/135 PCB-147/149 PCB-132 PCB-146 PCB-153/168 PCB-141 PCB-163/138/129 PCB-158 PCB-179 PCB-187 PCB-183 PCB-174 PCB-177 PCB-171/173 PCB-180/193 PCB-170 PCB-198/199 PCB-194	40.7 pg 20.3 pg 15.8 pg 21.3 pg 153 pg 61.1 pg 23.4 pg 144 pg 20 pg 16.1 pg 38.8 pg 37.5 pg 119 pg 62.4 pg 30.8 pg 12.2 pg 105 pg 27.8 pg 91.3 pg 27.1 pg 53.2 pg 76.7 pg 20.3 pg 47.9 pg 102 pg 28.3 pg 11.8 pg 68.9 pg 27.3 pg 78.3 pg 9.09 pg 19.6 pg 30.1 pg 19.2 pg 47.4 pg 25.3 pg 16.9 pg 71.5 pg 34.1 pg 20.4 pg 20.3 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02
12I-CE05-T175-XR02	12/18/13	PCB-105 PCB-118 PCB-156/157 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs PCB-1 PCB-2 PCB-3 PCB-4 PCB-6 PCB-8 PCB-11 PCB-19 PCB-30/18	21.3 pg 39.4 pg 13.5 pg 82.6 pg 613 pg 516 pg 366 pg 246 pg 416 pg 421 pg 97 pg 29.5 pg 25.8 pg 27.3 pg 49.3 pg 43.6 pg 129 pg 391 pg 13.6 pg 103 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
12I-CE05-T175-XR02 (Continued)	12/18/13	PCB-17	38.3 pg	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02
		PCB-16	52.9 pg	
		PCB-32	30.8 pg	
		PCB-26/29	15.4 pg	
		PCB-25	7.97 pg	
		PCB-31	75.4 pg	
		PCB-28/20	84 pg	
		PCB-21/33	44.2 pg	
		PCB-22	32.2 pg	
		PCB-37	18.1 pg	
		PCB-50/53	10.2 pg	
		PCB-45	7.51 pg	
		PCB-51	15.9 pg	
		PCB-52	76.8 pg	
		PCB-69/49	27.7 pg	
		PCB-44/47/65	79.2 pg	
		PCB-42	10.9 pg	
		PCB-71/40	17.2 pg	
		PCB-64	18 pg	
		PCB-68	9.15 pg	
		PCB-61/70/74/76	54 pg	
		PCB-66	25.8 pg	
		PCB-56	13.5 pg	
		PCB-95	51.5 pg	
		PCB-113/90/101	51.8 pg	
		PCB-99	11.8 pg	
		PCB-108/119/86/97/125/87	27.1 pg	
		PCB-110	43.3 pg	
		PCB-136	14.5 pg	
		PCB-151/135	33.5 pg	
		PCB-147/149	72.9 pg	
		PCB-132	31 pg	
		PCB-146	13.2 pg	
		PCB-153/168	76.8 pg	
		PCB-141	30.1 pg	
		PCB-163/138/129	109 pg	
		PCB-158	11.9 pg	
		PCB-128/166	9.15 pg	
		PCB-179	17.6 pg	
		PCB-187	55.9 pg	
		PCB-183	27.6 pg	
		PCB-185	7.26 pg	
		PCB-174	70.2 pg	
		PCB-177	38.3 pg	
		PCB-171/173	24.7 pg	
		PCB-180/193	120 pg	
		PCB-170	59.5 pg	
		PCB-198/199	32.5 pg	
		PCB-196	17.3 pg	
		PCB-203	16.4 pg	
		PCB-194	30.7 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T102-BM01	Hepta-CBs	1710 pg	1710U pg
	Octa-CBs	339 pg	339U pg
	PCB-2	54.9 pg	54.9U pg
	PCB-3	147 pg	147U pg
	PCB-11	2320 pg	2320U pg
	PCB-174	232 pg	232U pg
	PCB-177	106 pg	106U pg
	PCB-171/173	51.7 pg	51.7U pg
	PCB-180/193	412 pg	412U pg
	PCB-170	174 pg	174U pg
	PCB-198/199	81.2 pg	81.2U pg
	PCB-196	42.2 pg	42.2U pg
	PCB-203	52 pg	52U pg
	PCB-194	94.8 pg	94.8U pg
12I-CE05-T102-BM02	Mono-CBs	451 pg	451U pg
	Hepta-CBs	1020 pg	1020U pg
	Octa-CBs	194 pg	194U pg
	PCB-2	33.7 pg	33.7U pg
	PCB-3	66.2 pg	66.2U pg
	PCB-9	68.7 pg	68.7U pg
	PCB-11	1060 pg	1060U pg
	PCB-179	74 pg	74U pg
	PCB-187	174 pg	174U pg
	PCB-183	80.7 pg	80.7U pg
	PCB-174	148 pg	148U pg
	PCB-177	64.2 pg	64.2U pg
	PCB-171/173	32.4 pg	32.4U pg
	PCB-180/193	250 pg	250U pg
	PCB-170	105 pg	105U pg
	PCB-198/199	51.7 pg	51.7U pg
	PCB-196	18.9 pg	18.9U pg
	PCB-203	34.3 pg	34.3U pg
	PCB-194	50.8 pg	50.8U pg
12I-CE05-T175-AP01	Mono-CBs	492 pg	492U pg
	PCB-1	187 pg	187U pg
	PCB-2	84.1 pg	84.1U pg
	PCB-9	109 pg	109U pg
	PCB-8	1180 pg	1180U pg
	PCB-11	3040 pg	3040U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-T175-AM01	PCB-156/157	32.2 pg	32.2U pg
	Hepta-CBs	743 pg	743U pg
	Octa-CBs	165 pg	165U pg
	PCB-2	66.7 pg	66.7U pg
	PCB-3	137 pg	137U pg
	PCB-8	1080 pg	1080U pg
	PCB-11	1320 pg	1320U pg
	PCB-136	81.2 pg	81.2U pg
	PCB-151/135	213 pg	213U pg
	PCB-147/149	457 pg	457U pg
	PCB-141	95 pg	95U pg
	PCB-179	39 pg	39U pg
	PCB-187	128 pg	128U pg
	PCB-183	66.3 pg	66.3U pg
	PCB-174	109 pg	109U pg
	PCB-177	65.7 pg	65.7U pg
	PCB-180/193	208 pg	208U pg
	PCB-170	98.1 pg	98.1U pg
	PCB-198/199	52.5 pg	52.5U pg
	PCB-194	53.7 pg	53.7U pg
	PCB-146	62.1 pg	62.1U pg
	PCB-163/138/129	503 pg	503U pg
	PCB-158	56 pg	56U pg
	PCB-196	24 pg	24U pg
	PCB-203	35.3 pg	35.3U pg
12I-CE05-T175-AM02	Hepta-CBs	860 pg	860U pg
	Octa-CBs	131 pg	131U pg
	PCB-2	108 pg	108U pg
	PCB-11	2790 pg	2790U pg
	PCB-179	63.6 pg	63.6U pg
	PCB-183	77.6 pg	77.6U pg
	PCB-174	131 pg	131U pg
	PCB-177	64 pg	64U pg
	PCB-171/173	32.3 pg	32.3U pg
	PCB-180/193	197 pg	197U pg
	PCB-170	85.9 pg	85.9U pg
	PCB-198/199	52.2 pg	52.2U pg
	PCB-194	33.5 pg	33.5U pg
	PCB-156/157	62.5 pg	62.5U pg
	PCB-68	27.2 pg	27.2U pg
	PCB-187	163 pg	163U pg
	PCB-203	29.9 pg	29.9U pg
12I-CE05-TTR2-BM01	Hepta-CBs	1000 pg	1000U pg
	Octa-CBs	157 pg	157U pg
	PCB-2	71 pg	71U pg
	PCB-3	117 pg	117U pg
	PCB-11	1360 pg	1360U pg
	PCB-179	78.3 pg	78.3U pg
	PCB-183	86 pg	86U pg
	PCB-174	134 pg	134U pg
	PCB-177	72.5 pg	72.5U pg
	PCB-171/173	35.7 pg	35.7U pg
	PCB-180/193	218 pg	218U pg
	PCB-170	87.1 pg	87.1U pg
	PCB-198/199	54.1 pg	54.1U pg
	PCB-194	37.1 pg	37.1U pg
	PCB-156/157	59.9 pg	59.9U pg
	PCB-187	185 pg	185U pg
	PCB-185	7.39 pg	7.39U pg
	PCB-203	30.9 pg	30.9U pg
	PCB-196	19.8 pg	19.8U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
12I-CE05-TTR2-BM02	PCB-2	180 pg	180U pg
	PCB-171/173	78.5 pg	78.5U pg
	Octa-CBs	419 pg	419U pg
	PCB-174	335 pg	335U pg
	PCB-177	189 pg	189U pg
	PCB-180/193	583 pg	583U pg
	PCB-170	225 pg	225U pg
	PCB-198/199	117 pg	117U pg
	PCB-196	53.3 pg	53.3U pg
	PCB-203	50.8 pg	50.8U pg
	PCB-194	109 pg	109U pg
12I-CE05-TTR2-BN01	Hepta-CBs	1200 pg	1200U pg
	Octa-CBs	171 pg	171U pg
	PCB-2	126 pg	126U pg
	PCB-11	1930 pg	1930U pg
	PCB-174	167 pg	167U pg
	PCB-177	83.8 pg	83.8U pg
	PCB-171/173	38.4 pg	38.4U pg
	PCB-180/193	249 pg	249U pg
	PCB-170	107 pg	107U pg
	PCB-198/199	52.4 pg	52.4U pg
	PCB-194	39 pg	39U pg
	PCB-187	221 pg	221U pg
	PCB-183	108 pg	108U pg
	PCB-185	5.63 pg	5.63U pg
	PCB-196	24.1 pg	24.1U pg
	PCB-203	31.4 pg	31.4U pg
12I-CE05-TTR2-BN02	PCB-2	169 pg	169U pg
	PCB-171/173	72.4 pg	72.4U pg
	PCB-170	160 pg	160U pg
	PCB-198/199	87.8 pg	87.8U pg
	PCB-194	53 pg	53U pg
	Hepta CBs	2080 pg	2080U pg
	Octa CBs	304 pg	304U pg
	PCB-185	25.9 pg	25.9U pg
	PCB-174	297 pg	297U pg
	PCB-177	155 pg	155U pg
	PCB-180/193	416 pg	416U pg
	PCB-196	38.6 pg	38.6U pg
	PCB-203	46 pg	46U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
12I-CE05-T102-BM01	^{13}C-PCB-15 ^{13}C-PCB-77 ^{13}C-PCB-105 ^{13}C-PCB-118 ^{13}C-PCB-126	116 (19-107) 110 (31-109) 113 (50-111) 118 (49-111) 111 (50-106)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-105 PCB-127 PCB-118 PCB-126 Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
12I-CE05-T175-AP01	^{13}C-PCB-104 ^{13}C- PCB-155	118 (36-115) 147 (25-124)	PCB-104 PCB-96 Penta-CBs PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
12I-CE05-T175-XR04	^{13}C- PCB-15 ^{13}C- PCB-77 ^{13}C- PCB-118	108 (19-107) 113 (31-109) 114 (49-111)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-118 Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
12I-CE05-T175-XR02	^{13}C-PCB-15 ^{13}C-PCB-77 ^{13}C-PCB-105 ^{13}C-PCB-118 ^{13}C-PCB-126	111 (19-107) 116 (31-109) 112 (50-111) 117 (49-111) 108 (50-106)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-105 PCB-127 Penta-CBs PCB-118 PCB-126	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
12I-CE05-TTR2-BM02	^{13}C-PCB-77	110 (31-109)	PCB-77 Tetra-CBs	J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
MB1_10558	^{13}C-PCB-15 ^{13}C-PCB-105 ^{13}C-PCB-118 ^{13}C-PCB-126	115 (19-107) 115 (50-111) 118 (49-111) 112 (50-106)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-105 PCB-127 Penta-CBs PCB-118 PCB-126	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All internal standard ion abundance ratios were within method criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identification

All target compounds met the identification criteria with the following exceptions:

Sample	Compound	Flag	A or P
12I-CE05-T175-XR01	PCB-4 PCB-9 PCB-15 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P

For the above listed samples, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	All TCL compounds

Sample	Compound
12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02	All TCL compounds except PCB-45 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5114	All compounds reported as estim ated maximum possible concentration (EMPC).	EMPC-J	A
12I-CE05-T102-BP01 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BQ01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	P

Sample	Compound	Finding	Criteria	Flag	A or P
12I-CE05-T102-BP01	Tri-CBs Tetra-CBs Penta-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	P
12I-CE05-TTR2-BP01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs	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)	P
12I-CE05-TTR2-BQ01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects)	P

XII. Overall Assessment of Data

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

XIII. Field Duplicates

No field duplicates were identified in this SDG.

CWCM Lower Passaic River High Volume Event #1
Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5114	12I-CE05-T102-BM01 12I-CE05-T175-XR02	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-105 PCB-127 PCB-118 PCB-126 Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5114	12I-CE05-T175-AP01	PCB-104 PCB-96 Penta-CBs PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5114	12I-CE05-T175-XR04	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-118 Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5114	12I-CE05-TTR2-BM02	PCB-77 Tetra-CBs	J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5114	12I-CE05-T175-XR01	PCB-4 PCB-9 PCB-15 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5114	12I-CE05-T102-BP01 12I-CE05-T102-BM01 12I-CE05-T102-BM02 12I-CE05-T175-AP01 12I-CE05-T175-AM01 12I-CE05-T175-AM02 12I-CE05-T175-XR04 12I-CE05-T175-XR01 12I-CE05-T175-XR02 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BM01 12I-CE05-TTR2-BM02 12I-CE05-TTR2-BQ01 12I-CE05-TTR2-BN01 12I-CE05-TTR2-BN02	All compounds reported as estimated maximum possible concentration (EMPC).	EMPC-J	A	Compound quantitation (k)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5114	12I-CE05-T102-BP01 12I-CE05-TTR2-BP01 12I-CE05-TTR2-BQ01	Results were flagged "E" by the laboratory to indicate sample exceeded calibration range.	J (all detects)	P	Compound quantitation (q)
A5114	12I-CE05-T102-BP01	Tri-CBs Tetra-CBs Penta-CBs	J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5114	12I-CE05-TTR2-BP01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5114	12I-CE05-TTR2-BQ01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)

CWCM Lower Passaic River High Volume Event #1
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T102-BM01	Mono-CBs PCB-2 PCB-3 PCB-11	1040U pg 54.9U pg 147U pg 2320U pg	A	bl
A5114	12I-CE05-T102-BM02	Mono-CBs PCB-1 PCB-2 PCB-3 PCB-6 PCB-8 PCB-11	451U pg 351U pg 33.7U pg 66.2U pg 387U pg 979U pg 1060U pg	A	bl
A5114	12I-CE05-T175-AP01	Mono-CBs PCB-1 PCB-2 PCB-3 PCB-6 PCB-8 PCB-11	492U pg 187U pg 84.1U pg 221U pg 363U pg 1180U pg 3040U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-AM01	Mono-CBs PCB-2 PCB-3 PCB-6 PCB-8 PCB-11 PCB-21/33	1110U pg 66.7U pg 137U pg 453U pg 1080U pg 1320U pg 596U pg	A	bl
A5114	12I-CE05-T175-AM02	PCB-2 PCB-3 PCB-11	108U pg 245U pg 2790U pg	A	bl
A5114	12I-CE05-T175-XR04	PCB-105 PCB-118 PCB-11 PCB-30/18 PCB-31 PCB-28/20 PCB-52 PCB-95 PCB-113/90/101 PCB-110 PCB-151/135 PCB-147/149 PCB-153/168 PCB-163/138/129 PCB-180/193	9.2U pg 15.3U pg 65.8U pg 13.2U pg 12.8U pg 20.5U pg 12.2U pg 15.8U pg 16.4U pg 13.4U pg 17.2U pg 18U pg 16.9U pg 23.5U pg 22.2U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-XR01	PCB-105	25U pg	A	bl
		PCB-118	44.3U pg		
		Mono-CBs	117U pg		
		PCB-1	41.5U pg		
		PCB-2	37.6U pg		
		PCB-3	38.4U pg		
		PCB-4	131U pg		
		PCB-6	67.6U pg		
		PCB-8	265U pg		
		PCB-11	676U pg		
		PCB-15	68.8U pg		
		PCB-19	31.5U pg		
		PCB-30/18	217U pg		
		PCB-17	98U pg		
		PCB-27	13.4U pg		
		PCB-16	117U pg		
		PCB-32	63.2U pg		
		PCB-26/29	35U pg		
		PCB-25	14.4U pg		
		PCB-31	170U pg		
		PCB-28/20	188U pg		
		PCB-21/33	105U pg		
		PCB-22	70.9U pg		
		PCB-37	40.7U pg		
		PCB-50/53	20.3U pg		
		PCB-45	15.8U pg		
		PCB-51	21.3U pg		
		PCB-52	153U pg		
		PCB-69/49	61.1U pg		
		PCB-48	23.4U pg		
		PCB-44/47/65	144U pg		
		PCB-42	20U pg		
		PCB-41	16.1U pg		
		PCB-71/40	38.8U pg		
		PCB-64	37.5U pg		
		PCB-61/70/74/76	119U pg		
		PCB-66	62.4U pg		
		PCB-56	30.8U pg		
		PCB-60	12.2U pg		
		PCB-95	105U pg		
		PCB-84	27.8U pg		
		PCB-113/90/101	91.3U pg		
		PCB-99	27.1U pg		
		PCB-108/119/86/97/125/87	53.2U pg		
		PCB-110	76.7U pg		
		PCB-136	20.3U pg		
		PCB-151/135	47.9U pg		
		PCB-147/149	102U pg		
		PCB-132	28.3U pg		
		PCB-153/168	68.9U pg		
		PCB-163/138/129	78.3U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-XR02	PCB-105	21.3U pg	A	bl
		PCB-118	39.4U pg		
		Mono-CBs	82.6U pg		
		PCB-1	29.5U pg		
		PCB-2	25.8U pg		
		PCB-3	27.3U pg		
		PCB-4	49.3U pg		
		PCB-6	43.6U pg		
		PCB-8	129U pg		
		PCB-11	391U pg		
		PCB-19	13.6U pg		
		PCB-30/18	103U pg		
		PCB-17	38.3U pg		
		PCB-16	52.9U pg		
		PCB-32	30.8U pg		
		PCB-26/29	15.4U pg		
		PCB-25	7.97U pg		
		PCB-31	75.4U pg		
		PCB-28/20	84U pg		
		PCB-21/33	44.2U pg		
		PCB-22	32.2U pg		
		PCB-37	18.1U pg		
		PCB-50/53	10.2U pg		
		PCB-45	7.51U pg		
		PCB-51	15.9U pg		
		PCB-52	76.8U pg		
		PCB-69/49	27.7U pg		
		PCB-44/47/65	79.2U pg		
		PCB-42	10.9U pg		
		PCB-71/40	17.2U pg		
		PCB-64	18U pg		
		PCB-61/70/74/76	54U pg		
		PCB-66	25.8U pg		
		PCB-56	13.5U pg		
		PCB-95	51.5U pg		
		PCB-113/90/101	51.8U pg		
		PCB-99	11.8U pg		
		PCB-108/119/86/97/125/87	27.1U pg		
		PCB-110	43.3U pg		
		PCB-136	14.5U pg		
		PCB-151/135	33.5U pg		
		PCB-147/149	72.9U pg		
		PCB-132	31U pg		
		PCB-153/168	76.8U pg		
		PCB-163/138/129	109U pg		
A5114	12I-CE05-TTR2-BM01	Mono-CBs	774U pg	A	bl
		PCB-2	71U pg		
		PCB-3	117U pg		
		PCB-8	1550U pg		
		PCB-11	1360U pg		
A5114	12I-CE05-TTR2-BM02	PCB-2	180U pg	A	bl
		PCB-3	340U pg		
A5114	12I-CE05-TTR2-BN01	PCB-2	126U pg	A	bl
		PCB-3	250U pg		
		PCB-11	1930U pg		
A5114	12I-CE05-TTR2-BN02	PCB-2	169U pg	A	bl
		PCB-3	318U pg		

CWCM Lower Passaic River High Volume Event #1
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5114

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T102-BM01	Hepta-CBs	1710U pg	A	be
		Octa-CBs	339U pg		
		PCB-2	54.9U pg		
		PCB-3	147U pg		
		PCB-11	2320U pg		
		PCB-174	232U pg		
		PCB-177	106U pg		
		PCB-171/173	51.7U pg		
		PCB-180/193	412U pg		
		PCB-170	174U pg		
		PCB-198/199	81.2U pg		
		PCB-196	42.2U pg		
		PCB-203	52U pg		
		PCB-194	94.8U pg		
A5114	12I-CE05-T102-BM02	Mono-CBs	451U pg	A	be
		Hepta-CBs	1020U pg		
		Octa-CBs	194U pg		
		PCB-2	33.7U pg		
		PCB-3	66.2U pg		
		PCB-9	68.7U pg		
		PCB-11	1060U pg		
		PCB-179	74U pg		
		PCB-187	174U pg		
		PCB-183	80.7U pg		
		PCB-174	148U pg		
		PCB-177	64.2U pg		
		PCB-171/173	32.4U pg		
		PCB-180/193	250U pg		
		PCB-170	105U pg		
		PCB-198/199	51.7U pg		
		PCB-196	18.9U pg		
		PCB-203	34.3U pg		
		PCB-194	50.8U pg		
A5114	12I-CE05-T175-AP01	Mono-CBs	492U pg	A	be
		PCB-1	187U pg		
		PCB-2	84.1U pg		
		PCB-9	109U pg		
		PCB-8	1180U pg		
		PCB-11	3040U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-T175-AM01	PCB-156/157	32.2U pg	A	be
		Hepta-CBs	743U pg		
		Octa-CBs	165U pg		
		PCB-2	66.7U pg		
		PCB-3	137U pg		
		PCB-8	1080U pg		
		PCB-11	1320U pg		
		PCB-136	81.2U pg		
		PCB-151/135	213U pg		
		PCB-147/149	457U pg		
		PCB-141	95U pg		
		PCB-179	39U pg		
		PCB-187	128U pg		
		PCB-183	66.3U pg		
		PCB-174	109U pg		
		PCB-177	65.7U pg		
		PCB-180/193	208U pg		
		PCB-170	98.1U pg		
		PCB-198/199	52.5U pg		
		PCB-194	53.7U pg		
		PCB-146	62.1U pg		
		PCB-163/138/129	503U pg		
		PCB-158	56U pg		
		PCB-196	24U pg		
		PCB-203	35.3U pg		
A5114	12I-CE05-T175-AM02	Hepta-CBs	860U pg	A	be
		Octa-CBs	131U pg		
		PCB-2	108U pg		
		PCB-11	2790U pg		
		PCB-179	63.6U pg		
		PCB-183	77.6U pg		
		PCB-174	131U pg		
		PCB-177	64U pg		
		PCB-171/173	32.3U pg		
		PCB-180/193	197U pg		
		PCB-170	85.9U pg		
		PCB-198/199	52.2U pg		
		PCB-194	33.5U pg		
		PCB-156/157	62.5U pg		
		PCB-68	27.2U pg		
		PCB-187	163U pg		
		PCB-203	29.9U pg		
A5114	12I-CE05-TTR2-BM01	Hepta-CBs	1000U pg	A	be
		Octa-CBs	157U pg		
		PCB-2	71U pg		
		PCB-3	117U pg		
		PCB-11	1360U pg		
		PCB-179	78.3U pg		
		PCB-183	86U pg		
		PCB-174	134U pg		
		PCB-177	72.5U pg		
		PCB-171/173	35.7U pg		
		PCB-180/193	218U pg		
		PCB-170	87.1U pg		
		PCB-198/199	54.1U pg		
		PCB-194	37.1U pg		
		PCB-156/157	59.9U pg		
		PCB-187	185U pg		
		PCB-185	7.39U pg		
		PCB-203	30.9U pg		
		PCB-196	19.8U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5114	12I-CE05-TTR2-BM02	PCB-2 PCB-171/173 Octa-CBs PCB-174 PCB-177 PCB-180/193 PCB-170 PCB-198/199 PCB-196 PCB-203 PCB-194	180U pg 78.5U pg 419U pg 335U pg 189U pg 583U pg 225U pg 117U pg 53.3U pg 50.8U pg 109U pg	A	be
A5114	12I-CE05-TTR2-BN01	Hepta-CBs Octa-CBs PCB-2 PCB-11 PCB-174 PCB-177 PCB-171/173 PCB-180/193 PCB-170 PCB-198/199 PCB-194 PCB-187 PCB-183 PCB-185 PCB-196 PCB-203	1200U pg 171U pg 126U pg 1930U pg 167U pg 83.8U pg 38.4U pg 249U pg 107U pg 52.4U pg 39U pg 221U pg 108U pg 5.63U pg 24.1U pg 31.4U pg	A	be
A5114	12I-CE05-TTR2-BN02	PCB-2 PCB-171/173 PCB-170 PCB-198/199 PCB-194 Hepta CBs Octa CBs PCB-185 PCB-174 PCB-177 PCB-180/193 PCB-196 PCB-203	169U pg 72.4U pg 160U pg 87.8U pg 53U pg 2080U pg 304U pg 25.9U pg 297U pg 155U pg 416U pg 38.6U pg 46U pg	A	be

LDC #: 29736A31

SDG #: A5114

Laboratory: SGS Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 5-22-13

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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

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: 12/17/12 → 12/18/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	≤ 20 / 35
IV.	Routine calibration/~~CV~~	A	ccv: 30/50%
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client
VII.	Laboratory control samples	A	BCS_3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	SW	
XI.	Compound quantitation/~~RL/LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	~~SW~~ A	
XIV.	Field duplicates	N	
XV.	Field blanks	~~A~~ SW	EB= 7,8,9

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: 5 filters / 10 PUF's

1	12I-CE05-T102-BP01 ✓	11	12I-CE05-TTR2-BM01	21		31	
2	12I-CE05-T102-BM01	12	12I-CE05-TTR2-BM02	22		32	
3	12I-CE05-T102-BM02	13	12I-CE05-TTR2-BQ01 ✓	23		33	
4	12I-CE05-T175-AP01 ✓	14	12I-CE05-TTR2-BN01	24		34	
5	12I-CE05-T175-AM01	15	12I-CE05-TTR2-BN02	25		35	
6	12I-CE05-T175-AM02	16		26		36	
7	12I-CE05-T175-XR04 ✓	17		27		37	
8	12I-CE05-T175-XR01	18		28		38	
9	12I-CE05-T175-XR02	19		29		39	
10	12I-CE05-TTR2-BP01 ✓	20		30	MB1-10558	40	

✓ Filters

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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?
Blank extraction date: 01/24/13 **Blank analysis date:** 02/01/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1 10558	5x	2	3	4	5	6	7	8	9	11
PCB-105	9.97*	49.85						9.2*	25	21.3	
PCB-118	19.3	96.5						15.3*	44.3*	39.4	
Mono-CBs	222	1110	1040	451	492	1110			117	82.6	774
Di-CBs	1630	8150									
Tri-CBs	1380	6900									
Tetra-CBs	678*	3390									
Penta-CBs	264*	1320									
Hexa-CBs	102*	510									
Hepta-CBs	10.9*	54.5									
Total PCB (Monon-Deca)	4280*	21400									
PCB-1	82.9	414.5		351	187				41.5	29.5	
PCB-2	58.2	291	54.9	33.7	84.1	66.7	108		37.6	25.8	71
PCB-3	80.7	403.5	147	66.2	221	137	245		38.4*	27.3	117
PCB-4	201	1005							131	49.3*	
PCB-6	92.7	463.5		387	363	453			67.6*	43.6	
PCB-8	359	1795		979	1180	1080			265	129	1550
PCB-11	905	4525	2320	1060	3040	1320	2790	65.8	676	391	1360
PCB-15	71.3	356.5							68.8		
PCB-19	43.5	217.5							31.5	13.6	
PCB-30/18	283	1415						13.2	217	103	
PCB-17	137	685							98	38.3*	

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Compound	Blank ID		Sample Identification								
	MB1 10558	5x	2	3	4	5	6	7	8	9	11
PCB-27	19.8	99							13.4*		
PCB-16	136	680							117	52.9	
PCB-32	78.2	391							63.2	30.8	
PCB-26/29	42.7	213.5							35	15.4	
PCB-25	20.6	103							14.4*	7.97*	
PCB-31	195	975						12.8	170	75.4	
PCB-28/20	206	1030						20.5	188	84	
PCB-21/33	122	610				596			105	44.2	
PCB-22	70	350							70.9	32.2	
PCB-37	23	115							40.7	18.1	
PCB-50/53	19.5*	97.5							20.3	10.2	
PCB-45	27.7	138.5							15.8*	7.51*	
PCB-51	12.6	63							21.3*	15.9*	
PCB-46	9.39	46.95									
PCB-52	154	770						12.2*	153	76.8	
PCB-69/49	61.7	308.5							61.1	27.7*	
PCB-48	28.6	143							23.4		
PCB-44/47/65	110	550							144	79.2	
PCB-42	24.3*	121.5							20*	10.9*	
PCB-41	11.1*	55.5							16.1		
PCB-71/40	35.8*	179							38.8	17.2*	
PCB-64	34.7	173.5							37.5	18	
PCB-61/70/74/76	89.6	448						22.6	119	54	
PCB-66	30.4*	152							62.4	25.8	
PCB-56	16.8	84							30.8*	13.5*	
PCB-60	11.3*	56.5							12.2*		
PCB-95	60.1*	300.5						15.8*	105	51.5	
PCB-91	7.58*	37.9									

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3806
9m

Compound	Blank ID		Sample Identification								
	MB1 10558	5x	2	3	4	5	6	7	8	9	11
PCB-84	19.6	98							27.8		
PCB-113/90/101	50.6	253						16.4*	91.3	51.8	
PCB-99	21.3	106.5							27.1	11.8*	
PCB-108/119/86/97/125/87	33.5	167.5							53.2	27.1*	
PCB-110	41.7	208.5						13.4*	76.7	43.3	
PCB-136	7.68*	38.4							20.3	14.5	
PCB-151/135	13.1	65.5						17.2	47.9	33.5*	
PCB147/149	23.8	119						18	102	72.9	
PCB-132	11.6	58							28.3*	31	
PCB-153/168	18.7	93.5						16.9	68.9	76.8	
PCB-163/138/129	27.3	136.5						23.5*	78.3*	109	
PCB-180/193	10.9*	54.5						22.2			

*EMPC
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 2m
2nd Reviewer:

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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?
Blank extraction date: 01/24/13 **Blank analysis date:** 02/01/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1 10558	5x	12	14	15						
PCB-105	9.97*	49.85									
PCB-118	19.3	96.5									
Mono-CBs	222	1110									
Di-CBs	1630	8150									
Tri-CBs	1380	6900									
Tetra-CBs	678*	3390									
Penta-CBs	264*	1320									
Hexa-CBs	102*	510									
Hepta-CBs	10.9*	54.5									
Total PCB (Monon-Deca)	4280*	21400									
PCB-1	82.9	414.5									
PCB-2	58.2	291	180	126	169						
PCB-3	80.7	403.5	340	250	318						
PCB-4	201	1005									
PCB-6	92.7	463.5									
PCB-8	359	1795									
PCB-11	905	4525		1930							
PCB-15	71.3	356.5									
PCB-19	43.5	217.5									
PCB-30/18	283	1415									
PCB-17	137	685									

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Compound	Blank ID		Sample Identification								
	MB1 10558	5x	12	14	15						
PCB-27	19.8	99									
PCB-16	136	680									
PCB-32	78.2	391									
PCB-26/29	42.7	213.5									
PCB-25	20.6	103									
PCB-31	195	975									
PCB-28/20	206	1030									
PCB-21/33	122	610									
PCB-22	70	350									
PCB-37	23	115									
PCB-50/53	19.5*	97.5									
PCB-45	27.7	138.5									
PCB-51	12.6	63									
PCB-46	9.39	46.95									
PCB-52	154	770									
PCB-69/49	61.7	308.5									
PCB-48	28.6	143									
PCB-44/47/65	110	550									
PCB-42	24.3*	121.5									
PCB-41	11.1*	55.5									
PCB-71/40	35.8*	179									
PCB-64	34.7	173.5									
PCB-61/70/74/76	89.6	448									
PCB-66	30.4*	152									
PCB-56	16.8	84									
PCB-60	11.3*	56.5									
PCB-95	60.1*	300.5									
PCB-91	7.58*	37.9									

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6876
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Compound	Blank ID		Sample Identification								
	MB1 10558	5x	12	14	15						
PCB-84	19.6	98									
PCB-113/90/101	50.6	253									
PCB-99	21.3	106.5									
PCB-108/119/86/97/125/87	33.5	167.5									
PCB-110	41.7	208.5									
PCB-136	7.68*	38.4									
PCB-151/135	13.1	65.5									
PCB147/149	23.8	119									
PCB-132	11.6	58									
PCB-153/168	18.7	93.5									
PCB-163/138/129	27.3	136.5									
PCB-180/193	10.9*	54.5									

*EMPC
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 12/18/12
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All >5x

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR04	5x									
PCB-105	9.2*	46									
PCB-118	15.3*	76.5									
Di-CBs	65.8	329									
Tri-CBs	46.4	232									
Tetra-CBs	34.7*	173.5									
Penta-CBs	70.1*	350.5									
Hexa-CBs	75.6*	378									
Hepta-CBs	37.2	186									
Total PCB (Mono-Deca)	330*	1650									
PCB-11	65.8	329									
PCB-30/18	13.2	66									
PCB-31	12.8	64									
PCB-28/20	20.5	102.5									
PCB-52	12.2*	61									
PCB-61/70/74/76	22.6	113									
PCB-95	15.8*	79									
PCB-113/90/101	16.4*	82									
PCB-110	13.4*	67									
PCB-151/135	17.2	86									
PCB-147/149	18*	90									
PCB-153/168	16.9	84.5									
PCB-163/138/129	23.5*	117.5									

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR04	5x									
PCB-180/193	22.2	111									
PCB-170	15	75									

*EMPC

12I-CE05-T175-XR04 (A5114)

All contaminants within five times the blank concentration were qualified as not detected, "U".

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LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: EM
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 12/18/12
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR01	5x	2	3	4	5	6	11	12	14	15
PCB-105	25	125									
PCB-118	44.3*	221.5									
Mono-CBs	117*	585		451	492						
Di-CBs	1230*	6150									
Tri-CBs	1160*	5800									
Tetra-CBs	775*	3875									
Penta-CBs	450*	2250									
Hexa-CBs	394*	1970									
Hepta-CBs	264*	1320		1020*		743*	860*	1000*		1200*	
Octa-CBs	40.7	203.5		194*		165*	131*	157*		171*	
Total PCB (Mono-Deca)	4440*	22200									
PCB-1	41.5	207.5			187						
PCB-2	37.6	188	54.9	33.7	84.1	66.7	108	71	180	126	169
PCB-3	38.4*	192	147	66.2		137		117			
PCB-4	131	655									
PCB-9	26.5	132.5		68.7*	109						
PCB-6	67.6*	338									
PCB-8	265	1325			1180	1080					
PCB-11	676	3380	2320	1060	3040	1320	2790	1360		1930	
PCB-15	68.8	344									
PCB-19	31.5	157.5									
PCB-30/18	217	1085									

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR01	5x	2	3	4	5	6	11	12	14	15
PCB-17	98	490									
PCB-27	13.4*	67									
PCB-16	117	585									
PCB-32	63.2	316									
PCB-26/29	35	175									
PCB-25	14.4*	72									
PCB-31	170	850									
PCB-28/20	188	940									
PCB-21/33	105	525									
PCB-22	70.9	354.5									
PCB-37	40.7	203.5									
PCB-50/53	20.3	101.5									
PCB-45	15.8*	79									
PCB-51	21.3*	106.5									
PCB-52	153	765									
PCB-69/49	61.1	305.5									
PCB-48	23.4	117									
PCB-44/47/65	144	720									
PCB-42	20*	100									
PCB-41	16.1	80.5									
PCB-71/40	38.8	194									
PCB-64	37.5	187.5									
PCB-61/70/74/76	119	595									
PCB-66	62.4	312									
PCB-56	30.8*	154									
PCB-60	12.2*	61									
PCB-95	105	525									
PCB-84	27.8	139									

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR01	5x	2	3	4	5	6	11	12	14	15
PCB-113/90/101	91.3	456.5									
PCB-99	27.1	135.5									
PCB-108/119/86/97/125/87	53.2	266									
PCB-110	76.7	383.5									
PCB-136	20.3	101.5				81.2					
PCB-151/135	47.9	239.5				213					
PCB-147/149	102	510				457					
PCB-132	28.3*	141.5									
PCB-146	11.8	59									
PCB-153/168	68.9	344.5									
PCB-141	27.3	136.5				95					
PCB-163/138/129	78.3*	391.5									
PCB-158	9.09*	45.45									
PCB-179	19.6	98		74		39*	63.6*	78.3			
PCB-187	30.1*	150.5				128					
PCB-183	19.2*	96		80.7		66.3	77.6	86			
PCB-174	47.4	237	232	148		109*	131	134		167	
PCB-177	25.3*	126.5	106*	64.2*		65.7	64	72.5*		83.8*	
PCB-171/173	16.9*	84.5	51.7*	32.4			32.3*	35.7	78.5	38.4	72.4
PCB-180/193	71.5	357.5		250		208	197	218		249	
PCB-170	34.1	170.5		105		98.1	85.9	87.1		107	160
PCB-198/199	20.4	102	81.2	51.7*		52.5	52.2*	54.1		52.4	87.8
PCB-194	20.3	101.5	94.8	50.8		53.7	33.5	37.1		39*	53

*EMPC

12I-CE05-T175-XR01 (A5114)

All contaminants within five times the blank concentration were qualified as not detected, "U".

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LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: GM
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 12/18/12
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR02	5x	2	3	4	5	6	11	12	14	15
PCB-105	21.3	106.5									
PCB-118	39.4	197									
PCB-156/157	13.5	67.5				32.2*	62.5	59.9			
Mono-CBs	82.6	413									
Di-CBs	613*	3065									
Tri-CBs	516*	2580									
Tetra-CBs	366*	1830									
Penta-CBs	246*	1230									
Hexa-CBs	416*	2080									
Hepta-CBs	421*	2105	1710*	1020*		743*	860*	1000*		1200*	2080*
Octa-CBs	97*	485	339*	194*		165*	131*	157*	419*	171*	304
Total PCB (Mono-Deca)	2760*	13800									
PCB-1	29.5	147.5									
PCB-2	25.8	129	54.9	33.7	84.1	66.7	108	71		126	
PCB-3	27.3	136.5		66.2				117			
PCB-4	49.3*	246.5									
PCB-6	43.6	218									
PCB-8	129	645									
PCB-11	391	1955		1060		1320		1360		1930	
PCB-19	13.6	68									
PCB-30/18	103	515									
PCB-17	38.3*	191.5									

7 of 8 ym

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR02	5x	2	3	4	5	6	11	12	14	15
PCB-16	52.9	264.5									
PCB-32	30.8	154									
PCB-26/29	15.4	77									
PCB-25	7.97*	39.85									
PCB-31	75.4	377									
PCB-28/20	84	420									
PCB-21/33	44.2	221									
PCB-22	32.2	161									
PCB-37	18.1	90.5									
PCB-50/53	10.2	51									
PCB-45	7.51*	37.55									
PCB-51	15.9*	79.5									
PCB-52	76.8	384									
PCB-69/49	27.7*	138.5									
PCB-44/47/65	79.2	396									
PCB-42	10.9*	54.5									
PCB-71/40	17.2*	86									
PCB-64	18	90									
PCB-68	9.15*	45.75					27.2				
PCB-61/70/74/76	54	270									
PCB-66	25.8	129									
PCB-56	13.5*	67.5									
PCB-95	51.5	257.5									
PCB-113/90/101	51.8	259									
PCB-99	11.8*	59									
PCB-108/119/86/97/125/87	27.1*	135.5									
PCB-110	43.3	216.5									
PCB-136	14.5	72.5									

Compound	Blank ID	Sample Identification									
	12I-CE05-T175-XR02	5x	2	3	4	5	6	11	12	14	15
PCB-151/135	33.5*	167.5									
PCB-147/149	72.9	364.5									
PCB-132	31	155									
PCB-146	13.2*	66				62.1					
PCB-153/168	76.8	384									
PCB-141	30.1	150.5				95					
PCB-163/138/129	109	545				503					
PCB-158	11.9	59.5				56					
PCB-128/166	9.15*	45.75									
PCB-179	17.6*	88		74		39*	63.6*	78.3			
PCB-187	55.9	279.5		174		128	163	185		221	
PCB-183	27.6*	138		80.7		66.3	77.6	86		108	
PCB-185	7.26*	36.3						7.39*		5.63	25.9*
PCB-174	70.2	351	232	148		109*	131	134	335	167	297
PCB-177	38.3*	191.5	106*	64.2*		65.7	64	72.5*	189	83.8*	155
PCB-171/173	24.7	123.5	51.7*	32.4			32.3*	35.7	78.5	38.4	72.4
PCB-180/193	120	600	412	250		208	197	218	583	249	416
PCB-170	59.5	297.5	174	105		98.1	85.9	87.1	225	107	160
PCB-198/199	32.5	162.5	81.2	51.7*		52.5	52.2*	54.1	117	52.4	87.8
PCB-196	17.3	86.5	42.2	18.9*		24*		19.8*	53.3	24.1*	38.6
PCB-203	16.4	82	52	34.3*		35.3	29.9	30.9	50.8*	31.4	46
PCB-194	30.7*	153.5	94.8	50.8		53.7	33.5	37.1	109	39*	53

*EMPC

12I-CE05-T175-XR02 (A5114)

All contaminants within five times the blank concentration were qualified as not detected, "U".

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LDC #:29736A31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [handwritten initials]
2nd Reviewer: [handwritten initials]

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

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 within the QC criteria?

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

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		MB1_10558	13C PCB-15	115 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-105	115 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	118 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13CPCB-126	112 (50-106)	Jdets/P (PCB-126, Penta-CBs)

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		2	13C PCB-15	116 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	110 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-105	113 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	118 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	111 (50-106)	Jdets/P (PCB-126, Penta-CBs)
		4	13C PCB-104	118 (36-115)	Jdets/P (PCB-104, PCB-96, Penta-CBs)
			13C PCB-155	147 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
		7	13C PCB-15	108 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	113 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-118	114 (49-111)	Jdets/P(PCB-118, Penta-CBs)
		9	13C PCB-15	111 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	116 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-105	112 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	117 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	108 (50-106)	Jdets/P(PCB-126, Penta-CBs)
		12	13C PCB-77	110 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
		13	13C PCB-28 (Static)	146 (75-125)	J/UJ/P (PCB-1 through PCB-39, Mono-CBs, Di-CBs, Tri-CBs)
			13C PCB-111	149 (75-125)	J/UJ/P (PCB-40 through PCB-169, Tetra-CBs, Penta-CBs, Hexa-CBs)
			13C PCB-178	134 (75-125)	J/UJ/P(PCB-170 through PCB-209, Hepta-CBs, Octa-CBs, Nona-CBs, Deca-CB)

TM 10-16-14 (filter sample)

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

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

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		PCB-4, PCB-9, PCB-15	The laboratory indicated that congeners were	8	Jdets/P (+ Total Di-CBs) (c)
			quantitated using single ion mode (SI). The		
			area for the secondary ion trace was not		
			integrated due to significantly elevated noise		
			levels from background PFK.		
			Quantitation should be performed using the		
			area of the primary and secondary ions.		
			concentration of detected native compounds in secondary PUF >20% of primary PUF	2, 3, 5, 6, 8, 9, 14, 15	TEXT (all compounds + Total Mono- through Nona-CBs)
				11, 12	TEXT (all compounds except PCB-45 + Total Mono- through Nona-CBs)

Notes: _____

LDC #29736A31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JM
2nd Reviewer: _____

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

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	Compound	Finding	Associated Samples	Qualifications
		All	EMPC results	All	EMPC-Jdets/A (k)
			congeners flagged "E" exceed upper calibration range	1	Jdets/P (+Tri-, Tetra- and Penta-CBs) (q)
				10	Jdets/P (+Di-,Tri-, Tetra-, Penta- and Hexa-CBs) (q)
				13	Jdets/P (+Di-, Tri-, Tetra- and Penta-CBs) (q)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 29736A31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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 = $(A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) — 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 ($^{13}C_3$ std)	Recalculated RRF ($^{13}C_3$ std)	Reported %RSD	Recalculated %RSD
1	ICAL	12-14-12	PCB 77 (^{13}C-PCB 77)	1.25	1.25	1.24	1.24	5.4	5.3
			PCB 105 (^{13}C-PCB 105)	1.06	1.06	1.05	1.04	2.1	2.1
			PCB 167 (^{13}C-PCB 167)	1.18	1.18	1.20	1.20	1.6	1.6
			PCB 189 (^{13}C-PCB 189)	1.12	1.11	1.11	1.11	2.1	1.9
2			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 29730A31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

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

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)	Ave RRF ~~Conc~~ (initial)	Reported RRF ~~Conc~~ (BCS3)	Recalculated RRF ~~Conc~~ (BCS3)	Reported %D	Recalculated %D
1	130201V01	2-1-13	PCB 77 (^{13}C-PCB 77)	1.25	1.25	1.24	-0.1	0
			PCB 105 (^{13}C-PCB 105)	1.06	0.97	0.97	-8.0	8.5
			PCB 167 (^{13}C-PCB 167)	1.18	1.05	1.05	-10.9	11.0
			PCB 189 (^{13}C-PCB 189)	1.12	1.04	1.04	-6.4	7.1
2	130201V12	2-1-13	PCB 77 (^{13}C-PCB 77)	1.25	1.18	1.18	-5.3	5.6
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.99	-5.8	6.6
			PCB 167 (^{13}C-PCB 167)	1.18	1.06	1.06	-9.9	10.2
			PCB 189 (^{13}C-PCB 189)	1.12	1.15	1.15	3.1	2.7
3			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					
4			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					

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 #: 29736A3J

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 3, PCB 77:

Conc. = $\frac{(4.08e5)(2000)(1)}{(5.44e4)(1.21)(1)(\ )}$

= 124pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5114 SITE: CWCM High Volume
LAB: SGS Analytical Perspectives

CHECKLIST

I.0 **Data Completeness and Deliverables**

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ✓ [ ] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 **Reporting Requirements and Deliverables**

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] ___ ___

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] ___ ___

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] ___ ___

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] ___ ___

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [✓] ___ ___

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 **Initial Calibration**

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in **Table 8** (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [✓] ___ ___

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [✓] ___ ___

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [✓] ___ ___

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [✓] ___ ___

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [✓] ___ ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)CI}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\,(ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [__] / __

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [X] [/] __

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? [/] [ ] __

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [/] __ __

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [/] __ __

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ✓ ___

10.2 Are all labeled compound recoveries within the required limits ? [ ] ✓ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ✓ ___

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_i, using the formula:

$$\% \, Rec_i = \frac{(A_{i1} + A_{i2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_i}$$

$A_{i1} + A_{i2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_i = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ___ ✓

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [✓] ___ ___

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set.

13.3 Was the Ongoing Precision and Recovery (~~OPR~~ BCS3) standard analyzed at the required frequency? [✓] ___ ___

13.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in outline below? [✓] ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$-2- MoCB and $^{13}C_{12}$-4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [ ] ___ ✓

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [ ] ___ ✓

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] ___ ✓

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ___ ✓

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___/___

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ ___/___

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ ___/___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 29, 2014

SUBJECT: Revised CWCM High Volume, LPR, Event #1, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 29736:

SDG #	Fraction
A5114 & A5125	Polychlorinated Biphenyls as Congeners

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to breakthrough exceedance

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page
  -Removed qualifications due to static spike %Rs and breakthrough exceedances

SDG #	Fraction
A5114 & A5125	Dioxins/Dibenzofurans

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to Internal Standard %Rs

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 29736B21_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #1
Collection Date:	January 8 through January 10, 2013
LDC Report Date:	October 28, 2014
Matrix:	Water
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5125

Sample Identification

N08-CE05-TNBE-BP01
N08-CE05-TNBE-BM01
N08-CE05-TNBE-BM02
N08-CE05-TNBS-BP01
N08-CE05-TNBS-BM01
N08-CE05-TNBS-BM02
N08-CE05-TKVK-BM01
N08-CE05-TKVK-BM02
N08-CE05-TKVK-BN02
N08-CE05-TKVK-BN01
N08-CE05-TKVK-XR01-102
N08-CE05-TKVK-XR01-101
N08-CE05-TKVK-XR02-101
N08-CE05-TKVK-XR02-102
N08-CE05-TKVK-BP01
N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR04-101
N08-CE05-TKVK-XR04-102

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, September 2006) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution, and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
2/9/13 (130209P1-01)	^{13}C-1,2,3,6,7,8-HxCDD	80.7 ng/mL (85-118)	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 MB1_10596	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
2/9/13 (130209P1-12)	1,2,3,4,6,7,8-HpCDF	56.9 ng/mL (45-55)	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 MB1_10596	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
2/9/13 (130209P1-12)	^{13}C-1,2,3,6,7,8-HxCDD	84.9 ng/mL (85-118)	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 MB1_10596	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
2/11/13 (130211P1-01)	^{13}C-1,2,3,6,7,8-HxCDD	79.3 ng/mL (85-118)	N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
2/11/13 (130211P1-13)	^{13}C-1,2,3,6,7,8-HxCDD ^{13}C-1,2,3,4,6,7,8-HpCDF	81.3 ng/mL (85-118) 75.3 ng/mL (78-129)	N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101	1,2,3,6,7,8-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) UJ (all non-detects)	P
2/11/13 (130211P2-01)	1,2,3,4,6,7,8-HpCDF	55.3 ng/mL (45-55)	N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
2/11/13 (130211P2-01)	^{13}C-1,2,3,6,7,8-HxCDD	81.3 ng/mL (85-118)	N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
2/12/13	1,2,3,4,6,7,8-HpCDF	57.1 ng/mL (45-55)	N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
2/12/13	^{13}C-1,2,3,6,7,8-HxCDD	83.8 ng/mL (85-118)	N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1_10596	1/31/13	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total PeCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	0.975 pg 1.65 pg 4.67 pg 0.976 pg 1.44 pg 5.44 pg 2.83 pg 4.36 pg 3.19 pg 0.444 pg 0.976 pg	All samples in SDG A5125

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBE-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	1.11 pg 2.5 pg 11.1 pg 1.15 pg 26.9 pg 1.11 pg 5.1 pg 1.56 pg 1.15 pg	1.11U pg 2.5U pg 11.1U pg 1.15U pg 26.9U pg 1.11U pg 5.1U pg 1.56U pg 1.15U pg
N08-CE05-TNBE-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF Total TCDD Total HpCDD Total HpCDF	1.72 pg 5.42 pg 1.71 pg 13.8 pg 3.82 pg 1.71 pg	1.72U pg 5.42U pg 1.71U pg 13.8U pg 3.82U pg 1.71U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBS-BM01	1,2,3,7,8,9-HxCDD	1.61 pg	1.61U pg
	1,2,3,4,6,7,8-HpCDD	1.14 pg	1.14U pg
	OCDD	11.9 pg	11.9U pg
	1,2,3,4,6,7,8-HpCDF	0.683 pg	0.683U pg
	OCDF	1.38 pg	1.38U pg
	Total TCDD	7.95 pg	7.95U pg
	Total HxCDD	1.61 pg	1.61U pg
	Total HpCDD	3.12 pg	3.12U pg
	Total HpCDF	0.683 pg	0.683U pg
N08-CE05-TNBS-BM02	1,2,3,7,8,9-HxCDD	1.54 pg	1.54U pg
	1,2,3,4,6,7,8-HpCDD	1.98 pg	1.98U pg
	OCDD	13.1 pg	13.1U pg
	1,2,3,4,6,7,8-HpCDF	0.916 pg	0.916U pg
	Total TCDD	17.6 pg	17.6U pg
	Total HxCDD	1.54 pg	1.54U pg
	Total HpCDD	4.72 pg	4.72U pg
	Total HxCDF	1.21 pg	1.21U pg
	Total HpCDF	2.02 pg	2.02U pg
N08-CE05-TKVK-BM01	1,2,3,7,8,9-HxCDD	1.54 pg	1.54U pg
	1,2,3,4,6,7,8-HpCDD	1.86 pg	1.86U pg
	OCDD	13.5 pg	13.5U pg
	1,2,3,4,6,7,8-HpCDF	1.08 pg	1.08U pg
	OCDF	2.32 pg	2.32U pg
	Total TCDD	9.65 pg	9.65U pg
	Total HxCDD	1.54 pg	1.54U pg
	Total HpCDD	5.05 pg	5.05U pg
	Total HxCDF	2.02 pg	2.02U pg
	Total HpCDF	1.91 pg	1.91U pg
N08-CE05-TKVK-BM02	1,2,3,7,8,9-HxCDD	0.904 pg	0.904U pg
	1,2,3,4,6,7,8-HpCDD	1.63 pg	1.63U pg
	OCDD	6.41 pg	6.41U pg
	Total TCDD	4.58 pg	4.58U pg
	Total HxCDD	0.904 pg	0.904U pg
	Total HpCDD	3.06 pg	3.06U pg
N08-CE05-TKVK-BN02	1,2,3,7,8,9-HxCDD	0.879 pg	0.879U pg
	1,2,3,4,6,7,8-HpCDD	1.39 pg	1.39U pg
	OCDD	8.08 pg	8.08U pg
	1,2,3,4,6,7,8-HpCDF	0.812 pg	0.812U pg
	OCDF	2.64 pg	2.64U pg
	Total TCDD	3.75 pg	3.75U pg
	Total HxCDD	0.879 pg	0.879U pg
	Total HpCDD	3.88 pg	3.88U pg
	Total HpCDF	1.79 pg	1.79U pg
N08-CE05-TKVK-BN01	1,2,3,7,8,9-HxCDD	1.16 pg	1.16U pg
	1,2,3,4,6,7,8-HpCDD	2.3 pg	2.3U pg
	OCDD	11.7 pg	11.7U pg
	1,2,3,4,6,7,8-HpCDF	0.767 pg	0.767U pg
	OCDF	0.888 pg	0.888U pg
	Total TCDD	8.5 pg	8.5U pg
	Total PeCDD	3.11 pg	3.11U pg
	Total HxCDD	1.71 pg	1.71U pg
	Total HpCDD	4.86 pg	4.86U pg
	Total HpCDF	1.48 pg	1.48U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR01-102	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	1.39 pg 1.04 pg 3.95 pg 1.61 pg 1.39 pg 2.1 pg	1.39U pg 1.04U pg 3.95U pg 1.61U pg 1.39U pg 2.1U pg
N08-CE05-TKVK-XR01-101	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF	1.32 pg 1.5 pg 4.41 pg 1.66 pg 1.6 pg 1.32 pg 2.88 pg 0.985 pg	1.32U pg 1.5U pg 4.41U pg 1.66U pg 1.6U pg 1.32U pg 2.88U pg 0.985U pg
N08-CE05-TKVK-XR02-101	1,2,3,7,8,9-HxCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.782 pg 2 pg 1.34 pg 0.782 pg 1.23 pg	0.782U pg 2U pg 1.34U pg 0.782U pg 1.23U pg
N08-CE05-TKVK-XR02-102	OCDD Total TCDD Total HpCDD	6.55 pg 1.22 pg 1.53 pg	6.55U pg 1.22U pg 1.53U pg
N08-CE05-TKVK-XR04-101	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.64 pg 1.51 pg 15.4 pg 1.52 pg 0.822 pg 0.64 pg 3.22 pg	0.64U pg 1.51U pg 15.4U pg 1.52U pg 0.822U pg 0.64U pg 3.22U pg
N08-CE05-TKVK-XR04-102	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.942 pg 1.24 pg 11.7 pg 1.47 pg 0.844 pg 0.942 pg 2.44 pg	0.942U pg 1.24U pg 11.7U pg 1.47U pg 0.844U pg 0.942U pg 2.44U pg

Samples N08-CE05-TKVK-XR01-102, N08-CE05-TKVK-XR01-101, N08-CE05-TKVK-XR02-101, N08-CE05-TKVK-XR02-102, N08-CE05-TKVK-XR04-101, and N08-CE05-TKVK-XR04-102 were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-102	1/10/13	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	1.39 pg 1.04 pg 3.95 pg 1.61 pg 1.39 pg 2.1 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR01-101	1/10/13	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF	1.32 pg 1.5 pg 4.41 pg 1.66 pg 1.6 pg 1.32 pg 2.88 pg 0.985 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR02-101	1/10/13	1,2,3,7,8,9-HxCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.782 pg 2 pg 1.34 pg 0.782 pg 1.23 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR02-102	1/10/13	OCDD Total TCDD Total HpCDD	6.55 pg 1.22 pg 1.53 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR04-101	1/10/13	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.64 pg 1.51 pg 15.4 pg 1.52 pg 0.822 pg 0.64 pg 3.22 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR04-102	1/10/13	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.942 pg 1.24 pg 11.7 pg 1.47 pg 0.844 pg 0.942 pg 2.44 pg	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBE-BP01	1,2,3,7,8,9-HxCDD	5.63 pg	5.63U pg
N08-CE05-TNBE-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total HxCDD Total HpCDD Total HxCDF	1.11 pg 2.5 pg 11.1 pg 1.11 pg 5.1 pg 1.56 pg	1.11U pg 2.5U pg 11.1U pg 1.11U pg 5.1U pg 1.56U pg
N08-CE05-TNBE-BM02	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	1.72 pg 5.42 pg 3.82 pg	1.72U pg 5.42U pg 3.82U pg
N08-CE05-TNBS-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	1.61 pg 1.14 pg 11.9 pg 1.38 pg 7.95 pg 1.61 pg 3.12 pg	1.61U pg 1.14U pg 11.9U pg 1.38U pg 7.95U pg 1.61U pg 3.12U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBS-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total HxCDD Total HpCDD Total HxCDF	1.54 pg 1.98 pg 13.1 pg 1.54 pg 4.72 pg 1.21 pg	1.54U pg 1.98U pg 13.1U pg 1.54U pg 4.72U p 1.21U pg
N08-CE05-TKVK-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total HxCDD Total HpCDD Total HxCDF	1.54 pg 1.86 pg 13.5 pg 2.32 pg 1.54 pg 5.05 pg 2.02 pg	1.54U pg 1.86U pg 13.5U pg 2.32U pg 1.54U pg 5.05U pg 2.02U pg
N08-CE05-TKVK-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.904 pg 1.63 pg 6.41 pg 4.58 pg 0.904 pg 3.06 pg	0.904U pg 1.63U pg 6.41U pg 4.58U pg 0.904U pg 3.06U pg
N08-CE05-TKVK-BN02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.879 pg 1.39 pg 8.08 pg 2.64 pg 3.75 pg 0.879 pg 3.88 pg	0.879U pg 1.39U pg 8.08U pg 2.64U pg 3.75U pg 0.879U pg 3.88U pg
N08-CE05-TKVK-BN01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total HxCDD Total HpCDD	1.16 pg 2.3 pg 11.7 pg 0.888 pg 1.71 pg 4.86 pg	1.16U pg 2.3U pg 11.7U pg 0.888U pg 1.71U pg 4.86U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria with the following exceptions:

Sample	Static Spikes	%R (Limits)	Compound
N08-CE05-TNBE-BM01	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	197 (75-125) 208 (75-125) 202 (75-125) 208 (75-125) 216 (75-125)	All TCL compounds
N08-CE05-TNBE-BM02	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C1,2,3,4,6,8,9-HpCDF	214 (75-125) 224 (75-125) 219 (75-125) 224 (75-125) 216 (75-125)	All TCL compounds
N08-CE05-TNBS-BM01	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	217 (75-125) 218 (75-125) 225 (75-125) 216 (75-125) 237 (75-125)	All TCL compounds
N08-CE05-TNBS-BM02	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	223 (75-125) 213 (75-125) 202 (75-125) 217 (75-125) 223 (75-125)	All TCL compounds
N08-CE05-TKVK-BM01	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	217 (75-125) 221 (75-125) 218 (75-125) 222 (75-125) 233 (75-125)	All TCL compounds
N08-CE05-TKVK-BM02	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	218 (75-125) 217 (75-125) 225 (75-125) 222 (75-125) 225 (75-125)	All TCL compounds
N08-CE05-TKVK-BN02	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	222 (75-125) 231 (75-125) 236 (75-125) 221 (75-125) 220 (75-125)	All TCL compounds
N08-CE05-TKVK-BN01	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	216 (75-125) 216 (75-125) 216 (75-125) 221 (75-125) 230 (75-125)	All TCL compounds

Sample	Static Spikes	%R (Limits)	Compound
N08-CE05-TKVK-XR01-102	^{37}Cl-2,3,7,8-TCDD ^{13}C-1,2,3,4,7-PeCDD ^{13}C-1,2,3,4,6-PeCDF ^{13}C-1,2,3,4,6,9-HxCDF ^{13}C-1,2,3,4,6,8,9-HpCDF	213 (75-125) 222 (75-125) 206 (75-125) 217 (75-125) 213 (75-125)	All TCL compounds
N08-CE05-TKVK-XR01-101	^{37}Cl-2,3,7,8-TCDD ^{13}C 1,2,3,4,7-PeCDD ^{13}C 1,2,3,4,6-PeCDF ^{13}C 1,2,3,4,6,9-HxCDF ^{13}C 1,2,3,4,6,8,9-HpCDF	215 (75-125) 209 (75-125) 217 (75-125) 217 (75-125) 215 (75-125)	All TCL compounds
N08-CE05-TKVK-XR02-101	^{37}Cl-2,3,7,8-TCDD ^{13}C 1,2,3,4,7-PeCDD ^{13}C 1,2,3,4,6-PeCDF ^{13}C 1,2,3,4,6,9-HxCDF ^{13}C 1,2,3,4,6,8,9-HpCDF	217 (75-125) 233 (75-125) 200 (75-125) 220 (75-125) 240 (75-125)	All TCL compounds
N08-CE05-TKVK-XR02-102	^{37}Cl-2,3,7,8-TCDD ^{13}C 1,2,3,4,7-PeCDD ^{13}C 1,2,3,4,6-PeCDF ^{13}C 1,2,3,4,6,9-HxCDF ^{13}C 1,2,3,4,6,8,9-HpCDF	225 (75-125) 229 (75-125) 222 (75-125) 233 (75-125) 244 (75-125)	All TCL compounds

No data were qualified due to this non-conformance.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR04-102	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5125	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5125

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,6,7,8-HxCDD Total HxCDD	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Continuing calibration (concentration) (c)
A5125	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR04-102	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P	Continuing calibration (concentration) (c)
A5125	N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101	1,2,3,6,7,8-HxCDD Total HxCDD 1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) UJ (all non-detects)	P	Continuing calibration (concentration) (c)
A5125	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR04-102	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (k)

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5125

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TNBE-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	1.11U pg 2.5U pg 11.1U pg 1.15U pg 26.9U pg 1.11U pg 5.1U pg 1.56U pg 1.15U pg	A	bl
A5125	N08-CE05-TNBE-BM02	1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF Total TCDD Total HpCDD Total HpCDF	1.72U pg 5.42U pg 1.71U pg 13.8U pg 3.82U pg 1.71U pg	A	bl
A5125	N08-CE05-TNBS-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total HxCDD Total HpCDD Total HpCDF	1.61U pg 1.14U pg 11.9U pg 0.683U pg 1.38U pg 7.95U pg 1.61U pg 3.12U pg 0.683U pg	A	bl
A5125	N08-CE05-TNBS-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	1.54U pg 1.98U pg 13.1U pg 0.916U pg 17.6U pg 1.54U pg 4.72U pg 1.21U pg 2.02U pg	A	bl
A5125	N08-CE05-TKVK-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF Total HpCDF	1.54U pg 1.86U pg 13.5U pg 1.08U pg 2.32U pg 9.65U pg 1.54U pg 5.05U pg 2.02U pg 1.91U pg	A	bl
A5125	N08-CE05-TKVK-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.904U pg 1.63U pg 6.41U pg 4.58U pg 0.904U pg 3.06U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BN02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total HxCDD Total HpCDD Total HpCDF	0.879U pg 1.39U pg 8.08U pg 0.812U pg 2.64U pg 3.75U pg 0.879U pg 3.88U pg 1.79U pg	A	bl
A5125	N08-CE05-TKVK-BN01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD 1,2,3,4,6,7,8-HpCDF OCDF Total TCDD Total PeCDD Total HxCDD Total HpCDD Total HpCDF	1.16U pg 2.3U pg 11.7U pg 0.767U pg 0.888U pg 8.5U pg 3.11U pg 1.71U pg 4.86U pg 1.48U pg	A	bl
A5125	N08-CE05-TKVK-XR01-102	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	1.39U pg 1.04U pg 3.95U pg 1.61U pg 1.39U pg 2.1U pg	A	bl
A5125	N08-CE05-TKVK-XR01-101	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD Total HxCDF	1.32U pg 1.5U pg 4.41U pg 1.66U pg 1.6U pg 1.32U pg 2.88U pg 0.985U pg	A	bl
A5125	N08-CE05-TKVK-XR02-101	1,2,3,7,8,9-HxCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.782U pg 2U pg 1.34U pg 0.782U pg 1.23U pg	A	bl
A5125	N08-CE05-TKVK-XR02-102	OCDD Total TCDD Total HpCDD	6.55U pg 1.22U pg 1.53U pg	A	bl
A5125	N08-CE05-TKVK-XR04-101	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.64U pg 1.51U pg 15.4U pg 1.52U pg 0.822U pg 0.64U pg 3.22U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR04-102	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.942U pg 1.24U pg 11.7U pg 1.47U pg 0.844U pg 0.942U pg 2.44U pg	A	bl

CWCM Lower Passaic River High Volume Event #1
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5125

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TNBE-BP01	1,2,3,7,8,9-HxCDD	5.63U pg	A	be
A5125	N08-CE05-TNBE-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total HxCDD Total HpCDD Total HxCDF	1.11U pg 2.5U pg 11.1U pg 1.11U pg 5.1U pg 1.56U pg	A	be
A5125	N08-CE05-TNBE-BM02	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	1.72U pg 5.42U pg 3.82U pg	A	be
A5125	N08-CE05-TNBS-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	1.61U pg 1.14U pg 11.9U pg 1.38U pg 7.95U pg 1.61U pg 3.12U pg	A	be
A5125	N08-CE05-TNBS-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total HxCDD Total HpCDD Total HxCDF	1.54U pg 1.98U pg 13.1U pg 1.54U pg 4.72U pg 1.21U pg	A	be
A5125	N08-CE05-TKVK-BM01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total HxCDD Total HpCDD Total HxCDF	1.54U pg 1.86U pg 13.5U pg 2.32U pg 1.54U pg 5.05U pg 2.02U pg	A	be
A5125	N08-CE05-TKVK-BM02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD Total TCDD Total HxCDD Total HpCDD	0.904U pg 1.63U pg 6.41U pg 4.58U pg 0.904U pg 3.06U pg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BN02	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total TCDD Total HxCDD Total HpCDD	0.879U pg 1.39U pg 8.08U pg 2.64U pg 3.75U pg 0.879U pg 3.88U pg	A	be
A5125	N08-CE05-TKVK-BN01	1,2,3,7,8,9-HxCDD 1,2,3,4,6,7,8-HpCDD OCDD OCDF Total HxCDD Total HpCDD	1.16U pg 2.3U pg 11.7U pg 0.888U pg 1.71U pg 4.86U pg	A	be

LDC #: 29736B21
SDG #: A5125
Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET
Full

Date: 6-3-13
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 1/8/13 → 1/10/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤20/35
IV.	Routine calibration/~~ICV~~ SW	~~A~~	≤20/30
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	Client
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	Dynamic + Static
X.	Target compound identifications	~~A~~ SW TM 10/27/14	
XI.	Compound quantitation/~~RL/LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB=11-14, 17-18

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: 6 filters /12 PUFS

1	N08-CE05-TNNE-BP01	11	N08-CE05-TKVK-XR01-102	21		31	
2	N08-CE05-TNNE-BM01	12	N08-CE05-TKVK-XR01-101	22		32	
3	N08-CE05-TNNE-BM02	13	N08-CE05-TKVK-XR02-101	23		33	
4	N08-CE05-TNBS-BP01	14	N08-CE05-TKVK-XR02-102	24		34	
5	N08-CE05-TNBS-BM01	15	N08-CE05-TKVK-BP01	25		35	
6	N08-CE05-TNBS-BM02	16	N08-CE05-TKVK-BQ01	26		36	
7	N08-CE05-TKVK-BM01	17	N08-CE05-TKVK-XR04-101	27		37	
8	N08-CE05-TKVK-BM02	18	N08-CE05-TKVK-XR04-102	28		38	
9	N08-CE05-TKVK-BN02	19		29		39	
10	N08-CE05-TKVK-BN01	20		30		40	MBI-10596

Notes:

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria? (c)

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	02/09/13	130209P1-01	13C-D	80.7 (85-118)		MB1_10596, 1-8	J/UJ/P (D, T)
	02/09/13	130209P1-12	O	56.9 (45-55)		MB1_10596, 1-8	Jdets/P (O, Y)
			13C-D	84.9 (85-118)		MB1_10596, 1-8	J/UJ/P (D, T)
	02/11/13	130211P1-01	13C-D	79.3 (85-118)		9-10, 12-17	J/UJ/P (D, T)
	02/11/13	130211P1-13	13C-D	81.3 (85-118)		9-10, 12-17	J/UJ/P (D, T)
			13C-O	75.3 (78-129)		9-10, 12-17	J/UJ/P (O, Y)
	02/11/13	130211P2-01	O	55.3 (45-55)		11, 18	Jdets/P (O, Y)
			13C-D	81.3 (85-118)			J/UJ/P (D, T)
	02/12/13	130211P2-06	O	57.1 (45-55)		11, 18	Jdets/P (O, Y)
			13C-D	83.8 (85-118)		11, 18	J/UJ/P (D, T)

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9m
2nd Reviewer: a

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 01/31/13 **Blank analysis date:** 02/09/13 **Associated samples:** All

Conc. units: pg

Compound	Blank ID	Sample Identification										
	MB1 10596	5x	2	3	5	6	7	8	9	10	11	12
E	0.975*	4.875	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*	1.39	1.32
F	1.65*	8.25	2.5	1.72*	1.14*	1.98*	1.86*	1.63	1.39	2.3	1.04	1.5
G	4.67*	23.35	11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7	3.95	4.41
O	0.976	4.88	1.15*	1.71*	0.683*	0.916*	1.08*		0.812	0.767*		
Q	1.44	7.2			1.38*		2.32*		2.64*	0.888*		1.66*
R	5.44*	27.2	26.9	13.8*	7.95*	17.6*	9.65*	4.58*	3.75*	8.5	1.61	1.6
S	2.83*	14.15								3.11*		
T	4.36*	21.8	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*	1.39	1.32
U	3.19*	15.95	5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86	2.1*	2.88
X	0.444	2.22	1.56*			1.21	2.02*					0.985*
Y	0.976	4.88	1.15*	1.71*	0.683*	2.02*	1.91*		1.79*	1.48*		

*EMPC

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9m
2nd Reviewer: 4

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 01/31/13 **Blank analysis date:** 02/09/13 **Associated samples:** All

Conc. units: pg

Compound	Blank ID	Sample Identification										
	MB1 10596	5x	13	14	17	18						
E	0.975*	4.875	0.782*		0.64	0.942						
F	1.65*	8.25			1.51	1.24						
G	4.67*	23.35	2*	6.55	15.4	11.7*						
O	0.976	4.88										
Q	1.44	7.2			1.52	1.47						
R	5.44*	27.2	1.34	1.22*	0.822*	0.844						
S	2.83*	14.15										
T	4.36*	21.8	0.782*		0.64	0.942						
U	3.19*	15.95	1.23	1.53	3.22*	2.44*						
X	0.444	2.22										
Y	0.976	4.88										

*EMPC

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: a

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-102	5X	1	2	3	5	6	7	8	9	10
E	1.39	6.95	5.63	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*
F	1.04	5.2		2.5	1.72*	1.14*	1.98*	1.86*	1.63	1.39	2.3
G	3.95	19.75		11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7
R	1.61	8.05				7.95*			4.58*	3.75*	
T	1.39	6.95		1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*
U	2.1*	10.5		5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86

* EMPC

N08-CE05-TKVK-XR01-102 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR01-102.wpd4

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5X	1	2	3	5	6	7	8	9	10
E	1.32	6.6	5.63	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*
F	1.5	7.5		2.5	1.72*	1.14*	1.98*	1.86*	1.63	1.39	2.3
G	4.41	22.05		11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7
Q	1.66*	8.3				1.38*		2.32*		2.64*	0.888*
R	1.6	8				7.95*			4.58*	3.75*	
T	1.32	6.6		1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*
U	2.88	14.4		5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86
X	0.985*	4.925		1.56*			1.21	2.02*			

* EMPC

N08-CE05-TKVK-XR01-101 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR01-101.wpd4

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5X	2	3	5	6	7	8	9	10	
E	0.782*	3.91	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*	
G	2*	10		5.42*				6.41*	8.08		
R	1.34	6.7						4.58*	3.75*		
T	0.782*	3.91	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*	
U	1.23	6.15	5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86	

* EMPC

N08-CE05-TKVK-XR02-101 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR02-101.wpd4

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5X	2	3	5	6	7	8	9	10	
G	6.55	32.75	11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7	
R	1.22*	6.1						4.58*	3.75*		
U	1.53	7.65	5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86	

* EMPC

N08-CE05-TKVK-XR02-102 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR02-102.wpd4

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SM
2nd Reviewer: a

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification								
	N08-CE05-TKVK-XR04-101	5X	2	3	5	6	7	8	9	10
E	0.64	3.2	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*
F	1.51	7.55	2.5	1.72*	1.14*	1.98*	1.86*	1.63	1.39	2.3
G	15.4	77	11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7
Q	1.52	7.6			1.38*		2.32*		2.64*	0.888*
R	0.822*	4.11							3.75*	
T	0.64	3.2	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*
U	3.22*	16.1	5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86

* EMPC

N08-CE05-TKVK-XR04-101 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR04-101.wpd4

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Cgm
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 1/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5X	2	3	5	6	7	8	9	10	
E	0.942	4.71	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.16*	
F	1.24	6.2	2.5	1.72*	1.14*	1.98*	1.86*	1.63	1.39	2.3	
G	11.7*	58.5	11.1	5.42*	11.9	13.1*	13.5	6.41*	8.08	11.7	
Q	1.47	7.35			1.38*		2.32*		2.64*	0.888*	
R	0.844	4.22							3.75*		
T	0.942	4.71	1.11*		1.61	1.54	1.54*	0.904*	0.879*	1.71*	
U	2.44*	12.2	5.1*	3.82*	3.12*	4.72*	5.05*	3.06	3.88	4.86	

* EMPC

N08-CE05-TKVK-XR04-102 (A5125)

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:\Field Blanks\29736B21_N08-CE05-TKVK-XR04-102.wpd4

LDC #: 29732b32)

VALIDATION FINDINGS WORKSHEET

Internal Standards Static spikes

Reviewer: 9m
2nd Reviewer: K

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
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 QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit)	Qualifications
		2	37Cl-A	197 (75-125)	Text ~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	208 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	202 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	208 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	216 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		3	37Cl-A	214 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	224 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	219 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	224 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	216 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		5	37Cl-A	217 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	218 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	225 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	216 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	237 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		6	37Cl-A	223 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	213 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	202 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	217 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	223 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)

LDC #: 29736b21

VALIDATION FINDINGS WORKSHEET

Internal Standards

Static Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
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 QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10?

(i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit)	Qualifications
		7	37Cl-A	217 (75-125)	Text ~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	221 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	218 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	222 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	233 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		8	37Cl-A	218 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	217 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	225 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	222 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	225 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		9	37Cl-A	222 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	231 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	236 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	221 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	220 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		10	37Cl-A	216 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	216 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	216 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	221 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	230 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Internal Standards

Static Standards

Page: 3 of 4
Reviewer: CM
2nd Reviewer: M

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
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 QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10?

(i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit)	Qualifications
		11	37Cl-A	213 (75-125)	Text ~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	222 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	206 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	217 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	213 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		12	37Cl-A	215 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	209 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	217 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	217 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	215 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)

LDC #29731B21

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: TM
2nd Reviewer: a

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
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 QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit)	Qualifications
		13	37Cl-A	217 (75-125)	text ~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	233 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	200 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	220 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	240 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)
		14	37Cl-A	225 (75-125)	~~J/UJ/P~~ (A,H,R,V)
			13C 1,2,3,4,7-PeCDD	229 (75-125)	~~J/UJ/P~~ (B,S)
			13C 1,2,3,4,6-PeCDF	222 (75-125)	~~J/UJ/P~~ (I,J,W)
			13C 1,2,3,4,6,9-HxCDF	233 (75-125)	~~J/UJ/P~~ (C,D,E,K,L,M,N,T,X)
			13C 1,2,3,4,6,8,9-HpCDF	244 (75-125)	~~J/UJ/P~~ (F,G,O,P,Q,U,Y)

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds	all	TEXT
			in secondary PUF >20% of primary PUF		

Notes: See Attached

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Dioxins/Dibenzofurans (Method 1613B)

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 RLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			EMPC	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 29732B21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer: 9th
2nd Reviewer: A

METHOD: GC/MS Dioxins/Dibenzofurans (Method 1613B)

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 RLs were adjusted to reflect all sample dilutions and dry weight factors (if necessary).

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			The Lab noted that the BCS3 used to quantify the RRF for calculating the recovery of the		
			dynamic standard (FS) for the samples was not prepared with the samples. The selected		
			BCS3 was analyzed after the samples which deviates form normal procedure of injecting		
			the BCS3 before and after the samples in question.		

Comments: See sample calculation verification worksheet for recalculations

LDC #: 29736B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	ICAL	9-19-12	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	1.10	1.10	1.09	1.09	4.7	4.8
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.15	1.15	1.13	1.13	7.0	6.9
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.10	1.10	1.06	1.06	3.5	3.6
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.08	1.08	1.05	1.05	2.9	2.8
			OCDF (^{13}C-OCDF)	1.06	1.06	1.04	1.04	3.2	3.1
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 29736b21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130209P1-01	2-9-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	10.1	10.1	1	1
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	11.3	11.3	13	13
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	58.5	58.4	17	17
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	54.4	54.6	9	9
			OCDF (^{13}C-OCDF)	100	108	107	8	8
2	130211P1-01	2-11-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	10.2	10.2	2	2
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	9.69	9.66	-3	3
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	53.4	53.2	7	7
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	49.6	49.6	-1	1
			OCDF (^{13}C-OCDF)	100	103	102	3	3
3	130211P2-01	2-11-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	10.2	10.1	2	2
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	9.6	9.5	-4	4
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	53.7	53.8	7	7
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	50.3	50.5	1	1
			OCDF (^{13}C-OCDF)	100	108	108	8	8

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 #: 29736B21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 4, Q:

Conc. = $\frac{(2.06e6)(4000)(1)}{(2.66e7)(1.16)(1)(\ )}$

= 267 pg

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5125
LAB: SGS-Analytical Perspectives
SITE: CWCM-High Volume

1.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ✓ [ ] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Sample Data Summary (Form I CDD-1) [✓] ___ ___

b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2) [✓] ___ ___

c. Second Column Confirmation Summary (Form I, CDD-3) [ ] ___ ✓

d. Total Homologue Concentration Summary (Form II CDD) [✓] ___ ___

e. CDD/CDF Spiked Sample Summary (Form III CDD-1) [✓] ___ ___

f. CDD/CDF Duplicate Sample Summary (Form III CDD-2) [✓] ___ ___

	YES	NO	N/A
g. CDD/CDF Method Blank Summary (Form IV-CDD)	✓		
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	✓		
I. Chromatographic Resolution Summary (Form V CDD-2)	✓		
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	✓		
k. Initial Calibration (Form VI, CDD-1, CDD-2)	✓		
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	✓		

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

	YES	NO	N/A
a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis: the file name; sample number; and instrument I.D. number	✓		
b. Percent peak resolution valley	✓		
c. Window Defining Mixture raw data	✓		
d. SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	✓		
e. Integrated area and peak height must be listed for all peaks 2.5 times above background	✓		

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

	YES	NO	N/A
a. Chain of Custody Records	✓		
b. Sample Shipment Records	✓		
c. Sample log-in sheets	✓		
d. GC/MS Standard and Sample Run Log in chronological order	✓		
e. Sample Extraction Log	✓		

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals

YES NO N/A

or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] __ __

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [ ] __ ✓

b. For soil/sediment samples, 30 days from VTSR to extraction? [✓] __ __

c. For fish and tissue samples, one (1) year from VTSR to extraction? [ ] __ ✓

d. For all samples 45 days from time of extraction to time of analysis? [✓] __ __

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning

YES NO N/A

of every 12 hour period. Was this performed accordingly? [✓] __ __

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] __ __

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] __ __

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] __ __

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] __ __

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [__] __ __

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining Solution and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] __ __

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9- HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent

YES NO N/A

coefficient of variation must be ≤ 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be ≤ 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [ ] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

YES NO N/A

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [ ] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [ ] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in **Table 8** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:

YES NO N/A

For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{(A_{l1} + A_{l2}) \times Q_n}$$

For labeled analytes. Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2,3,7,8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [ ] [✓] ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4- TCDD and $^{13}C_{12}$1,2,3,7,8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

		YES	NO	N/A
6.1.5	Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2)	[/]		

6.2 Isomer Specificity Test Standard

6.2.1	Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613B, Section 15.4.2.2)	[/]		
6.2	Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis.	[ ]		[/]

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 Were the following MS/DS conditions used?

		YES	NO	N/A
7.1.1	SIM data were acquired for each of the ions listed in Table 8 (see analytical method) including diphenylether interfering ions.	[✓]		
7.2	Were the following identification criteria met?			
7.2.1	For the 2.3.7.8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract. must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]		
7.2.2	For non-2.3.7.8 substituted compounds (tetra through octa) found present. the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B. Section 16.4)	[✓]		
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte. the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B. Section 16.1)	[✓]		
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]		
7.2.5	The integrated ion current for the labeled compounds. internal standards. and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B. Section 16.2)	[✓]		
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9. or ± 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[✓]		
7.2.7	The relative retention time of the unlabeled 2.3.7.8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]		
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup. and internal standard must be met (Table 9 - Method 1613B).	[✓]		
7.2.9	The analyte concentration must be within the calibration range. If not. dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]		

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive. high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]		

ACTION: 1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

YES NO N/A

2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

   A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

   B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

   D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6, and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_l}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$$V \times (A_{11} + A_{12}) \times RR$$

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{11} + A_{12}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_l = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range listed on Table 6 of the Analytical method? [ ] / ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ / [ ] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the

	YES	NO	N/A
Initial Precision and Recovery samples as required by the method?	[/]		

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present?	[/]		

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria?	[/]		

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 **or above one third the regulatory compliance level.**. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in

YES NO N/A

the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [___] ✓ ___

11.3 If not, were samples reanalyzed? [___] ✓ ___

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non-detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1.2.3.7.8.9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

YES NO N/A

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [ ] ___ /

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [ ] ___ /

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [ ] ___ /

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [ ] ___ /

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses

YES NO N/A

and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section 9.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table 6 of the method? [✓] ___ ___

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the Ongoing Precision and Recovery (~~OPR~~ BCS3) standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in Table 6 of the method? [✓] ___ ___

YES NO N/A

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2.3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [ ] [✓] ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 µg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 µg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2.3.7.8-TCDF, and 1.2.3.7,8-PeCDD at amounts > .5 µg/L or any other analyte at levels > 1 µg/L? [✓] ___ ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

YES NO N/A

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [ ] ___ /

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [ ] ___ /

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10. Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [ ] ___ /

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [ ] ___ /

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

20.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ___ /

20.2 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent? [ ] ___ /

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation. /

20.3 Was a matrix spike duplicate analyzed as per section 11.1 and 11.2? [ ] ___ ___

YES NO N/A

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any. can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ ___

21.2 Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes? [ ] ___ ___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills", Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision B- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October 1994

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin". 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF". National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016. Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

YES NO N/A

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 29, 2014

SUBJECT: Revised CWCM High Volume, LPR, Event #1, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted reports with the enclosed revised reports.

LDC Project # 29736:

SDG #	Fraction
A5114 & A5125	Polychlorinated Biphenyls as Congeners

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to breakthrough exceedance

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page
  -Removed qualifications due to static spike %Rs and breakthrough exceedances

SDG #	Fraction
A5114 & A5125	Dioxins/Dibenzofurans

- Revision A5114: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

- Revision A5125: -Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section
  -Removed qualifications due to Internal Standard %Rs

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 29736B31_RV2

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Newark Bay High Volume Event #1
Collection Date	January 8 through January 10, 2013
LDC Report Date:	October 28, 2014
Matrix:	Water
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5125

Sample Identification

N08-CE05-TNBE-BP01
N08-CE05-TNBE-BM01
N08-CE05-TNBE-BM02
N08-CE05-TNBS-BP01
N08-CE05-TNBS-BM01
N08-CE05-TNBS-BM02
N08-CE05-TKVK-BM01
N08-CE05-TKVK-BM02
N08-CE05-TKVK-BN02
N08-CE05-TKVK-BN01
N08-CE05-TKVK-XR01-102
N08-CE05-TKVK-XR01-101
N08-CE05-TKVK-XR02-101
N08-CE05-TKVK-XR02-102
N08-CE05-TKVK-BP01
N08-CE05-TKVK-BQ01
N08-CE05-TKVK-XR04-101
N08-CE05-TKVK-XR04-102

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls (PCB) as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2) and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue, and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 with the following exceptions:

Date	Standard ID	Compound	Ion Abundance Ratio (Limits)	Associated Samples	Affected Compounds	Flag	A or P
12/14/12	121214S05	PCB-4 to PCB-15	0 (1.33-1.79)	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101 MB1_10596	PCB-4 to PCB-15 Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P
7/26/12	120725X16	PCB-4	0 (1.33-1.79)	N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR04-102	PCB-4 Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

The laboratory indicated that the Dichlorobiphenyl congeners listed above were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK therefore ion abundance ratio criteria cannot be met. Using professional judgment, associated data were qualified as estimated.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound with the exception noted above.

IV. Continuing Calibration

Continuing 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 PCBs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

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
MB1_10596	1/31/13	PCB-118	25.5 pg	All samples in SDG A5125
		Mono-CBs	249 pg	
		Di-CBs	3990 pg	
		Tri-CBs	5680 pg	
		Tetra-CBs	2130 pg	
		Penta-CBs	379 pg	
		Hexa-CBs	161 pg	
		Hepta-CBs	34 pg	
		PCB-1	76.7 pg	
		PCB-2	62.4 pg	
		PCB-3	110 pg	
		PCB-4	489 pg	
		PCB-10	30.2 pg	
		PCB-9	115 pg	
		PCB-7	71 pg	
		PCB-6	292 pg	
		PCB-5	36.2 pg	
		PCB-8	1530 pg	
		PCB-11	1010 pg	
		PCB-13/12	64.4 pg	
		PCB-15	347 pg	
		PCB-19	132 pg	
		PCB-30/18	1170 pg	
		PCB-17	547 pg	
		PCB-27	72.7 pg	
		PCB-24	13.5 pg	
		PCB-16	521 pg	
		PCB-32	299 pg	
		PCB-26/29	172 pg	
		PCB-25	77.9 pg	
		PCB-31	828 pg	
		PCB-28/20	921 pg	
		PCB-21/33	526 pg	
		PCB-22	299 pg	
		PCB-37	93.3 pg	
		PCB-50/53	90.3 pg	
		PCB-45	88.8 pg	
		PCB-51	51.3 pg	
		PCB-46	31.2 pg	
		PCB-52	430 pg	
		PCB-43	20.7 pg	
		PCB-69/49	218 pg	
		PCB-48	104 pg	
		PCB-44/47/65	389 pg	
		PCB-59/62/75	39.1 pg	
		PCB-42	95.5 pg	
		PCB-41	50.8 pg	
		PCB-71/40	141 pg	
		PCB-64	116 pg	
		PCB-61/70/74/76	170 pg	
		PCB-66	74 pg	
		PCB-56	22 pg	
		PCB-95	104 pg	
		PCB-91	14.5 pg	
		PCB-84	24.4 pg	
		PCB-113/90/101	75.5 pg	
		PCB-99	29.6 pg	
		PCB-108/119/86/97/125/87	52.9 pg	
		PCB-110	52 pg	
		PCB-136	9.66 pg	
		PCB-151/135	26.4 pg	
		PCB-147/149	39.6 pg	
		PCB-132	17.9 pg	
		PCB-153/168	33.8 pg	
		PCB-163/138/129	34.1 pg	
		PCB-179	11.8 pg	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1_10596 (continued)	1/31/13	PCB-180/193	22.2 pg	All samples in SDG A5125

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBE-BP01	PCB-9	207 pg	207U pg
	PCB-7	99.7 pg	99.7U pg
	PCB-5	30.7 pg	30.7U pg
	PCB-8	4760 pg	4760U pg
	PCB-11	2250 pg	2250U pg
	PCB-30/18	4700 pg	4700U pg
	PCB-24	58.8 pg	58.8U pg
	PCB-16	1740 pg	1740U pg
	PCB-21/33	2230 pg	2230U pg
N08-CE05-TNBE-BM01	PCB-2	162 pg	162U pg
	PCB-3	242 pg	242U pg
	PCB-5	174 pg	174U pg
N08-CE05-TNBE-BM02	PCB-2	96.8 pg	96.8U pg
	PCB-3	140 pg	140U pg
	PCB-9	289 pg	289U pg
	PCB-7	142 pg	142U pg
	PCB-6	866 pg	866U pg
	PCB-5	67.6 pg	67.6U pg
	PCB-8	3230 pg	3230U pg
	PCB-11	3130 pg	3130U pg
	PCB-21/33	2220 pg	2220U pg
N08-CE05-TNBS-BP01	PCB-7	352 pg	352U pg
	PCB-5	89.4 pg	89.4U pg
N08-CE05-TNBS-BM01	PCB-2	115 pg	115U pg
	PCB-3	164 pg	164U pg
	PCB-9	207 pg	207U pg
	PCB-7	110 pg	110U pg
	PCB-6	678 pg	678U pg
	PCB-5	46.3 pg	46.3U pg
	PCB-8	2470 pg	2470U pg
	PCB-11	4120 pg	4120U pg
	PCB-15	1650 pg	1650U pg
	PCB-21/33	1690 pg	1690U pg
N08-CE05-TNBS-BM02	PCB-2	128 pg	128U pg
	PCB-3	182 pg	182U pg
	PCB-9	376 pg	376U pg
	PCB-7	187 pg	187U pg
	PCB-5	83.9 pg	83.9U pg
	PCB-8	5240 pg	5240U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-BM01	PCB-2	105 pg	105U pg
	PCB-3	142 pg	142U pg
	PCB-9	252 pg	252U pg
	PCB-7	107 pg	107U pg
	PCB-6	980 pg	980U pg
	PCB-5	45.3 pg	45.3U pg
	PCB-8	3120 pg	3120U pg
	PCB-21/33	2170 pg	2170U pg
N08-CE05-TKVK-BM02	PCB-2	58.5 pg	58.5U pg
	PCB-3	76.8 pg	76.8U pg
	PCB-9	87.3 pg	87.3U pg
	PCB-7	39.4 pg	39.4U pg
	PCB-6	341 pg	341U pg
	PCB-5	16.8 pg	16.8U pg
	PCB-8	1040 pg	1040U pg
	PCB-11	2100 pg	2100U pg
	PCB-13/12	158 pg	158U pg
	PCB-15	802 pg	802U pg
	PCB-30/18	4240 pg	4240U pg
	PCB-17	2430 pg	2430U pg
	PCB-24	54.7 pg	54.7U pg
	PCB-16	1330 pg	1330U pg
	PCB-31	3000 pg	3000U pg
	PCB-28/20	3470 pg	3470U pg
	PCB-21/33	696 pg	696U pg
	PCB-22	780 pg	780U pg
	PCB-41	129 pg	129U pg
	PCB-179	54.9 pg	54.9U pg
N08-CE05-TKVK-BN02	PCB-2	96.7 pg	96.7U pg
	PCB-3	181 pg	181U pg
	PCB-9	231 pg	231U pg
	PCB-7	147 pg	147U pg
	PCB-6	821 pg	821U pg
	PCB-5	63.3 pg	63.3U pg
	PCB-8	3630 pg	3630U pg
N08-CE05-TKVK-BN01	PCB-2	89.3 pg	89.3U pg
	PCB-3	127 pg	127U pg
	PCB-9	225 pg	225U pg
	PCB-7	99.1 pg	99.1U pg
	PCB-6	893 pg	893U pg
	PCB-5	38.6 pg	38.6U pg
	PCB-8	2930 pg	2930U pg
	PCB-21/33	2000 pg	2000U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR01-102	PCB-118	67.8 pg	67.8U pg
	Mono-CBs	126 pg	126U pg
	Di-CBs	934 pg	934U pg
	Tri-CBs	940 pg	940U pg
	Tetra-CBs	990 pg	990U pg
	Penta-CBs	568 pg	568U pg
	Hexa-CBs	597 pg	597U pg
	PCB-1	48.9 pg	48.9U pg
	PCB-2	34.2 pg	34.2U pg
	PCB-3	43.2 pg	43.2U pg
	PCB-4	114 pg	114U pg
	PCB-10	14.5 pg	14.5U pg
	PCB-9	15.8 pg	15.8U pg
	PCB-7	10.1 pg	10.1U pg
	PCB-6	46.7 pg	46.7U pg
	PCB-5	4.21 pg	4.21U pg
	PCB-8	162 pg	162U pg
	PCB-11	498 pg	498U pg
	PCB-13/12	13.8 pg	13.8U pg
	PCB-15	54.2 pg	54.2U pg
	PCB-19	29.4 pg	29.4U pg
	PCB-30/18	162 pg	162U pg
	PCB-17	79.8 pg	79.8U pg
	PCB-27	17.5 pg	17.5U pg
	PCB-24	2.23 pg	2.23U pg
	PCB-16	77.9 pg	77.9U pg
	PCB-32	52.3 pg	52.3U pg
	PCB-26/29	31.5 pg	31.5U pg
	PCB-25	16 pg	16U pg
	PCB-31	139 pg	139U pg
	PCB-28/20	163 pg	163U pg
	PCB-21/33	77.3 pg	77.3U pg
	PCB-22	53.7 pg	53.7U pg
	PCB-37	33.4 pg	33.4U pg
	PCB-50/53	23.7 pg	23.7U pg
	PCB-45	18.7 pg	18.7U pg
	PCB-51	28.7 pg	28.7U pg
	PCB-46	9.3 pg	9.3U pg
	PCB-52	163 pg	163U pg
	PCB-43	3.66 pg	3.66U pg
	PCB-69/49	79.6 pg	79.6U pg
	PCB-48	20.9 pg	20.9U pg
	PCB-44/47/65	211 pg	211U pg
	PCB-59/62/75	10.2 pg	10.2U pg
	PCB-42	29.3 pg	29.3U pg
	PCB-41	10.8 pg	10.8U pg
	PCB-71/40	53.6 pg	53.6U pg
	PCB-64	41 pg	41U pg
	PCB-61/70/74/76	133 pg	133U pg
	PCB-66	75 pg	75U pg
	PCB-56	35.8 pg	35.8U pg
	PCB-95	87.6 pg	87.6U pg
	PCB-91	12.1 pg	12.1U pg
	PCB-84	27.3 pg	27.3U pg
	PCB-113/90/101	91.7 pg	91.7U pg
	PCB-99	37.1 pg	37.1U pg
	PCB-108/119/86/97/125/87	52.1 pg	52.1U pg
	PCB-110	92.6 pg	92.6U pg
	PCB-136	14.8 pg	14.8U pg
	PCB-151/135	41.4 pg	41.4U pg
	PCB-147/149	102 pg	102U pg
	PCB-132	37 pg	37U pg
	PCB-153/168	115 pg	115U pg
	PCB-163/138/129	151 pg	151U pg
	PCB-179	20.8 pg	20.8U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR01-101	PCB-118	23.6 pg	23.6U pg
	Mono-CBs	99.8 pg	99.8U pg
	Di-CBs	752 pg	752U pg
	Tri-CBs	660 pg	660U pg
	Tetra-CBs	638 pg	638U pg
	Penta-CBs	279 pg	279U pg
	Hexa-CBs	226 pg	226U pg
	PCB-1	35.6 pg	35.6U pg
	PCB-2	30 pg	30U pg
	PCB-3	34.2 pg	34.2U pg
	PCB-4	67.9 pg	67.9U pg
	PCB-10	7.17 pg	7.17U pg
	PCB-9	10.9 pg	10.9U pg
	PCB-7	7.31 pg	7.31U pg
	PCB-6	37.1 pg	37.1U pg
	PCB-5	3.63 pg	3.63U pg
	PCB-8	106 pg	106U pg
	PCB-11	457 pg	457U pg
	PCB-13/12	18.8 pg	18.8U pg
	PCB-15	35.2 pg	35.2U pg
	PCB-19	17.9 pg	17.9U pg
	PCB-30/18	114 pg	114U pg
	PCB-17	52.5 pg	52.5U pg
	PCB-27	9.72 pg	9.72U pg
	PCB-24	2.1 pg	2.1U pg
	PCB-16	59.1 pg	59.1U pg
	PCB-32	34.7 pg	34.7U pg
	PCB-26/29	21.8 pg	21.8U pg
	PCB-25	10.2 pg	10.2U pg
	PCB-31	96 pg	96U pg
	PCB-28/20	109 pg	109U pg
	PCB-21/33	61.3 pg	61.3U pg
	PCB-22	39.8 pg	39.8U pg
	PCB-37	25 pg	25U pg
	PCB-50/53	14.2 pg	14.2U pg
	PCB-45	12.5 pg	12.5U pg
	PCB-51	24.3 pg	24.3U pg
	PCB-46	5.4 pg	5.4U pg
	PCB-52	94.2 pg	94.2U pg
	PCB-43	3.08 pg	3.08U pg
	PCB-69/49	41.4 pg	41.4U pg
	PCB-48	13.5 pg	13.5U pg
	PCB-44/47/65	188 pg	188U pg
	PCB-59/62/75	7.02 pg	7.02U pg
	PCB-42	16.6 pg	16.6U pg
	PCB-41	7.14 pg	7.14U pg
	PCB-71/40	29.5 pg	29.5U pg
	PCB-64	22.5 pg	22.5U pg
	PCB-61/70/74/76	67.7 pg	67.7U pg
	PCB-66	38.3 pg	38.3U pg
	PCB-56	19.4 pg	19.4U pg
	PCB-95	49.2 pg	49.2U pg
	PCB-91	7.29 pg	7.29U pg
	PCB-84	15.5 pg	15.5U pg
	PCB-113/90/101	44.3 pg	44.3U pg
	PCB-99	16.8 pg	16.8U pg
	PCB-108/119/86/97/125/87	30.7 pg	30.7U pg
	PCB-110	41 pg	41U pg
	PCB-136	8.27 pg	8.27U pg
	PCB-151/135	17.3 pg	17.3U pg
	PCB-147/149	39.2 pg	39.2U pg
	PCB-132	14.3 pg	14.3U pg
	PCB-153/168	38.9 pg	38.9U pg
	PCB-163/138/129	49.2 pg	49.2U pg
	PCB-179	8.29 pg	8.29U pg
	PCB-180/193	64.8 pg	64.8U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR02-101	PCB-118	30.7 pg	30.7U pg
	Mono-CBs	152 pg	152U pg
	Di-CBs	1600 pg	1600U pg
	Tri-CBs	1290 pg	1290U pg
	Tetra-CBs	638 pg	638U pg
	Penta-CBs	317 pg	317U pg
	Hexa-CBs	358 pg	358U pg
	PCB-1	56.4 pg	56.4U pg
	PCB-2	39.2 pg	39.2U pg
	PCB-3	56.3 pg	56.3U pg
	PCB-4	161 pg	161U pg
	PCB-10	9.94 pg	9.94U pg
	PCB-9	24.6 pg	24.6U pg
	PCB-7	19.1 pg	19.1U pg
	PCB-6	71.7 pg	71.7U pg
	PCB-5	6.39 pg	6.39U pg
	PCB-8	284 pg	284U pg
	PCB-11	934 pg	934U pg
	PCB-13/12	23.5 pg	23.5U pg
	PCB-15	69.1 pg	69.1U pg
	PCB-19	37.1 pg	37.1U pg
	PCB-30/18	278 pg	278U pg
	PCB-17	129 pg	129U pg
	PCB-27	18.7 pg	18.7U pg
	PCB-24	3.85 pg	3.85U pg
	PCB-16	133 pg	133U pg
	PCB-32	71.2 pg	71.2U pg
	PCB-26/29	36.3 pg	36.3U pg
	PCB-25	15.9 pg	15.9U pg
	PCB-31	172 pg	172U pg
	PCB-28/20	189 pg	189U pg
	PCB-21/33	110 pg	110U pg
	PCB-22	64.1 pg	64.1U pg
	PCB-37	27.8 pg	27.8U pg
	PCB-50/53	20 pg	20U pg
	PCB-45	23.6 pg	23.6U pg
	PCB-51	13.2 pg	13.2U pg
	PCB-46	8.58 pg	8.58U pg
	PCB-52	136 pg	136U pg
	PCB-43	5.02 pg	5.02U pg
	PCB-69/49	51.6 pg	51.6U pg
	PCB-48	22.3 pg	22.3U pg
	PCB-44/47/65	109 pg	109U pg
	PCB-59/62/75	7.64 pg	7.64U pg
	PCB-42	21.2 pg	21.2U pg
	PCB-41	9.98 pg	9.98U pg
	PCB-71/40	33.9 pg	33.9U pg
	PCB-64	29.4 pg	29.4U pg
	PCB-61/70/74/76	74.6 pg	74.6U pg
	PCB-66	34.5 pg	34.5U pg
	PCB-56	16.3 pg	16.3U pg
	PCB-95	63.2 pg	63.2U pg
	PCB-91	7.19 pg	7.19U pg
	PCB-84	17.9 pg	17.9U pg
	PCB-113/90/101	52.4 pg	52.4U pg
	PCB-99	20.3 pg	20.3U pg
	PCB-108/119/86/97/125/87	30.1 pg	30.1U pg
	PCB-110	48.5 pg	48.5U pg
	PCB-136	10.2 pg	10.2U pg
	PCB-151/135	26 pg	26U pg
	PCB-147/149	60.2 pg	60.2U pg
	PCB-132	21 pg	21U pg
	PCB-153/168	68.1 pg	68.1U pg
	PCB-163/138/129	89.5 pg	89.5U pg
	PCB-179	13.8 pg	13.8U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR02-102	PCB-118	37.5 pg	37.5U pg
	Mono-CBs	115 pg	115U pg
	Di-CBs	997 pg	997U pg
	Tri-CBs	753 pg	753U pg
	Tetra-CBs	663 pg	663U pg
	Penta-CBs	380 pg	380U pg
	Hexa-CBs	320 pg	320U pg
	PCB-1	41.8 pg	41.8U pg
	PCB-2	35.5 pg	35.5U pg
	PCB-3	38 pg	38U pg
	PCB-4	75.4 pg	75.4U pg
	PCB-10	6.4 pg	6.4U pg
	PCB-9	13.6 pg	13.6U pg
	PCB-7	8.81 pg	8.81U pg
	PCB-6	53.4 pg	53.4U pg
	PCB-5	3.47 pg	3.47U pg
	PCB-8	129 pg	129U pg
	PCB-11	629 pg	629U pg
	PCB-13/12	23.5 pg	23.5U pg
	PCB-15	53.2 pg	53.2U pg
	PCB-19	19.7 pg	19.7U pg
	PCB-30/18	133 pg	133U pg
	PCB-17	64.5 pg	64.5U pg
	PCB-27	12.3 pg	12.3U pg
	PCB-24	2.73 pg	2.73U pg
	PCB-16	61.3 pg	61.3U pg
	PCB-32	41.8 pg	41.8U pg
	PCB-26/29	27.8 pg	27.8U pg
	PCB-25	14.1 pg	14.1U pg
	PCB-31	113 pg	113U pg
	PCB-28/20	132 pg	132U pg
	PCB-21/33	57.5 pg	57.5U pg
	PCB-22	37.8 pg	37.8U pg
	PCB-37	30.3 pg	30.3U pg
	PCB-50/53	15.6 pg	15.6U pg
	PCB-45	14.1 pg	14.1U pg
	PCB-51	18.4 pg	18.4U pg
	PCB-46	5.72 pg	5.72U pg
	PCB-52	128 pg	128U pg
	PCB-43	4.32 pg	4.32U pg
	PCB-69/49	50.5 pg	50.5U pg
	PCB-48	15.9 pg	15.9U pg
	PCB-44/47/65	136 pg	136U pg
	PCB-59/62/75	6.88 pg	6.88U pg
	PCB-42	19.2 pg	19.2U pg
	PCB-41	6.45 pg	6.45U pg
	PCB-71/40	33.1 pg	33.1U pg
	PCB-64	25.9 pg	25.9U pg
	PCB-61/70/74/76	85.3 pg	85.3U pg
	PCB-66	48.8 pg	48.8U pg
	PCB-56	21.2 pg	21.2U pg
	PCB-95	68.6 pg	68.6U pg
	PCB-91	10.2 pg	10.2U pg
	PCB-84	20.9 pg	20.9U pg
	PCB-113/90/101	61.4 pg	61.4U pg
	PCB-99	27.2 pg	27.2U pg
	PCB-108/119/86/97/125/87	36.1 pg	36.1U pg
	PCB-110	59.7 pg	59.7U pg
	PCB-136	10.6 pg	10.6U pg
	PCB-151/135	24.7 pg	24.7U pg
	PCB-147/149	57 pg	57U pg
	PCB-132	19.8 pg	19.8U pg
	PCB-153/168	58.6 pg	58.6U pg
	PCB-163/138/129	77.3 pg	77.3U pg
	PCB-179	10.3 pg	10.3U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR04-101	PCB-118	18.2 pg	18.2U pg
	Mono-CBs	17.9 pg	17.9U pg
	Di-CBs	236 pg	236U pg
	Tri-CBs	178 pg	178U pg
	Tetra-CBs	158 pg	158U pg
	Penta-CBs	112 pg	112U pg
	Hexa-CBs	90 pg	90U pg
	Hepta-CBs	57.9 pg	57.9U pg
	PCB-1	6.46 pg	6.46U pg
	PCB-2	5.36 pg	5.36U pg
	PCB-3	6.1 pg	6.1U pg
	PCB-4	9.64 pg	9.64U pg
	PCB-10	1.14 pg	1.14U pg
	PCB-9	3.01 pg	3.01U pg
	PCB-6	5.41 pg	5.41U pg
	PCB-8	19.4 pg	19.4U pg
	PCB-11	151 pg	151U pg
	PCB-13/12	8 pg	8U pg
	PCB-15	37.8 pg	37.8U pg
	PCB-19	2.67 pg	2.67U pg
	PCB-30/18	15 pg	15U pg
	PCB-17	8.87 pg	8.87U pg
	PCB-27	2.28 pg	2.28U pg
	PCB-16	7.38 pg	7.38U pg
	PCB-32	6.96 pg	6.96U pg
	PCB-26/29	8.94 pg	8.94U pg
	PCB-25	5.06 pg	5.06U pg
	PCB-31	29.1 pg	29.1U pg
	PCB-28/20	41.8 pg	41.8U pg
	PCB-21/33	12.2 pg	12.2U pg
	PCB-22	10.4 pg	10.4U pg
	PCB-37	24.7 pg	24.7U pg
	PCB-50/53	2.03 pg	2.03U pg
	PCB-45	2.09 pg	2.09U pg
	PCB-51	1.2 pg	1.2U pg
	PCB-46	0.871 pg	0.871U pg
	PCB-52	20.7 pg	20.7U pg
	PCB-69/49	9.52 pg	9.52U pg
	PCB-48	2.6 pg	2.6U pg
	PCB-44/47/65	19.5 pg	19.5U pg
	PCB-59/62/75	1.68 pg	1.68U pg
	PCB-42	4.7 pg	4.7U pg
	PCB-41	1.64 pg	1.64U pg
	PCB-71/40	8 pg	8U pg
	PCB-64	6.15 pg	6.15U pg
	PCB-61/70/74/76	32.4 pg	32.4U pg
	PCB-66	22.3 pg	22.3U pg
	PCB-56	10.5 pg	10.5U pg
	PCB-95	13.4 pg	13.4U pg
	PCB-91	1.85 pg	1.85U pg
	PCB-84	4.24 pg	4.24U pg
	PCB-113/90/101	16.4 pg	16.4U pg
	PCB-99	8.72 pg	8.72U pg
	PCB-108/119/86/97/125/87	11.6 pg	11.6U pg
	PCB-110	20.1 pg	20.1U pg
	PCB-136	2.72 pg	2.72U pg
	PCB-151/135	7.04 pg	7.04U pg
	PCB-147/149	15.4 pg	15.4U pg
	PCB-132	6.73 pg	6.73U pg
	PCB-153/168	17 pg	17U pg
	PCB-163/138/129	20.8 pg	20.8U pg
	PCB-179	3.12 pg	3.12U pg
	PCB-180/193	16.5 pg	16.5U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-XR04-102	PCB-118	18.5 pg	18.5U pg
	Mono-CBs	17.6 pg	17.6U pg
	Di-CBs	138 pg	138U pg
	Tri-CBs	166 pg	166U pg
	Tetra-CBs	168 pg	168U pg
	Penta-CBs	137 pg	137U pg
	Hexa-CBs	128 pg	128U pg
	Hepta-CBs	97.8 pg	97.8U pg
	PCB-1	6.56 pg	6.56U pg
	PCB-2	4.79 pg	4.79U pg
	PCB-3	6.21 pg	6.21U pg
	PCB-4	15.4 pg	15.4U pg
	PCB-10	1.41 pg	1.41U pg
	PCB-9	3.46 pg	3.46U pg
	PCB-6	5.91 pg	5.91U pg
	PCB-8	23.5 pg	23.5U pg
	PCB-11	58.3 pg	58.3U pg
	PCB-13/12	5.28 pg	5.28U pg
	PCB-15	24.9 pg	24.9U pg
	PCB-19	3.51 pg	3.51U pg
	PCB-30/18	18.9 pg	18.9U pg
	PCB-17	11.5 pg	11.5U pg
	PCB-27	2.31 pg	2.31U pg
	PCB-16	8.43 pg	8.43U pg
	PCB-32	7.24 pg	7.24U pg
	PCB-26/29	7.57 pg	7.57U pg
	PCB-25	4.42 pg	4.42U pg
	PCB-31	27.8 pg	27.8U pg
	PCB-28/20	37.8 pg	37.8U pg
	PCB-21/33	11.7 pg	11.7U pg
	PCB-22	9.33 pg	9.33U pg
	PCB-37	15.6 pg	15.6U pg
	PCB-50/53	3.11 pg	3.11U pg
	PCB-45	2.66 pg	2.66U pg
	PCB-51	1.74 pg	1.74U pg
	PCB-46	1.12 pg	1.12U pg
	PCB-52	25 pg	25U pg
	PCB-69/49	12.6 pg	12.6U pg
	PCB-48	3.15 pg	3.15U pg
	PCB-44/47/65	25.5 pg	25.5U pg
	PCB-59/62/75	1.85 pg	1.85U pg
	PCB-42	5.26 pg	5.26U pg
	PCB-41	1.74 pg	1.74U pg
	PCB-71/40	9.42 pg	9.42U pg
	PCB-64	6.82 pg	6.82U pg
	PCB-61/70/74/76	30.8 pg	30.8U pg
	PCB-66	19.3 pg	19.3U pg
	PCB-56	8.68 pg	8.68U pg
	PCB-95	19 pg	19U pg
	PCB-91	3.03 pg	3.03U pg
	PCB-84	5.94 pg	5.94U pg
	PCB-113/90/101	22.6 pg	22.6U pg
	PCB-99	9.93 pg	9.93U pg
	PCB-108/119/86/97/125/87	14.1 pg	14.1U pg
	PCB-110	24 pg	24U pg
	PCB-136	4.33 pg	4.33U pg
	PCB-151/135	11.1 pg	11.1U pg
	PCB-147/149	25.2 pg	25.2U pg
	PCB-132	7.84 pg	7.84U pg
	PCB-153/168	24.8 pg	24.8U pg
	PCB-163/138/129	28.2 pg	28.2U pg
	PCB-179	5 pg	5U pg
	PCB-180/193	26.3 pg	26.3U pg

Samples N08-CE05-TKVK-XR01-102, N08-CE05-TKVK-XR01-101, N08-CE05-TKVK-XR02-101, N08-CE05-TKVK-XR02-102, N08-CE05-TKVK-XR04-101, and N08-CE05-TKVK-XR04-102 were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-102	1/10/13	PCB-77	5.73 pg	N08-CE05-TNBE-BP01
		PCB-105	31 pg	N08-CE05-TNBE-BM01
		PCB-114	1.73 pg	N08-CE05-TNBE-BM02
		PCB-118	67.8 pg	N08-CE05-TNBS-BP01
		PCB-123	1.17 pg	N08-CE05-TNBS-BM01
		PCB-156/157	18.8 pg	N08-CE05-TNBS-BM02
		PCB-167	5.16 pg	N08-CE05-TKVK-BM01
		PCB-189	3.42 pg	N08-CE05-TKVK-BM02
		Mono-CBs	126 pg	N08-CE05-TKVK-BN02
		Di-CBs	934 pg	N08-CE05-TKVK-BN01
		Tri-CBs	940 pg	N08-CE05-TKVK-BP01
		Tetra-CBs	990 pg	N08-CE05-TKVK-BQ01
		Penta-CBs	568 pg	
		Hexa-CBs	597 pg	
		Hepta-CBs	684 pg	
		Octa-CBs	192 pg	
		Nona-CBs	12.7 pg	
		PCB-1	48.9 pg	
		PCB-2	34.2 pg	
		PCB-3	43.2 pg	
		PCB-4	114 pg	
		PCB-10	14.5 pg	
		PCB-9	15.8 pg	
		PCB-7	10.1 pg	
		PCB-6	46.7 pg	
		PCB-5	4.21 pg	
		PCB-8	162 pg	
		PCB-14	1.08 pg	
		PCB-11	498 pg	
		PCB-13/12	13.8 pg	
		PCB-15	54.2 pg	
		PCB-19	29.4 pg	
		PCB-30/18	162 pg	
		PCB-17	79.8 pg	
		PCB-27	17.5 pg	
		PCB-24	2.23 pg	
		PCB-16	77.9 pg	
		PCB-32	52.3 pg	
		PCB-26/29	31.5 pg	
		PCB-25	16 pg	
		PCB-31	139 pg	
		PCB-28/20	63 pg	
		PCB-21/33	77.3 pg	
		PCB-22	53.7 pg	
		PCB-35	4.73 pg	
		PCB-37	33.4 pg	
		PCB-54	1.25 pg	
		PCB-50/53	23.7 pg	
		PCB-45	18.7 pg	
		PCB-51	28.7 pg	
		PCB-46	9.3 pg	
		PCB-52	163 pg	
		PCB-73	0.746 pg	
		PCB-43	3.66 pg	
		PCB-69/49	79.6 pg	
		PCB-48	20.9 pg	
		PCB-44/47/65	211 pg	
		PCB-59/62/75	10.2 pg	
		PCB-42	29.3 pg	
		PCB-41	10.8 pg	
		PCB-71/40	53.6 pg	
		PCB-64	41 pg	
		PCB-72	1.07 pg	
		PCB-68	9.5 pg	
		PCB-67	2.76 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-102 (continued)	1/10/13	PCB-63	2.98 pg	N08-CE05-TNBE-BP01
		PCB-61/70/74/76	133 pg	N08-CE05-TNBE-BM01
		PCB-66	75 pg	N08-CE05-TNBE-BM02
		PCB-55	1 pg	N08-CE05-TNBS-BP01
		PCB-56	35.8 pg	N08-CE05-TNBS-BM01
		PCB-60	15.8 pg	N08-CE05-TNBS-BM02
		PCB-79	1.04 pg	N08-CE05-TKVK-BM01
		PCB-96	1.06 pg	N08-CE05-TKVK-BM02
		PCB-103	1.33 pg	N08-CE05-TKVK-BN02
		PCB-94	0.926 pg	N08-CE05-TKVK-BN01
		PCB-95	87.6 pg	N08-CE05-TKVK-BP01
		PCB-100/93	1.86 pg	N08-CE05-TKVK-BQ01
		PCB-102	3.69 pg	
		PCB-91	12.1 pg	
		PCB-84	27.3 pg	
		PCB-89	1.35 pg	
		PCB-92	16.8 pg	
		PCB-113/90/101	91.7 pg	
		PCB-83	5 pg	
		PCB-99	37.1 pg	
		PCB-108/119/86/97/125/87	52.1 pg	
		PCB-117	2.51 pg	
		PCB-116/85	10.4 pg	
		PCB-110	92.6 pg	
		PCB-115	1.83 pg	
		PCB-82	10.3 pg	
		PCB-107/124	2.52 pg	
		PCB-109	5.02 pg	
		PCB-122	0.911 pg	
		PCB-136	14.8 pg	
		PCB-151/135	41.4 pg	
		PCB-154	1.05 pg	
		PCB-144	5.65 pg	
		PCB-147/149	102 pg	
		PCB-134	5.27 pg	
		PCB-139/140	0.876 pg	
		PCB-131	0.944 pg	
		PCB-132	37 pg	
		PCB-133	1.44 pg	
		PCB-146	15.6 pg	
		PCB-153/168	115 pg	
		PCB-141	34.6 pg	
		PCB-130	5.24 pg	
		PCB-137	2.4 pg	
		PCB-164	10.7 pg	
		PCB-163/138/129	151 pg	
		PCB-158	13.3 pg	
		PCB-128/166	15.4 pg	
		PCB-179	20.8 pg	
		PCB-176	6.33 pg	
		PCB-178	12.3 pg	
		PCB-175	2.5 pg	
		PCB-187	82.6 pg	
		PCB-183	39.5 pg	
		PCB-185	7.3 pg	
		PCB-174	96.1 pg	
		PCB-177	47.4 pg	
		PCB-171/173	23 pg	
		PCB-172	15.2 pg	
		PCB-180/193	214 pg	
		PCB-191	3.8 pg	
		PCB-170	90.4 pg	
		PCB-190	19.4 pg	
		PCB-202	4.63 pg	
		PCB-201	4.18 pg	
		PCB-197	1.52 pg	
		PCB-200	5.19 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-102 (continued)	1/10/13	PCB-198/199	47.6 pg	N08-CE05-TNBE-BP01
		PCB-196	22.9 pg	N08-CE05-TNBE-BM01
		PCB-203	27.9 pg	N08-CE05-TNBE-BM02
		PCB-195	23.4 pg	N08-CE05-TNBS-BP01
		PCB-194	52.4 pg	N08-CE05-TNBS-BM01
		PCB-205	2.14 pg	N08-CE05-TNBS-BM02
		PCB-208	1.89 pg	N08-CE05-TKVK-BM01
		PCB-207	1.33 pg	N08-CE05-TKVK-BM02
		PCB-206	9.46 pg	N08-CE05-TKVK-BN02
		PCB-209	1.72 pg	N08-CE05-TKVK-BN01
				N08-CE05-TKVK-BP01
				N08-CE05-TKVK-BQ01

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-101	1/10/13	PCB-77	3.28 pg	N08-CE05-TNBE-BP01
		PCB-105	10.8 pg	N08-CE05-TNBE-BM01
		PCB-114	0.988 pg	N08-CE05-TNBE-BM02
		PCB-118	23.6 pg	N08-CE05-TNBS-BP01
		PCB-123	0.968 pg	N08-CE05-TNBS-BM01
		PCB-156/157	6.57 pg	N08-CE05-TNBS-BM02
		PCB-167	1.99 pg	N08-CE05-TKVK-BM01
		PCB-189	1.47 pg	N08-CE05-TKVK-BM02
		Mono-CBs	99.8 pg	N08-CE05-TKVK-BN02
		Di-CBs	752 pg	N08-CE05-TKVK-BN01
		Tri-CBs	660 pg	N08-CE05-TKVK-BP01
		Tetra-CBs	638 pg	N08-CE05-TKVK-BQ01
		Penta-CBs	279 pg	
		Hexa-CBs	226 pg	
		Hepta-CBs	219 pg	
		Octa-CBs	70.6 pg	
		Nona-CBs	7.4 pg	
		PCB-1	35.6 pg	
		PCB-2	30 pg	
		PCB-3	34.2 pg	
		PCB-4	67.9 pg	
		PCB-10	7.17 pg	
		PCB-9	10.9 pg	
		PCB-7	7.31 pg	
		PCB-6	37.1 pg	
		PCB-5	3.63 pg	
		PCB-8	106 pg	
		PCB-14	1.39 pg	
		PCB-11	457 pg	
		PCB-13/12	18.8 pg	
		PCB-15	35.2 pg	
		PCB-19	17.9 pg	
		PCB-30/18	114 pg	
		PCB-17	52.5 pg	
		PCB-27	9.72 pg	
		PCB-24	2.1 pg	
		PCB-16	59.1 pg	
		PCB-32	34.7 pg	
		PCB-34	0.88 pg	
		PCB-26/29	21.8 pg	
		PCB-25	10.2 pg	
		PCB-31	96 pg	
		PCB-28/20	109 pg	
		PCB-21/33	61.3 pg	
		PCB-22	39.8 pg	
		PCB-36	1 pg	
		PCB-39	1.14 pg	
		PCB-35	4.1 pg	
		PCB-37	25 pg	
		PCB-54	0.824 pg	
		PCB-50/53	14.2 pg	
		PCB-45	12.5 pg	
		PCB-51	24.3 pg	
		PCB-46	5.4 pg	
		PCB-52	94.2 pg	
		PCB-73	0.748 pg	
		PCB-43	3.08 pg	
		PCB-69/49	41.4 pg	
		PCB-48	13.5 pg	
		PCB-44/47/65	188 pg	
		PCB-59/62/75	7.02 pg	
		PCB-42	16.6 pg	
		PCB-41	7.14 pg	
		PCB-71/40	29.5 pg	
		PCB-64	22.5 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-101 (continued)	1/10/13	PCB-72	0.585 pg	N08-CE05-TNBE-BP01
		PCB-68	12.2 pg	N08-CE05-TNBE-BM01
		PCB-57	0.67 pg	N08-CE05-TNBE-BM02
		PCB-67	1.82 pg	N08-CE05-TNBS-BP01
		PCB-63	2.09 pg	N08-CE05-TNBS-BM01
		PCB-61/70/74/76	67.7 pg	N08-CE05-TNBS-BM02
		PCB-66	38.3 pg	N08-CE05-TKVK-BM01
		PCB-55	0.975 pg	N08-CE05-TKVK-BM02
		PCB-56	19.4 pg	N08-CE05-TKVK-BN02
		PCB-60	9.41 pg	N08-CE05-TKVK-BN01
		PCB-79	1.07 pg	N08-CE05-TKVK-BP01
		PCB-104	0.665 pg	N08-CE05-TKVK-BQ01
		PCB-96	1.33 pg	
		PCB-103	1.22 pg	
		PCB-95	49.2 pg	
		PCB-100/93	1.68 pg	
		PCB-102	2.66 pg	
		PCB-91	7.29 pg	
		PCB-84	15.5 pg	
		PCB-92	8.24 pg	
		PCB-113/90/101	44.3 pg	
		PCB-83	2.95 pg	
		PCB-99	16.8 pg	
		PCB-108/119/86/97/125/87	30.7 pg	
		PCB-117	1 pg	
		PCB-116/85	6.23 pg	
		PCB-110	41 pg	
		PCB-115	1.16 pg	
		PCB-82	5.13 pg	
		PCB-107/124	1.92 pg	
		PCB-109	2.54 pg	
		PCB-122	0.865 pg	
		PCB-155	1 pg	
		PCB-152	0.515 pg	
		PCB-150	0.358 pg	
		PCB-136	8.27 pg	
		PCB-145	0.497 pg	
		PCB-148	0.661 pg	
		PCB-151/135	17.3 pg	
		PCB-154	1.01 pg	
		PCB-144	3.03 pg	
		PCB-147/149	39.2 pg	
		PCB-134	2.29 pg	
		PCB-143	0.517 pg	
		PCB-139/140	1.1 pg	
		PCB-131	0.976 pg	
		PCB-132	14.3 pg	
		PCB-133	1.04 pg	
		PCB-146	5.76 pg	
		PCB-153/168	38.9 pg	
		PCB-141	11.8 pg	
		PCB-130	2.98 pg	
		PCB-137	1.29 pg	
		PCB-164	4.38 pg	
		PCB-163/138/129	49.2 pg	
		PCB-158	4.78 pg	
		PCB-128/166	6.2 pg	
		PCB-179	8.29 pg	
		PCB-176	2.56 pg	
		PCB-178	4.79 pg	
		PCB-175	1.34 pg	
		PCB-187	23.9 pg	
		PCB-183	11.4 pg	
		PCB-185	3.51 pg	
		PCB-174	30.7 pg	
		PCB-177	15 pg	
		PCB-171/173	7.96 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR01-101 (continued)	1/10/13	PCB-172	4.87 pg	N08-CE05-TNBE-BP01
		PCB-180/193	64.8 pg	N08-CE05-TNBE-BM01
		PCB-191	1.48 pg	N08-CE05-TNBE-BM02
		PCB-170	30.6 pg	N08-CE05-TNBS-BP01
		PCB-190	6.24 pg	N08-CE05-TNBS-BM01
		PCB-202	2.17 pg	N08-CE05-TNBS-BM02
		PCB-201	1.66 pg	N08-CE05-TKVK-BM01
		PCB-197	0.955 pg	N08-CE05-TKVK-BM02
		PCB-200	2.13 pg	N08-CE05-TKVK-BN02
		PCB-198/199	17.3 pg	N08-CE05-TKVK-BN01
		PCB-196	7.16 pg	N08-CE05-TKVK-BP01
		PCB-203	9.67 pg	N08-CE05-TKVK-BQ01
		PCB-195	8.37 pg	
		PCB-194	20 pg	
		PCB-205	1.27 pg	
		PCB-208	1.36 pg	
		PCB-207	1.04 pg	
		PCB-206	5 pg	
		PCB-209	2.3 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR02-101	1/10/13	PCB-77	2.71 pg	N08-CE05-TNBE-BP01
		PCB-105	15.4 pg	N08-CE05-TNBE-BM01
		PCB-114	0.957 pg	N08-CE05-TNBE-BM02
		PCB-118	30.7 pg	N08-CE05-TNBS-BP01
		PCB-123	0.709 pg	N08-CE05-TNBS-BM01
		PCB-156/157	12.9 pg	N08-CE05-TNBS-BM02
		PCB-167	3.51 pg	N08-CE05-TKVK-BM01
		PCB-189	3.02 pg	N08-CE05-TKVK-BM02
		Mono-CBs	152 pg	N08-CE05-TKVK-BN02
		Di-CBs	1600 pg	N08-CE05-TKVK-BN01
		Tri-CBs	1290 pg	N08-CE05-TKVK-BP01
		Tetra-CBs	638 pg	N08-CE05-TKVK-BQ01
		Penta-CBs	317 pg	
		Hexa-CBs	358 pg	
		Hepta-CBs	474 pg	
		Octa-CBs	161 pg	
		Nona-CBs	12 pg	
		PCB-1	56.4 pg	
		PCB-2	39.2 pg	
		PCB-3	56.3 pg	
		PCB-4	161 pg	
		PCB-10	9.94 pg	
		PCB-9	24.6 pg	
		PCB-7	19.1 pg	
		PCB-6	71.7 pg	
		PCB-5	6.39 pg	
		PCB-8	284 pg	
		PCB-11	934 pg	
		PCB-13/12	23.5 pg	
		PCB-15	69.1 pg	
		PCB-19	37.1 pg	
		PCB-30/18	278 pg	
		PCB-17	129 pg	
		PCB-27	18.7 pg	
		PCB-24	3.85 pg	
		PCB-16	133 pg	
		PCB-32	71.2 pg	
		PCB-26/29	36.3 pg	
		PCB-25	15.9 pg	
		PCB-31	172 pg	
		PCB-28/20	189 pg	
		PCB-21/33	110 pg	
		PCB-22	64.1 pg	
		PCB-35	5.47 pg	
		PCB-37	27.8 pg	
		PCB-50/53	20 pg	
		PCB-45	23.6 pg	
		PCB-51	13.2 pg	
		PCB-46	8.58 pg	
		PCB-52	136 pg	
		PCB-73	0.61 pg	
		PCB-43	5.02 pg	
		PCB-69/49	51.6 pg	
		PCB-48	22.3 pg	
		PCB-44/47/65	109 pg	
		PCB-59/62/75	7.64 pg	
		PCB-42	21.2 pg	
		PCB-41	9.98 pg	
		PCB-71/40	33.9 pg	
		PCB-64	29.4 pg	
		PCB-68	2.49 pg	
		PCB-67	1.68 pg	
		PCB-63	1.87 pg	
		PCB-61/70/74/76	74.6 pg	
		PCB-66	34.5 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR02-101 (continued)	1/10/13	PCB-55	1.2 pg	N08-CE05-TNBE-BP01
		PCB-56	16.3 pg	N08-CE05-TNBE-BM01
		PCB-60	9 pg	N08-CE05-TNBE-BM02
		PCB-79	0.906 pg	N08-CE05-TNBS-BP01
		PCB-96	0.957 pg	N08-CE05-TNBS-BM01
		PCB-95	63.2 pg	N08-CE05-TNBS-BM02
		PCB-102	2.03 pg	N08-CE05-TKVK-BM01
		PCB-91	7.19 pg	N08-CE05-TKVK-BM02
		PCB-84	17.9 pg	N08-CE05-TKVK-BN02
		PCB-92	8.6 pg	N08-CE05-TKVK-BN01
		PCB-113/90/101	52.4 pg	N08-CE05-TKVK-BP01
		PCB-83	2.69 pg	N08-CE05-TKVK-BQ01
		PCB-99	20.3 pg	
		PCB-108/119/86/97/125/87	30.1 pg	
		PCB-116/85	6.67 pg	
		PCB-110	48.5 pg	
		PCB-82	5.15 pg	
		PCB-107/124	1.49 pg	
		PCB-109	2.06 pg	
		PCB-136	10.2 pg	
		PCB-151/135	26 pg	
		PCB-144	3.9 pg	
		PCB-147/149	60.2 pg	
		PCB-134	3.07 pg	
		PCB-131	0.833 pg	
		PCB-132	21 pg	
		PCB-146	9.16 pg	
		PCB-153/168	68.1 pg	
		PCB-141	21.7 pg	
		PCB-130	2.97 pg	
		PCB-137	2.26 pg	
		PCB-164	5.4 pg	
		PCB-163/138/129	89.5 pg	
		PCB-158	8.26 pg	
		PCB-128/166	8.52 pg	
		PCB-179	13.8 pg	
		PCB-176	3.87 pg	
		PCB-178	7.04 pg	
		PCB-175	1.8 pg	
		PCB-187	52.6 pg	
		PCB-183	27.7 pg	
		PCB-185	4.99 pg	
		PCB-174	65.9 pg	
		PCB-177	31 pg	
		PCB-171/173	14.8 pg	
		PCB-172	10.1 pg	
		PCB-180/193	152 pg	
		PCB-191	2.22 pg	
		PCB-170	68.7 pg	
		PCB-190	14.5 pg	
		PCB-202	3.48 pg	
		PCB-201	2.94 pg	
		PCB-197	1.67 pg	
		PCB-200	2.28 pg	
		PCB-198/199	39.7 pg	
		PCB-196	19.5 pg	
		PCB-203	23.4 pg	
		PCB-195	18 pg	
		PCB-194	47.5 pg	
		PCB-205	2.7 pg	
		PCB-208	1.66 pg	
		PCB-207	1.06 pg	
		PCB-206	9.33 pg	
		PCB-209	1.56 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR02-102	1/10/13	PCB-77	4.78 pg	N08-CE05-TNBE-BP01
		PCB-105	17 pg	N08-CE05-TNBE-BM01
		PCB-114	1.16 pg	N08-CE05-TNBE-BM02
		PCB-118	37.5 pg	N08-CE05-TNBS-BP01
		PCB-156/157	11.7 pg	N08-CE05-TNBS-BM01
		PCB-167	3.12 pg	N08-CE05-TNBS-BM02
		PCB-189	2.28 pg	N08-CE05-TKVK-BM01
		Mono-CBs	115 pg	N08-CE05-TKVK-BM02
		Di-CBs	997 pg	N08-CE05-TKVK-BN02
		Tri-CBs	753 pg	N08-CE05-TKVK-BN01
		Tetra-CBs	663 pg	N08-CE05-TKVK-BP01
		Penta-CBs	380 pg	N08-CE05-TKVK-BQ01
		Hexa-CBs	320 pg	
		Hepta-CBs	383 pg	
		Octa-CBs	147 pg	
		Nona-CBs	13.6 pg	
		PCB-1	41.8 pg	
		PCB-2	35.5 pg	
		PCB-3	38 pg	
		PCB-4	75.4 pg	
		PCB-10	6.4 pg	
		PCB-9	13.6 pg	
		PCB-7	8.81 pg	
		PCB-6	53.4 pg	
		PCB-5	3.47 pg	
		PCB-8	129 pg	
		PCB-11	629 pg	
		PCB-13/12	23.5 pg	
		PCB-15	53.2 pg	
		PCB-19	19.7 pg	
		PCB-30/18	133 pg	
		PCB-17	64.5 pg	
		PCB-27	12.3 pg	
		PCB-24	2.73 pg	
		PCB-16	61.3 pg	
		PCB-32	41.8 pg	
		PCB-26/29	27.8 pg	
		PCB-25	14.1 pg	
		PCB-31	113 pg	
		PCB-28/20	132 pg	
		PCB-21/33	57.5 pg	
		PCB-22	37.8 pg	
		PCB-35	5.38 pg	
		PCB-37	30.3 pg	
		PCB-54	0.834 pg	
		PCB-50/53	15.6 pg	
		PCB-45	14.1 pg	
		PCB-51	18.4 pg	
		PCB-46	5.72 pg	
		PCB-52	128 pg	
		PCB-73	0.515 pg	
		PCB-43	4.32 pg	
		PCB-69/49	50.5 pg	
		PCB-48	15.9 pg	
		PCB-44/47/65	136 pg	
		PCB-59/62/75	6.88 pg	
		PCB-42	19.2 pg	
		PCB-41	6.45 pg	
		PCB-71/40	33.1 pg	
		PCB-64	25.9 pg	
		PCB-72	0.71 pg	
		PCB-68	6.2 pg	
		PCB-67	1.91 pg	
		PCB-63	2.24 pg	
		PCB-61/70/74/76	85.3 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR02-102 (continued)	1/10/13	PCB-66	48.8 pg	N08-CE05-TNBE-BP01
		PCB-55	1.78 pg	N08-CE05-TNBE-BM01
		PCB-56	21.2 pg	N08-CE05-TNBE-BM02
		PCB-60	9.63 pg	N08-CE05-TNBS-BP01
		PCB-96	1.08 pg	N08-CE05-TNBS-BM01
		PCB-95	68.6 pg	N08-CE05-TNBS-BM02
		PCB-100/93	1.17 pg	N08-CE05-TKVK-BM01
		PCB-102	3.08 pg	N08-CE05-TKVK-BM02
		PCB-91	10.2 pg	N08-CE05-TKVK-BN02
		PCB-84	20.9 pg	N08-CE05-TKVK-BN01
		PCB-89	0.947 pg	N08-CE05-TKVK-BP01
		PCB-92	11.6 pg	N08-CE05-TKVK-BQ01
		PCB-113/90/101	61.4 pg	
		PCB-83	2.44 pg	
		PCB-99	27.2 pg	
		PCB-108/119/86/97/125/87	36.1 pg	
		PCB-116/85	8.62 pg	
		PCB-110	59.7 pg	
		PCB-82	6.83 pg	
		PCB-107/124	1.59 pg	
		PCB-109	3.01 pg	
		PCB-136	10.6 pg	
		PCB-151/135	24.7 pg	
		PCB-154	0.596 pg	
		PCB-144	3.32 pg	
		PCB-147/149	57 pg	
		PCB-134	3.24 pg	
		PCB-132	19.8 pg	
		PCB-146	9.17 pg	
		PCB-153/168	58.6 pg	
		PCB-141	15.7 pg	
		PCB-130	3.04 pg	
		PCB-137	1.61 pg	
		PCB-164	5.08 pg	
		PCB-163/138/129	77.3 pg	
		PCB-158	6.46 pg	
		PCB-128/166	9.32 pg	
		PCB-179	10.3 pg	
		PCB-176	2.93 pg	
		PCB-178	4.84 pg	
		PCB-175	1.41 pg	
		PCB-187	40.5 pg	
		PCB-183	18.1 pg	
		PCB-185	3.72 pg	
		PCB-174	47.1 pg	
		PCB-177	24.1 pg	
		PCB-171/173	12.5 pg	
		PCB-172	7.97 pg	
		PCB-180/193	128 pg	
		PCB-191	2.65 pg	
		PCB-170	62.8 pg	
		PCB-190	14 pg	
		PCB-202	3.04 pg	
		PCB-201	2.48 pg	
		PCB-197	1.03 pg	
		PCB-200	2.51 pg	
		PCB-198/199	38.7 pg	
		PCB-196	19.5 pg	
		PCB-203	23 pg	
		PCB-195	15.9 pg	
		PCB-194	38.6 pg	
		PCB-205	2.35 pg	
		PCB-208	2.69 pg	
		PCB-207	1.27 pg	
		PCB-206	9.68 pg	
		PCB-209	4.3 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR04-101	1/10/13	PCB-77	6.45 pg	N08-CE05-TNBE-BP01
		PCB-105	7.95 pg	N08-CE05-TNBE-BM01
		PCB-118	18.2 pg	N08-CE05-TNBE-BM02
		PCB-156/157	2.99 pg	N08-CE05-TNBS-BP01
		PCB-167	1.03 pg	N08-CE05-TNBS-BM01
		Mono-CBs	17.9 pg	N08-CE05-TNBS-BM02
		Di-CBs	236 pg	N08-CE05-TKVK-BM01
		Tri-CBs	178 pg	N08-CE05-TKVK-BM02
		Tetra-CBs	158 pg	N08-CE05-TKVK-BN02
		Penta-CBs	112 pg	N08-CE05-TKVK-BN01
		Hexa-CBs	90 pg	N08-CE05-TKVK-BP01
		Hepta-CBs	57.9 pg	N08-CE05-TKVK-BQ01
		Octa-CBs	37.3 pg	
		Nona-CBs	67.5 pg	
		PCB-1	6.46 pg	
		PCB-2	5.36 pg	
		PCB-3	6.1 pg	
		PCB-4	9.64 pg	
		PCB-10	1.14 pg	
		PCB-9	3.01 pg	
		PCB-6	5.41 pg	
		PCB-8	19.4 pg	
		PCB-11	151 pg	
		PCB-13/12	8 pg	
		PCB-15	37.8 pg	
		PCB-19	2.67 pg	
		PCB-30/18	15 pg	
		PCB-17	8.87 pg	
		PCB-27	2.28 pg	
		PCB-16	7.38 pg	
		PCB-32	6.96 pg	
		PCB-26/29	8.94 pg	
		PCB-25	5.06 pg	
		PCB-31	29.1 pg	
		PCB-28/20	41.8 pg	
		PCB-21/33	12.2 pg	
		PCB-22	10.4 pg	
		PCB-35	2.57 pg	
		PCB-37	24.7 pg	
		PCB-50/53	2.03 pg	
		PCB-45	2.09 pg	
		PCB-51	1.2 pg	
		PCB-46	0.871 pg	
		PCB-52	20.7 pg	
		PCB-69/49	9.52 pg	
		PCB-48	2.6 pg	
		PCB-44/47/65	19.5 pg	
		PCB-59/62/75	1.68 pg	
		PCB-42	4.7 pg	
		PCB-41	1.64 pg	
		PCB-71/40	8 pg	
		PCB-64	6.15 pg	
		PCB-61/70/74/76	32.4 pg	
		PCB-66	22.3 pg	
		PCB-55	1.13 pg	
		PCB-56	10.5 pg	
		PCB-60	4.66 pg	
		PCB-95	13.4 pg	
		PCB-91	1.85 pg	
		PCB-84	4.24 pg	
		PCB-92	2.76 pg	
		PCB-113/90/101	16.4 pg	
		PCB-99	8.72 pg	
		PCB-108/119/86/97/125/87	11.6 pg	
		PCB-116/85	2.94 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR04-101 (continued)	1/10/13	PCB-110	20.1 pg	N08-CE05-TNBE-BP01
		PCB-82	2.48 pg	N08-CE05-TNBE-BM01
		PCB-109	1.19 pg	N08-CE05-TNBE-BM02
		PCB-136	2.72 pg	N08-CE05-TNBS-BP01
		PCB-151/135	7.04 pg	N08-CE05-TNBS-BM01
		PCB-144	1.14 pg	N08-CE05-TNBS-BM02
		PCB-147/149	15.4 pg	N08-CE05-TKVK-BM01
		PCB-132	6.73 pg	N08-CE05-TKVK-BM02
		PCB-146	2.51 pg	N08-CE05-TKVK-BN02
		PCB-153/168	17 pg	N08-CE05-TKVK-BN01
		PCB-141	4.12 pg	N08-CE05-TKVK-BP01
		PCB-130	1.23 pg	N08-CE05-TKVK-BQ01
		PCB-137	0.812 pg	
		PCB-164	1.4 pg	
		PCB-163/138/129	20.8 pg	
		PCB-158	1.97 pg	
		PCB-128/166	3.1 pg	
		PCB-179	3.12 pg	
		PCB-184	0.591 pg	
		PCB-176	0.711 pg	
		PCB-178	1.17 pg	
		PCB-187	7.83 pg	
		PCB-183	3.56 pg	
		PCB-185	0.783 pg	
		PCB-174	8.02 pg	
		PCB-177	4.2 pg	
		PCB-171/173	2.09 pg	
		PCB-180/193	16.5 pg	
		PCB-170	7.91 pg	
		PCB-190	1.35 pg	
		PCB-202	1.45 pg	
		PCB-198/199	13.7 pg	
		PCB-196	3.34 pg	
		PCB-203	8.77 pg	
		PCB-195	2.14 pg	
		PCB-194	7.87 pg	
		PCB-208	13 pg	
		PCB-207	4.3 pg	
		PCB-206	50.1 pg	
		PCB-209	22.3 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR04-102	1/10/13	PCB-77	3.96 pg	N08-CE05-TNBE-BP01
		PCB-105	7.79 pg	N08-CE05-TNBE-BM01
		PCB-118	18.5 pg	N08-CE05-TNBE-BM02
		PCB-156/157	3.3 pg	N08-CE05-TNBS-BP01
		PCB-167	1.17 pg	N08-CE05-TNBS-BM01
		Mono-CBs	17.6 pg	N08-CE05-TNBS-BM02
		Di-CBs	138 pg	N08-CE05-TKVK-BM01
		Tri-CBs	166 pg	N08-CE05-TKVK-BM02
		Tetra-CBs	168 pg	N08-CE05-TKVK-BN02
		Penta-CBs	137 pg	N08-CE05-TKVK-BN01
		Hexa-CBs	128 pg	N08-CE05-TKVK-BP01
		Hepta-CBs	97.8 pg	N08-CE05-TKVK-BQ01
		Octa-CBs	34.7 pg	
		Nona-CBs	30.6 pg	
		PCB-1	6.56 pg	
		PCB-2	4.79 pg	
		PCB-3	6.21 pg	
		PCB-4	15.4 pg	
		PCB-10	1.41 pg	
		PCB-9	3.46 pg	
		PCB-6	5.91 pg	
		PCB-8	23.5 pg	
		PCB-11	58.3 pg	
		PCB-13/12	5.28 pg	
		PCB-15	24.9 pg	
		PCB-19	3.51 pg	
		PCB-30/18	18.9 pg	
		PCB-17	11.5 pg	
		PCB-27	2.31 pg	
		PCB-16	8.43 pg	
		PCB-32	7.24 pg	
		PCB-26/29	7.57 pg	
		PCB-25	4.42 pg	
		PCB-31	27.8 pg	
		PCB-28/20	37.8 pg	
		PCB-21/33	11.7 pg	
		PCB-22	9.33 pg	
		PCB-37	15.6 pg	
		PCB-50/53	3.11 pg	
		PCB-45	2.66 pg	
		PCB-51	1.74 pg	
		PCB-46	1.12 pg	
		PCB-52	25 pg	
		PCB-69/49	12.6 pg	
		PCB-48	3.15 pg	
		PCB-44/47/65	25.5 pg	
		PCB-59/62/75	1.85 pg	
		PCB-42	5.26 pg	
		PCB-41	1.74 pg	
		PCB-71/40	9.42 pg	
		PCB-64	6.82 pg	
		PCB-68	0.928 pg	
		PCB-61/70/74/76	30.8 pg	
		PCB-66	19.3 pg	
		PCB-56	8.68 pg	
		PCB-60	4.46 pg	
		PCB-95	19 pg	
		PCB-91	3.03 pg	
		PCB-84	5.94 pg	
		PCB-92	4.25 pg	
		PCB-113/90/101	22.6 pg	
		PCB-83	1.74 pg	
		PCB-99	9.93 pg	
		PCB-108/119/86/97/125/87	14.1 pg	
		PCB-116/85	3.38 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N08-CE05-TKVK-XR04-102 (continued)	1/10/13	PCB-110	24 pg	All samples in SDG A5125
		PCB-82	2.83 pg	
		PCB-136	4.33 pg	
		PCB-151/135	11.1 pg	
		PCB-144	1.66 pg	
		PCB-147/149	25.2 pg	
		PCB-132	7.84 pg	
		PCB-146	3.82 pg	
		PCB-153/168	24.8 pg	
		PCB-141	6.73 pg	
		PCB-130	1.5 pg	
		PCB-137	0.783 pg	
		PCB-164	1.45 pg	
		PCB-163/138/129	28.2 pg	
		PCB-158	2.58 pg	
		PCB-128/166	3.5 pg	
		PCB-179	5 pg	
		PCB-176	1.03 pg	
		PCB-178	1.97 pg	
		PCB-187	15.2 pg	
		PCB-183	7.83 pg	
		PCB-185	0.708 pg	
		PCB-174	13.3 pg	
		PCB-177	6.92 pg	
		PCB-171/173	3.68 pg	
		PCB-172	2.05 pg	
		PCB-180/193	26.3 pg	
		PCB-170	11.5 pg	
		PCB-190	2.32 pg	
		PCB-202	1.42 pg	
		PCB-201	1.03 pg	
		PCB-200	0.95 pg	
		PCB-198/199	9.74 pg	
		PCB-196	4.06 pg	
		PCB-203	6.06 pg	
		PCB-195	2.73 pg	
		PCB-194	8.7 pg	
		PCB-208	4.53 pg	
		PCB-207	1.27 pg	
		PCB-206	24.8 pg	
		PCB-209	13.7 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBE-BP01	PCB-11	2250 pg	2250U pg
	PCB-145	1.5 pg	1.5U pg
	PCB-5	30.7 pg	30.7U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBE-BM01	PCB-189	10.6 pg	10.6U pg
	PCB-2	162 pg	162U pg
	PCB-170	448 pg	448U pg
	PCB-195	72.1 pg	72.1U pg
	PCB-194	147 pg	147U pg
	PCB-205	6.88 pg	6.88U pg
	PCB-145	2.26 pg	2.26U pg
	PCB-3	242 pg	242U pg
	PCB-209	12.6 pg	12.6U pg
	PCB-208	26.8 pg	26.8U pg
	PCB-207	13 pg	13U pg
	PCB-206	54.7 pg	54.7U pg
	Nona-CBs	94.5 pg	94.5U pg
N08-CE05-TNBE-BM02	PCB-156/157	66.8 pg	66.8U pg
	PCB-189	2.6 pg	2.6U pg
	Hepta-CBs	1350 pg	1350U pg
	Octa-CBs	185 pg	185U pg
	Nona-CBs	22.9 pg	22.9U pg
	PCB-2	96.8 pg	96.8U pg
	PCB-3	140 pg	140U pg
	PCB-14	4.98 pg	4.98U pg
	PCB-176	27.5 pg	27.5U pg
	PCB-178	55.6 pg	55.6U pg
	PCB-175	9.36 pg	9.36U pg
	PCB-187	294 pg	294U pg
	PCB-183	97.4 pg	97.4U pg
	PCB-185	25.4 pg	25.4U pg
	PCB-174	172 pg	172U pg
	PCB-177	101 pg	101U pg
	PCB-171/173	41.1 pg	41.1U pg
	PCB-172	20.8 pg	20.8U pg
	PCB-180/193	271 pg	271U pg
	PCB-191	4.99 pg	4.99U pg
	PCB-170	88.1 pg	88.1U pg
	PCB-190	19.3 pg	19.3U pg
	PCB-202	18.4 pg	18.4U pg
	PCB-201	12.7 pg	12.7U pg
	PCB-197	3.19 pg	3.19U pg
	PCB-200	4.59 pg	4.59U pg
	PCB-198/199	54.2 pg	54.2U pg
	PCB-196	21.4 pg	21.4U pg
	PCB-203	28.6 pg	28.6U pg
	PCB-195	12.2 pg	12.2U pg
	PCB-194	29.1 pg	29.1U pg
	PCB-205	1.29 pg	1.29U pg
	PCB-208	7.77 pg	7.77U pg
	PCB-207	2.86 pg	2.86U pg
	PCB-206	12.2 pg	12.2U pg
	PCB-209	5.02 pg	5.02U pg
	PCB-11	3130 pg	3130U pg
	PCB-184	2.05 pg	2.05U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TNBS-BM01	PCB-156/157	63.5 pg	63.5U pg
	PCB-189	3.54 pg	3.54U pg
	Hepta-CBs	1370 pg	1370U pg
	Octa-CBs	226 pg	226U pg
	Nona-CBs	33 pg	33U pg
	PCB-2	115 pg	115U pg
	PCB-3	164 pg	164U pg
	PCB-141	154 pg	154U pg
	PCB-179	96.3 pg	96.3U pg
	PCB-176	20.8 pg	20.8U pg
	PCB-178	46.1 pg	46.1U pg
	PCB-175	10.5 pg	10.5U pg
	PCB-187	342 pg	342U pg
	PCB-183	107 pg	107U pg
	PCB-185	20.2 pg	20.2U pg
	PCB-174	167 pg	167U pg
	PCB-177	107 pg	107U pg
	PCB-171/173	41.9 pg	41.9U pg
	PCB-172	22.7 pg	22.7U pg
	PCB-180/193	267 pg	267U pg
	PCB-170	99.3 pg	99.3U pg
	PCB-190	20.3 pg	20.3U pg
	PCB-201	14.5 pg	14.5U pg
	PCB-197	3.31 pg	3.31U pg
	PCB-200	4.25 pg	4.25U pg
	PCB-198/199	58.5 pg	58.5U pg
	PCB-196	22.8 pg	22.8U pg
	PCB-203	30.1 pg	30.1U pg
	PCB-195	20.3 pg	20.3U pg
	PCB-194	48 pg	48U pg
	PCB-207	3.74 pg	3.74U pg
	PCB-206	18.1 pg	18.1U pg
	PCB-209	7.76 pg	7.76U pg
	PCB-11	4120 pg	4120U pg
	PCB-208	11.1 pg	11.1U pg
N08-CE05-TNBS-BM02	Hepta-CBs	2830 pg	2830U pg
	Octa-CBs	541 pg	541U pg
	PCB-2	128 pg	128U pg
	PCB-3	182 pg	182U pg
	PCB-185	32 pg	32U pg
	PCB-174	328 pg	328U pg
	PCB-177	216 pg	216U pg
	PCB-171/173	91.3 pg	91.3U pg
	PCB-172	43.3 pg	43.3U pg
	PCB-180/193	631 pg	631U pg
	PCB-170	242 pg	242U pg
	PCB-190	52.8 pg	52.8U pg
	PCB-198/199	141 pg	141U pg
	PCB-196	68.6 pg	68.6U pg
	PCB-203	77.1 pg	77.1U pg
	PCB-195	44 pg	44U pg
	PCB-194	139 pg	139U pg
	Nona-CBs	79.5 pg	79.5U pg
	PCB-208	26 pg	26U pg
	PCB-206	53.5 pg	53.5U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-BM01	PCB-156/157	83.3 pg	83.3U pg
	PCB-189	4.63 pg	4.63U pg
	Hepta-CBs	1800 pg	1800U pg
	Octa-CBs	288 pg	288U pg
	Nona-CBs	39.9 pg	39.9U pg
	PCB-2	105 pg	105U pg
	PCB-3	142 pg	142U pg
	PCB-176	28.9 pg	28.9U pg
	PCB-183	137 pg	137U pg
	PCB-185	21.3 pg	21.3U pg
	PCB-174	208 pg	208U pg
	PCB-177	135 pg	135U pg
	PCB-171/173	52.4 pg	52.4U pg
	PCB-172	28.2 pg	28.2U pg
	PCB-180/193	360 pg	360U pg
	PCB-191	6.72 pg	6.72U pg
	PCB-170	124 pg	124U pg
	PCB-190	27.6 pg	27.6U pg
	PCB-201	18.9 pg	18.9U pg
	PCB-197	4.44 pg	4.44U pg
	PCB-200	6.86 pg	6.86U pg
	PCB-198/199	79.5 pg	79.5U pg
	PCB-196	32.2 pg	32.2U pg
	PCB-203	40.1 pg	40.1U pg
	PCB-195	20.9 pg	20.9U pg
	PCB-194	51.5 pg	51.5U pg
	PCB-205	2.92 pg	2.92U pg
	PCB-207	5.54 pg	5.54U pg
	PCB-206	21.2 pg	21.2U pg
	PCB-145	1.32 pg	1.32U pg
	PCB-209	8.74 pg	8.74U pg
	PCB-208	13.2 pg	13.2U pg
	PCB-184	1.92 pg	1.92U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-BM02	PCB-156/157	29.1 pg	29.1U pg
	PCB-167	11.9 pg	11.9U pg
	PCB-189	1.71 pg	1.71U pg
	Hepta-CBs	664 pg	664U pg
	Octa-CBs	106 pg	106U pg
	Nona-CBs	14.4 pg	14.4U pg
	PCB-2	58.5 pg	58.5U pg
	PCB-3	76.8 pg	76.8U pg
	PCB-7	39.4 pg	39.4U pg
	PCB-5	16.8 pg	16.8U pg
	PCB-11	2100 pg	2100U pg
	PCB-68	35.1 pg	35.1U pg
	PCB-153/168	554 pg	554U pg
	PCB-164	47 pg	47U pg
	PCB-163/138/129	551 pg	551U pg
	PCB-158	38 pg	38U pg
	PCB-128/166	60.3 pg	60.3U pg
	PCB-179	54.9 pg	54.9U pg
	PCB-176	10.6 pg	10.6U pg
	PCB-178	23.2 pg	23.2U pg
	PCB-175	4.33 pg	4.33U pg
	PCB-187	159 pg	159U pg
	PCB-183	52.8 pg	52.8U pg
	PCB-185	8.92 pg	8.92U pg
	PCB-174	76.5 pg	76.5U pg
	PCB-177	52 pg	52U pg
	PCB-171/173	20.7 pg	20.7U pg
	PCB-172	10.4 pg	10.4U pg
	PCB-180/193	129 pg	129U pg
	PCB-191	2.14 pg	2.14U pg
	PCB-170	47.8 pg	47.8U pg
	PCB-190	10.4 pg	10.4U pg
	PCB-202	10.8 pg	10.8U pg
	PCB-201	7.1 pg	7.1U pg
	PCB-198/199	33.2 pg	33.2U pg
	PCB-196	12.8 pg	12.8U pg
	PCB-203	16.4 pg	16.4U pg
	PCB-195	6.99 pg	6.99U pg
	PCB-194	18.7 pg	18.7U pg
	PCB-208	5.33 pg	5.33U pg
	PCB-206	9.02 pg	9.02U pg
	PCB-209	5.38 pg	5.38U pg
	PCB-9	87.3 pg	87.3U pg
	PCB-6	341 pg	341U pg
	PCB-8	1040 pg	1040U pg
	PCB-141	76 pg	76U pg
	PCB-155	2.55 pg	2.55U pg
	PCB-152	1.8 pg	1.8U pg
	PCB-143	1.86 pg	1.86U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N08-CE05-TKVK-BN02	PCB-156/157	62.9 pg	62.9U pg
	Hepta-CBs	1700 pg	1700U pg
	Octa-CBs	377 pg	377U pg
	PCB-2	96.7 pg	96.7U pg
	PCB-3	181 pg	181U pg
	PCB-141	171 pg	171U pg
	PCB-176	24.9 pg	24.9U pg
	PCB-178	40.4 pg	40.4U pg
	PCB-187	368 pg	368U pg
	PCB-183	135 pg	135U pg
	PCB-185	19 pg	19U pg
	PCB-174	225 pg	225U pg
	PCB-177	120 pg	120U pg
	PCB-171/173	52.3 pg	52.3U pg
	PCB-180/193	380 pg	380U pg
	PCB-170	149 pg	149U pg
	PCB-190	37.6 pg	37.6U pg
	PCB-202	22.1 pg	22.1U pg
	PCB-201	16.6 pg	16.6U pg
	PCB-200	16 pg	16U pg
	PCB-198/199	92.6 pg	92.6U pg
	PCB-196	44.8 pg	44.8U pg
	PCB-203	46.6 pg	46.6U pg
	PCB-195	41.8 pg	41.8U pg
	PCB-194	96.9 pg	96.9U pg
N08-CE05-TKVK-BN01	PCB-156/157	68.5 pg	68.5U pg
	Hepta-CBs	1450 pg	1450U pg
	Octa-CBs	213 pg	213U pg
	PCB-2	89.3 pg	89.3U pg
	PCB-3	127 pg	127U pg
	PCB-176	25.3 pg	25.3U pg
	PCB-175	10.2 pg	10.2U pg
	PCB-187	370 pg	370U pg
	PCB-183	120 pg	120U pg
	PCB-185	11.6 pg	11.6U pg
	PCB-174	165 pg	165U pg
	PCB-177	110 pg	110U pg
	PCB-171/173	41.5 pg	41.5U pg
	PCB-172	18 pg	18U pg
	PCB-180/193	281 pg	281U pg
	PCB-170	90.4 pg	90.4U pg
	PCB-190	19.9 pg	19.9U pg
	PCB-201	16.8 pg	16.8U pg
	PCB-198/199	71.2 pg	71.2U pg
	PCB-196	23.9 pg	23.9U pg
	PCB-203	34.3 pg	34.3U pg
	PCB-194	37.7 pg	37.7U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
MB1_10596	^{13}C-PCB-15 ^{13}C-PCB-19 ^{13}C-PCB-54 ^{13}C-PCB-155 ^{13}C-PCB-189	112 (19-107) 110 (1-108) 107 (13-105) 156 (25-124) 118 (47-116)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-16 to PCB-19 PCB-24 PCB-27 PCB-30 PCB-32 Tri-CBs PCB-54 Tetra-CBs PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Hexa-CBs PCB-189 Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N08-CE05-TNBE-BP01	^{13}C-PCB-15	110 (19-107)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs	J (all detects) J (all detects) J (all detects)	P
N08-CE05-TNBE-BM01	^{13}C-PCB-15 ^{13}C-PCB-77 ^{13}C-PCB-155 ^{13}C-PCB-189	113 (19-107) 111 (31-109) 127 (25-124) 117 (47-116)	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Hexa-CBs PCB-189 Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TNBE-BM02	^{13}C-PCB-15	134 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-19	112 (1-108)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-77	128 (31-109)	Di-CBs	J (all detects)	
	^{13}C-PCB-81	129 (14-127)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-105	114 (50-111)	PCB-24	J (all detects)	
	^{13}C-PCB-123	117 (49-116)	PCB-27	J (all detects)	
	^{13}C-PCB-126	120 (50-106)	PCB-30	J (all detects)	
	^{13}C-PCB-189	124 (47-116)	PCB-32	J (all detects)	
	^{13}C-PCB-205	117 (46-115)	Tri-CBs	J (all detects)	
			PCB-77	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-40 to PCB-53	J (all detects)	
			PCB-55 to PCB-76	J (all detects)	
			PCB-78 to PCB-81	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	
N08-CE05-TNBS-BP01	^{13}C-PCB-15	113 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-77	121 (31-109)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-126	111 (50-106)	Di-CBs	J (all detects)	
	^{13}C-PCB-155	130 (25-124)	PCB-77	J (all detects)	
	^{13}C-PCB-189	133 (47-116)	Tetra-CBs	J (all detects)	
			PCB-126	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TNBS-BM01	^{13}C-PCB-15	128 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	129 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	115 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	115 (31-109)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-155	178 (25-124)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-189	156 (47-116)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-205	119 (46-115)	PCB-31	J (all detects)	
			PCB-33 to PCB-39	J (all detects)	
			Tri-CBs	J (all detects)	
			PCB-54	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-77	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TNBS-BM02	^{13}C-PCB-3	107 (11-106)	PCB-2	J (all detects)	P
	^{13}C-PCB-4	123 (14-107)	PCB-3	J (all detects)	
	^{13}C-PCB-15	133 (19-107)	Mono-CBs	J (all detects)	
	^{13}C-PCB-19	133 (1-108)	PCB-4	J (all detects)	
	^{13}C-PCB-54	119 (13-105)	PCB-10	J (all detects)	
	^{13}C-PCB-104	127 (36-115)	Di-CBs	J (all detects)	
	^{13}C-PCB-105	118 (50-111)	PCB-5 to PCB-9	J (all detects)	
	^{13}C-PCB-118	114 (49-111)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-123	121 (49-116)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-126	110 (50-106)	PCB-24	J (all detects)	
	^{13}C-PCB-155	141 (25-124)	PCB-27	J (all detects)	
	^{13}C-PCB-156/157	123 (40-120)	PCB-30	J (all detects)	
	^{13}C-PCB-188	131 (23-125)	PCB-32	J (all detects)	
	^{13}C-PCB-189	123 (47-116)	Tri-CBs	J (all detects)	
	^{13}C-PCB-205	125 (46-115)	PCB-54	J (all detects)	
	^{13}C-PCB-206	126 (38-122)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-208	127 (31-126)	PCB-96	J (all detects)	
	^{13}C-PCB-209	123 (43-115)	PCB-104	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-176	J (all detects)	
			PCB-178	J (all detects)	
			PCB-179	J (all detects)	
			PCB-184	J (all detects)	
			PCB-186	J (all detects)	
			PCB-188	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-189	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	
			PCB-206	J (all detects)	
			Nona-CBs	J (all detects)	
			PCB-207	J (all detects)	
			PCB-208	J (all detects)	
			PCB-209	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-BM01	^{13}C-PCB-15	122 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-19	109 (1-108)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-37	128 (25-123)	Di-CBs	J (all detects)	
	^{13}C-PCB-54	113 (13-105)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-77	125 (31-109)	PCB-24	J (all detects)	
	^{13}C-PCB-118	114 (49-111)	PCB-27	J (all detects)	
	^{13}C-PCB-126	116 (50-106)	PCB-30	J (all detects)	
	^{13}C-PCB-155	133 (25-124)	PCB-32	J (all detects)	
	^{13}C-PCB-167	120 (45-118)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-189	127 (47-116)	PCB-25 to PCB-26	J (all detects)	
			PCB-28 to PCB-29	J (all detects)	
			PCB-31	J (all detects)	
			PCB-33 to PCB-39	J (all detects)	
			Tri-CBs	J (all detects)	
			PCB-54	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-77	J (all detects)	
			PCB-118	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
N08-CE05-TKVK-BM02	^{13}C-PCB-15	124 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-19	110 (1-108)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-77	125 (31-109)	Di-CBs	J (all detects)	
	^{13}C-PCB-126	116 (50-106)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-155	137 (25-124)	PCB-24	J (all detects)	
	^{13}C-PCB-167	127 (45-118)	PCB-27	J (all detects)	
	^{13}C-PCB-189	126 (47-116)	PCB-30	J (all detects)	
			PCB-32	J (all detects)	
			Tri-CBs	J (all detects)	
			PCB-77	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-126	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-BN02	^{13}C-PCB-3	113 (11-106)	PCB-2	J (all detects)	P
	^{13}C-PCB-4	126 (14-107)	PCB-3	J (all detects)	
	^{13}C-PCB-15	130 (19-107)	Mono-CBs	J (all detects)	
	^{13}C-PCB-19	134 (1-108)	PCB-4	J (all detects)	
	^{13}C-PCB-54	123 (13-105)	PCB-10	J (all detects)	
	^{13}C-PCB-104	133 (36-115)	Di-CBs	J (all detects)	
	^{13}C-PCB-155	177 (25-124)	PCB-5 to PCB-9	J (all detects)	
	^{13}C-PCB-180	156 (25-150)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-188	129 (23-125)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-189	134 (47-116)	PCB-24	J (all detects)	
	^{13}C-PCB-205	126 (46-115)	PCB-27	J (all detects)	
	^{13}C-PCB-208	130 (31-126)	PCB-30	J (all detects)	
	^{13}C-PCB-209	125 (43-115)	PCB-32	J (all detects)	
			Tri-CBs	J (all detects)	
			PCB-54	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-96	J (all detects)	
			PCB-104	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-171 to PCB-175	J (all detects)	
			PCB-177	J (all detects)	
			PCB-180 to PCB-183	J (all detects)	
			PCB-185	J (all detects)	
			PCB-187	J (all detects)	
			PCB-190 to PCB-193	J (all detects)	
			PCB-176	J (all detects)	
			PCB-178	J (all detects)	
			PCB-179	J (all detects)	
			PCB-184	J (all detects)	
			PCB-186	J (all detects)	
			PCB-188	J (all detects)	
			PCB-189	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			PCB-207	J (all detects)	
			PCB-208	J (all detects)	
			PCB-209	J (all detects)	
			Hepta-CBs	J (all detects)	
			Octa-CBs	J (all detects)	
			Nona-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-BN01	^{13}C-PCB-3	110 (11-106)	PCB-2	J (all detects)	P
	^{13}C-PCB-4	124 (14-107)	PCB-3	J (all detects)	
	^{13}C-PCB-15	133 (19-107)	Mono-CBs	J (all detects)	
	^{13}C-PCB-19	126 (1-108)	PCB-4	J (all detects)	
	^{13}C-PCB-54	119 (13-105)	PCB-10	J (all detects)	
	^{13}C-PCB-77	113 (31-109)	Di-CBs	J (all detects)	
	^{13}C-PCB-104	120 (36-115)	PCB-5 to PCB-9	J (all detects)	
	^{13}C-PCB-105	117 (50-111)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-118	118 (49-111)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-123	121 (49-116)	PCB-24	J (all detects)	
	^{13}C-PCB-155	139 (25-124)	PCB-27	J (all detects)	
	^{13}C-PCB-189	121 (47-116)	PCB-30	J (all detects)	
	^{13}C-PCB-205	123 (46-115)	PCB-32	J (all detects)	
	^{13}C-PCB-206	128 (38-122)	Tri-CBs	J (all detects)	
	^{13}C-PCB-208	128 (31-126)	PCB-54	J (all detects)	
	^{13}C-PCB-209	120 (43-115)	Tetra-CBs	J (all detects)	
			PCB-77	J (all detects)	
			PCB-96	J (all detects)	
			PCB-104	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	
			PCB-206	J (all detects)	
			Nona-CBs	J (all detects)	
			PCB-207	J (all detects)	
			PCB-208	J (all detects)	
			PCB-209	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-XR01-102	^{13}C-PCB-15	142 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-19	122 (1-108)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-37	132 (25-123)	Di-CBs	J (all detects)	
	^{13}C-PCB-54	109 (13-105)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-77	135 (31-109)	PCB-24	J (all detects)	
	^{13}C-PCB-104	118 (36-115)	PCB-27	J (all detects)	
	^{13}C-PCB-105	122 (50-111)	PCB-30	J (all detects)	
	^{13}C-PCB-114	122 (41-121)	PCB-32	J (all detects)	
	^{13}C-PCB-118	123 (49-111)	Tri-CBs	J (all detects)	
	^{13}C-PCB-123	121 (49-116)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-126	131 (50-106)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-155	133 (25-124)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-156/157	128 (40-120)	PCB-31	J (all detects)	
	^{13}C-PCB-167	126 (45-118)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-169	120 (37-117)	PCB-54	J (all detects)	
	^{13}C-PCB-189	143 (47-116)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-205	124 (46-115)	PCB-77	J (all detects)	
			PCB-96	J (all detects)	
			PCB-104	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			PCB-114	J (all detects)	
			PCB-122	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-169	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-XR01-101	^{13}C-PCB-15	137 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-19	121 (1-108)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-37	131 (25-123)	Di-CBs	J (all detects)	
	^{13}C-PCB-54	114 (13-105)	PCB-16 to PCB-19	J (all detects)	
	^{13}C-PCB-77	136 (31-109)	PCB-24	J (all detects)	
	^{13}C-PCB-81	130 (14-127)	PCB-27	J (all detects)	
	^{13}C-PCB-104	116 (36-115)	PCB-30	J (all detects)	
	^{13}C-PCB-105	124 (50-111)	PCB-32	J (all detects)	
	^{13}C-PCB-114	123 (41-121)	Tri-CBs	J (all detects)	
	^{13}C-PCB-118	123 (49-111)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-123	123 (49-116)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-126	132 (50-106)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-155	130 (25-124)	PCB-31	J (all detects)	
	^{13}C-PCB-156/157	124 (40-120)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-167	131 (45-118)	PCB-54	J (all detects)	
	^{13}C-PCB-169	127 (37-117)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-189	130 (47-116)	PCB-77	J (all detects)	
	^{13}C-PCB-205	123 (46-115)	PCB-40 to PCB-53	J (all detects)	
	^{13}C-PCB-209	120 (43-115)	PCB-55 to PCB-76	J (all detects)	
			PCB-78 to PCB-81	J (all detects)	
			PCB-96	J (all detects)	
			PCB-104	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			PCB-114	J (all detects)	
			PCB-122	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-169	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	
			PCB-209	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-XR02-101	^{13}C-PCB-15	133 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	140 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	109 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	131 (31-109)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-81	135 (14-127)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-105	114 (50-111)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-118	116 (49-111)	PCB-31	J (all detects)	
	^{13}C-PCB-126	120 (50-106)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-155	130 (25-124)	Tri-CBs	J (all detects)	
	^{13}C-PCB-156/157	123 (40-120)	PCB-54	J (all detects)	
	^{13}C-PCB-167	127 (45-118)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-169	119 (37-117)	PCB-77	J (all detects)	
	^{13}C-PCB-189	128 (47-116)	PCB-40 to PCB-53	J (all detects)	
	^{13}C-PCB-205	118 (46-115)	PCB-55 to PCB-76	J (all detects)	
	^{13}C-PCB-209	116 (43-115)	PCB-78 to PCB-81	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-118	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-169	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	
			PCB-209	J (all detects)	
N08-CE05-TKVK-XR02-102	^{13}C-PCB-15	120 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-77	123 (31-109)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-105	114 (50-111)	Di-CBs	J (all detects)	
	^{13}C-PCB-118	112 (49-111)	PCB-77	J (all detects)	
	^{13}C-PCB-126	114 (50-106)	Tetra-CBs	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-118	J (all detects)	
			PCB-126	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-BP01	^{13}C-PCB-15	124 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	144 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	107 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	141 (31-109)	PCB -20 to PCB-23	J (all detects)	
	^{13}C-PCB-81	145 (14-127)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-105	113 (50-111)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-118	114 (49-111)	PCB-31	J (all detects)	
	^{13}C-PCB-126	128 (50-106)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-155	131 (25-124)	Tri-CBs	J (all detects)	
	^{13}C-PCB-156/157	128 (40-120)	PCB-54	J (all detects)	
	^{13}C-PCB-167	133 (45-118)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-169	118 (37-117)	PCB-77	J (all detects)	
	^{13}C-PCB-189	132 (47-116)	PCB-40 to PCB-53	J (all detects)	
			PCB-55 to PCB-76	J (all detects)	
			PCB-78 to PCB-81	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-118	J (all detects)	
			PCB-126	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-169	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-BQ01	^{13}C-PCB-15	125 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	146 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	111 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	126 (31-109)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-81	128 (14-127)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-126	112 (50-106)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-155	137 (25-124)	PCB-31	J (all detects)	
	^{13}C-PCB-156/157	121 (40-120)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-167	126 (45-118)	Tri-CBs	J (all detects)	
	^{13}C-PCB-189	131 (47-116)	PCB-54	J (all detects)	
			Tetra-CBs	J (all detects)	
			PCB-77	J (all detects)	
			PCB-40 to PCB-53	J (all detects)	
			PCB-55 to PCB-76	J (all detects)	
			PCB-78 to PCB-81	J (all detects)	
			PCB-126	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-155	J (all detects)	
			PCB-152	J (all detects)	
			PCB-150	J (all detects)	
			PCB-136	J (all detects)	
			PCB-145	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-156/157	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-XR04-101	^{13}C-PCB-15	129 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	136 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	109 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	131 (31-109)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-81	132 (14-127)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-105	114 (50-111)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-118	117 (49-111)	PCB-31	J (all detects)	
	^{13}C-PCB-123	118 (49-116)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-126	124 (50-106)	Tri-CBs	J (all detects)	
	^{13}C-PCB-167	122 (45-118)	PCB-54	J (all detects)	
	^{13}C-PCB-169	118 (37-117)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-189	123 (47-116)	PCB-77	J (all detects)	
			PCB-40 to PCB-53	J (all detects)	
			PCB-55 to PCB-76	J (all detects)	
			PCB-78 to PCB-81	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-169	J (all detects)	
			PCB-189	J (all detects)	
			Hepta-CBs	J (all detects)	

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N08-CE05-TKVK-XR04-102	^{13}C-PCB-15	133 (19-107)	PCB-5 to PCB-9	J (all detects)	P
	^{13}C-PCB-37	136 (25-123)	PCB-11 to PCB-15	J (all detects)	
	^{13}C-PCB-54	112 (13-105)	Di-CBs	J (all detects)	
	^{13}C-PCB-77	134 (31-109)	PCB-20 to PCB-23	J (all detects)	
	^{13}C-PCB-81	133 (14-127)	PCB-25 to PCB-26	J (all detects)	
	^{13}C-PCB-105	121 (50-111)	PCB-28 to PCB-29	J (all detects)	
	^{13}C-PCB-114	122 (41-121)	PCB-31	J (all detects)	
	^{13}C-PCB-118	122 (49-111)	PCB-33 to PCB-39	J (all detects)	
	^{13}C-PCB-123	122 (49-116)	Tri-CBs	J (all detects)	
	^{13}C-PCB-126	131 (50-106)	PCB-54	J (all detects)	
	^{13}C-PCB-156/157	123 (40-120)	Tetra-CBs	J (all detects)	
	^{13}C-PCB-167	125 (45-118)	PCB-77	J (all detects)	
	^{13}C-PCB-169	122 (37-117)	PCB-40 to PCB-53	J (all detects)	
	^{13}C-PCB-189	125 (47-116)	PCB-55 to PCB-76	J (all detects)	
	^{13}C-PCB-205	117 (46-115)	PCB-78 to PCB-81	J (all detects)	
			PCB-105	J (all detects)	
			PCB-127	J (all detects)	
			Penta-CBs	J (all detects)	
			PCB-114	J (all detects)	
			PCB-122	J (all detects)	
			PCB-118	J (all detects)	
			PCB-82 to PCB-95	J (all detects)	
			PCB-97 to PCB-103	J (all detects)	
			PCB-106 to PCB-113	J (all detects)	
			PCB-115 to PCB-117	J (all detects)	
			PCB-119 to PCB-121	J (all detects)	
			PCB-123 to PCB-125	J (all detects)	
			PCB-126	J (all detects)	
			PCB-156/157	J (all detects)	
			Hexa-CBs	J (all detects)	
			PCB-128	J (all detects)	
			PCB-159	J (all detects)	
			PCB-162	J (all detects)	
			PCB-166	J (all detects)	
			PCB-167	J (all detects)	
			PCB-169	J (all detects)	
			Hepta-CBs	J (all detects)	
			PCB-189	J (all detects)	
			PCB-194	J (all detects)	
			PCB-195	J (all detects)	
			PCB-205	J (all detects)	
			Octa-CBs	J (all detects)	

All internal standard ion abundance ratios were within method criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria with the following exceptions:

Sample	Static Spikes	%R (Limits)	Compound
N08-CE05-TKVK-BM02	^{13}C-PCB-178	72.4 (75-125)	PCB-170 to PCB-209 Hepta-CBs Octa-CBs Nona-CBs
N08-CE05-TKVK-BN02	^{13}C-PCB-178	74.7 (75-125)	PCB-170 to PCB-209 Hepta-CBs Octa-CBs Nona-CBs

No data were qualified due to this non-conformance.

X. Target Compound Identification

All target compounds met the identification criteria with the following exceptions:

Sample	Compound	Flag	A or P
N08-CE05-TKVK-BN02	PCB-5 Di-CBs	J (all detects) J (all detects)	P
N08-CE05-TKVK-BN01	PCB-7 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101	PCB-5 PCB-14 Di-CBs	J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-XR02-101	PCB-10 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-XR02-102	PCB-10 PCB-9 PCB-7 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-XR04-101	PCB-4 PCB-10 PCB-9 PCB-13/12 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-XR04-102	PCB-4 PCB-10 PCB-9 PCB-6 PCB-13/12 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

For the above listed samples, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101	All TCL compounds
N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02	All TCL compounds except PCB-179 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs
N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR02-102	All TCL compounds except PCB-79 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs
N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02	All TCL compounds except PCB-98 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5125	All compounds reported as estimated maximum possible concentration (EMPC).	EMPC-J	A
N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	P

Sample	Compound	Finding	Criteria	Flag	A or P
N08-CE05-TKVK-BP01	Di-CBs Tri-CBs Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	P
N08-CE05-TKVK-BQ01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs Nona-CBs Deca-CBs	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)	P

XII. Overall Assessment of Data

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

XIII. Field Duplicates

No field duplicates were identified in this SDG.

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SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101	PCB-4 to PCB-15 Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Initial calibration (ion abundance) (c)
A5125	N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR04-102	PCB-4 Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Initial calibration (ion abundance) (c)
A5125	N08-CE05-TNBE-BP01	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs	J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5125	N08-CE05-TNBE-BM01	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-77 Tetra-CBs PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Hexa-CBs PCB-189 Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TNBE-BM02	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-77	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-125	J (all detects)		
		PCB-126	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		
A5125	N08-CE05-TNBS-BP01	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-77	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-126	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TNBS-BM01	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TNBS-BM02	PCB-2	J (all detects)	P	Internal standards (%R) (i)
		PCB-3	J (all detects)		
		Mono-CBs	J (all detects)		
		PCB-4	J (all detects)		
		PCB-10	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-5 to PCB-9	J (all detects)		
		PCB-11 to PCB-15	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-96	J (all detects)		
		PCB-104	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		PCB-118	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-121	J (all detects)		
		PCB-123 to PCB-125	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-176	J (all detects)		
		PCB-178	J (all detects)		
		PCB-179	J (all detects)		
		PCB-184	J (all detects)		
		PCB-186	J (all detects)		
		PCB-188	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-189	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		
		PCB-206	J (all detects)		
		Nona-CBs	J (all detects)		
		PCB-207	J (all detects)		
		PCB-208	J (all detects)		
		PCB-209	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-BM01	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-118	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
A5125	N08-CE05-TKVK-BM02	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-77	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-126	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-BN02	PCB-2	J (all detects)	P	Internal standards (%R) (i)
		PCB-3	J (all detects)		
		Mono-CBs	J (all detects)		
		PCB-4	J (all detects)		
		PCB-10	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-5 to PCB-9	J (all detects)		
		PCB-11 to PCB-15	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-96	J (all detects)		
		PCB-104	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-171 to PCB-175	J (all detects)		
		PCB-177	J (all detects)		
		PCB-180 to PCB-183	J (all detects)		
		PCB-185	J (all detects)		
		PCB-187	J (all detects)		
		PCB-190 to PCB-193	J (all detects)		
		PCB-176	J (all detects)		
		PCB-178	J (all detects)		
		PCB-179	J (all detects)		
		PCB-184	J (all detects)		
		PCB-186	J (all detects)		
		PCB-188	J (all detects)		
		PCB-189	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		PCB-207	J (all detects)		
		PCB-208	J (all detects)		
		PCB-209	J (all detects)		
		Hepta-CBs	J (all detects)		
		Octa-CBs	J (all detects)		
		Nona-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-BN01	PCB-2	J (all detects)	P	Internal standards (%R) (i)
		PCB-3	J (all detects)		
		Mono-CBs	J (all detects)		
		PCB-4	J (all detects)		
		PCB-10	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-5 to PCB-9	J (all detects)		
		PCB-11 to PCB-15	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-96	J (all detects)		
		PCB-104	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		PCB-118	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-121	J (all detects)		
		PCB-123 to PCB-125	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		
		PCB-206	J (all detects)		
		Nona-CBs	J (all detects)		
		PCB-207	J (all detects)		
		PCB-208	J (all detects)		
		PCB-209	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR01-102	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-96	J (all detects)		
		PCB-104	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		PCB-114	J (all detects)		
		PCB-122	J (all detects)		
		PCB-118	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-121	J (all detects)		
		PCB-123 to PCB-125	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-169	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR01-101	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-16 to PCB-19	J (all detects)		
		PCB-24	J (all detects)		
		PCB-27	J (all detects)		
		PCB-30	J (all detects)		
		PCB-32	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-96	J (all detects)		
		PCB-104	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		PCB-114	J (all detects)		
		PCB-122	J (all detects)		
		PCB-118	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-121	J (all detects)		
		PCB-123 to PCB-125	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-169	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		
		PCB-209	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR02-101	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-118	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-169	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		
		PCB-194	J (all detects)		
		PCB-195	J (all detects)		
		PCB-205	J (all detects)		
		Octa-CBs	J (all detects)		
		PCB-209	J (all detects)		
A5125	N08-CE05-TKVK-XR02-102	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-77	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-118	J (all detects)		
		PCB-126	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-BP01	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB -20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-118	J (all detects)		
		PCB-126	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-169	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-BQ01	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-126	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-155	J (all detects)		
		PCB-152	J (all detects)		
		PCB-150	J (all detects)		
		PCB-136	J (all detects)		
		PCB-145	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-156/157	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR04-101	PCB-5 to PCB-9	J (all detects)	P	Internal standards (%R) (i)
		PCB-11 to PCB-15	J (all detects)		
		Di-CBs	J (all detects)		
		PCB-20 to PCB-23	J (all detects)		
		PCB-25 to PCB-26	J (all detects)		
		PCB-28 to PCB-29	J (all detects)		
		PCB-31	J (all detects)		
		PCB-33 to PCB-39	J (all detects)		
		Tri-CBs	J (all detects)		
		PCB-54	J (all detects)		
		Tetra-CBs	J (all detects)		
		PCB-77	J (all detects)		
		PCB-40 to PCB-53	J (all detects)		
		PCB-55 to PCB-76	J (all detects)		
		PCB-78 to PCB-81	J (all detects)		
		PCB-105	J (all detects)		
		PCB-127	J (all detects)		
		Penta-CBs	J (all detects)		
		PCB-118	J (all detects)		
		PCB-82 to PCB-95	J (all detects)		
		PCB-97 to PCB-103	J (all detects)		
		PCB-106 to PCB-113	J (all detects)		
		PCB-115 to PCB-117	J (all detects)		
		PCB-119 to PCB-121	J (all detects)		
		PCB-123 to PCB-125	J (all detects)		
		PCB-126	J (all detects)		
		PCB-128	J (all detects)		
		PCB-159	J (all detects)		
		PCB-162	J (all detects)		
		PCB-166	J (all detects)		
		PCB-167	J (all detects)		
		Hexa-CBs	J (all detects)		
		PCB-169	J (all detects)		
		PCB-189	J (all detects)		
		Hepta-CBs	J (all detects)		

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR04-102	PCB-5 to PCB-9 PCB-11 to PCB-15 Di-CBs PCB-20 to PCB-23 PCB-25 to PCB-26 PCB-28 to PCB-29 PCB-31 PCB-33 to PCB-39 Tri-CBs PCB-54 Tetra-CBs PCB-77 PCB-40 to PCB-53 PCB-55 to PCB-76 PCB-78 to PCB-81 PCB-105 PCB-127 Penta-CBs PCB-114 PCB-122 PCB-118 PCB-82 to PCB-95 PCB-97 to PCB-103 PCB-106 to PCB-113 PCB-115 to PCB-117 PCB-119 to PCB-121 PCB-123 to PCB-125 PCB-126 PCB-156/157 Hexa-CBs PCB-128 PCB-159 PCB-162 PCB-166 PCB-167 PCB-169 Hepta-CBs PCB-189 PCB-194 PCB-195 PCB-205 Octa-CBs	J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5125	N08-CE05-TKVK-BN02	PCB-5 Di-CBs	J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TKVK-BN01	PCB-7 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101	PCB-5 PCB-14 Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TKVK-XR02-101	PCB-10 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5125	N08-CE05-TKVK-XR02-102	PCB-10 PCB-9 PCB-7 PCB-5 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TKVK-XR04-101	PCB-4 PCB-10 PCB-9 PCB-13/12 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TKVK-XR04-102	PCB-4 PCB-10 PCB-9 PCB-6 PCB-13/12 Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5125	N08-CE05-TNBE-BP01 N08-CE05-TNBE-BM01 N08-CE05-TNBE-BM02 N08-CE05-TNBS-BP01 N08-CE05-TNBS-BM01 N08-CE05-TNBS-BM02 N08-CE05-TKVK-BM01 N08-CE05-TKVK-BM02 N08-CE05-TKVK-BN02 N08-CE05-TKVK-BN01 N08-CE05-TKVK-XR01-102 N08-CE05-TKVK-XR01-101 N08-CE05-TKVK-XR02-101 N08-CE05-TKVK-XR02-102 N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01 N08-CE05-TKVK-XR04-101 N08-CE05-TKVK-XR04-102	All compounds reported as estimated maximum possible concentration (EMPC).	EMPC-J	A	Compound quantitation (EMPC) (k)
A5125	N08-CE05-TKVK-BP01 N08-CE05-TKVK-BQ01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	P	Compound quantitation (exceeded range) (q)
A5125	N08-CE05-TKVK-BP01	Di-CBs Tri-CBs Tetra-CBs	J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5125	N08-CE05-TKVK-BQ01	Di-CBs Tri-CBs Tetra-CBs Penta-CBs Nona-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)

CWCM Newark Bay High Volume Event #1
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5125

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TNBE-BP01	PCB-9 PCB-7 PCB-5 PCB-8 PCB-11 PCB-30/18 PCB-24 PCB-16 PCB-21/33	207U pg 99.7U pg 30.7U pg 4760U pg 2250U pg 4700U pg 58.8U pg 1740U pg 2230U pg	A	bl
A5125	N08-CE05-TNBE-BM01	PCB-2 PCB-3 PCB-5	162U pg 242U pg 174U pg	A	bl
A5125	N08-CE05-TNBE-BM02	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-11 PCB-21/33	96.8U pg 140U pg 289U pg 142U pg 866U pg 67.6U pg 3230U pg 3130U pg 2220U pg	A	bl
A5125	N08-CE05-TNBS-BP01	PCB-7 PCB-5	352U pg 89.4U pg	A	bl
A5125	N08-CE05-TNBS-BM01	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-11 PCB-15 PCB-21/33	115U pg 164U pg 207U pg 110U pg 678U pg 46.3U pg 2470U pg 4120U pg 1650U pg 1690U pg	A	bl
A5125	N08-CE05-TNBS-BM02	PCB-2 PCB-3 PCB-9 PCB-7 PCB-5 PCB-8	128U pg 182U pg 376U pg 187U pg 83.9U pg 5240U pg	A	bl
A5125	N08-CE05-TKVK-BM01	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-21/33	105U pg 142U pg 252U pg 107U pg 980U pg 45.3U pg 3120U pg 2170U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BM02	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-11 PCB-13/12 PCB-15 PCB-30/18 PCB-17 PCB-24 PCB-16 PCB-31 PCB-28/20 PCB-21/33 PCB-22 PCB-41 PCB-179	58.5U pg 76.8U pg 87.3U pg 39.4U pg 341U pg 16.8U pg 1040U pg 2100U pg 158U pg 802U pg 4240U pg 2430U pg 54.7U pg 1330U pg 3000U pg 3470U pg 696U pg 780U pg 129U pg 54.9U pg	A	bl
A5125	N08-CE05-TKVK-BN02	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8	96.7U pg 181U pg 231U pg 147U pg 821U pg 63.3U pg 3630U pg	A	bl
A5125	N08-CE05-TKVK-BN01	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-21/33	89.3U pg 127U pg 225U pg 99.1U pg 893U pg 38.6U pg 2930U pg 2000U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR01-102	PCB-118	67.8U pg	A	bl
		Mono-CBs	126U pg		
		Di-CBs	934U pg		
		Tri-CBs	940U pg		
		Tetra-CBs	990U pg		
		Penta-CBs	568U pg		
		Hexa-CBs	597U pg		
		PCB-1	48.9U pg		
		PCB-2	34.2U pg		
		PCB-3	43.2U pg		
		PCB-4	114U pg		
		PCB-10	14.5U pg		
		PCB-9	15.8U pg		
		PCB-7	10.1U pg		
		PCB-6	46.7U pg		
		PCB-5	4.21U pg		
		PCB-8	162U pg		
		PCB-11	498U pg		
		PCB-13/12	13.8U pg		
		PCB-15	54.2U pg		
		PCB-19	29.4U pg		
		PCB-30/18	162U pg		
		PCB-17	79.8U pg		
		PCB-27	17.5U pg		
		PCB-24	2.23U pg		
		PCB-16	77.9U pg		
		PCB-32	52.3U pg		
		PCB-26/29	31.5U pg		
		PCB-25	16U pg		
		PCB-31	139U pg		
		PCB-28/20	163U pg		
		PCB-21/33	77.3U pg		
		PCB-22	53.7U pg		
		PCB-37	33.4U pg		
		PCB-50/53	23.7U pg		
		PCB-45	18.7U pg		
		PCB-51	28.7U pg		
		PCB-46	9.3U pg		
		PCB-52	163U pg		
		PCB-43	3.66U pg		
		PCB-69/49	79.6U pg		
		PCB-48	20.9U pg		
		PCB-44/47/65	211U pg		
		PCB-59/62/75	10.2U pg		
		PCB-42	29.3U pg		
		PCB-41	10.8U pg		
		PCB-71/40	53.6U pg		
		PCB-64	41U pg		
		PCB-61/70/74/76	133U pg		
		PCB-66	75U pg		
		PCB-56	35.8U pg		
		PCB-95	87.6U pg		
		PCB-91	12.1U pg		
		PCB-84	27.3U pg		
		PCB-113/90/101	91.7U pg		
		PCB-99	37.1U pg		
		PCB-108/119/86/97/125/87	52.1U pg		
		PCB-110	92.6U pg		
		PCB-136	14.8U pg		
		PCB-151/135	41.4U pg		
		PCB-147/149	102U pg		
		PCB-132	37U pg		
		PCB-153/168	115U pg		
		PCB-163/138/129	151U pg		
		PCB-179	20.8U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR01-101	PCB-118	23.6U pg	A	bl
		Mono-CBs	99.8U pg		
		Di-CBs	752U pg		
		Tri-CBs	660U pg		
		Tetra-CBs	638U pg		
		Penta-CBs	279U pg		
		Hexa-CBs	226U pg		
		PCB-1	35.6U pg		
		PCB-2	30U pg		
		PCB-3	34.2U pg		
		PCB-4	67.9U pg		
		PCB-10	7.17U pg		
		PCB-9	10.9U pg		
		PCB-7	7.31U pg		
		PCB-6	37.1U pg		
		PCB-5	3.63U pg		
		PCB-8	106U pg		
		PCB-11	457U pg		
		PCB-13/12	18.8U pg		
		PCB-15	35.2U pg		
		PCB-19	17.9U pg		
		PCB-30/18	114U pg		
		PCB-17	52.5U pg		
		PCB-27	9.72U pg		
		PCB-24	2.1U pg		
		PCB-16	59.1U pg		
		PCB-32	34.7U pg		
		PCB-26/29	21.8U pg		
		PCB-25	10.2U pg		
		PCB-31	96U pg		
		PCB-28/20	109U pg		
		PCB-21/33	61.3U pg		
		PCB-22	39.8U pg		
		PCB-37	25U pg		
		PCB-50/53	14.2U pg		
		PCB-45	12.5U pg		
		PCB-51	24.3U pg		
		PCB-46	5.4U pg		
		PCB-52	94.2U pg		
		PCB-43	3.08U pg		
		PCB-69/49	41.4U pg		
		PCB-48	13.5U pg		
		PCB-44/47/65	188U pg		
		PCB-59/62/75	7.02U pg		
		PCB-42	16.6U pg		
		PCB-41	7.14U pg		
		PCB-71/40	29.5U pg		
		PCB-64	22.5U pg		
		PCB-61/70/74/76	67.7U pg		
		PCB-66	38.3U pg		
		PCB-56	19.4U pg		
		PCB-95	49.2U pg		
		PCB-91	7.29U pg		
		PCB-84	15.5U pg		
		PCB-113/90/101	44.3U pg		
		PCB-99	16.8U pg		
		PCB-108/119/86/97/125/87	30.7U pg		
		PCB-110	41U pg		
		PCB-136	8.27U pg		
		PCB-151/135	17.3U pg		
		PCB-147/149	39.2U pg		
		PCB-132	14.3U pg		
		PCB-153/168	38.9U pg		
		PCB-163/138/129	49.2U pg		
		PCB-179	8.29U pg		
		PCB-180/193	64.8U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR02-101	PCB-118	30.7U pg	A	bl
		Mono-CBs	152U pg		
		Di-CBs	1600U pg		
		Tri-CBs	1290U pg		
		Tetra-CBs	638U pg		
		Penta-CBs	317U pg		
		Hexa-CBs	358U pg		
		PCB-1	56.4U pg		
		PCB-2	39.2U pg		
		PCB-3	56.3U pg		
		PCB-4	161U pg		
		PCB-10	9.94U pg		
		PCB-9	24.6U pg		
		PCB-7	19.1U pg		
		PCB-6	71.7U pg		
		PCB-5	6.39U pg		
		PCB-8	284U pg		
		PCB-11	934U pg		
		PCB-13/12	23.5U pg		
		PCB-15	69.1U pg		
		PCB-19	37.1U pg		
		PCB-30/18	278U pg		
		PCB-17	129U pg		
		PCB-27	18.7U pg		
		PCB-24	3.85U pg		
		PCB-16	133U pg		
		PCB-32	71.2U pg		
		PCB-26/29	36.3U pg		
		PCB-25	15.9U pg		
		PCB-31	172U pg		
		PCB-28/20	189U pg		
		PCB-21/33	110U pg		
		PCB-22	64.1U pg		
		PCB-37	27.8U pg		
		PCB-50/53	20U pg		
		PCB-45	23.6U pg		
		PCB-51	13.2U pg		
		PCB-46	8.58U pg		
		PCB-52	136U pg		
		PCB-43	5.02U pg		
		PCB-69/49	51.6U pg		
		PCB-48	22.3U pg		
		PCB-44/47/65	109U pg		
		PCB-59/62/75	7.64U pg		
		PCB-42	21.2U pg		
		PCB-41	9.98U pg		
		PCB-71/40	33.9U pg		
		PCB-64	29.4U pg		
		PCB-61/70/74/76	74.6U pg		
		PCB-66	34.5U pg		
		PCB-56	16.3U pg		
		PCB-95	63.2U pg		
		PCB-91	7.19U pg		
		PCB-84	17.9U pg		
		PCB-113/90/101	52.4U pg		
		PCB-99	20.3U pg		
		PCB-108/119/86/97/125/87	30.1U pg		
		PCB-110	48.5U pg		
		PCB-136	10.2U pg		
		PCB-151/135	26U pg		
		PCB-147/149	60.2U pg		
		PCB-132	21U pg		
		PCB-153/168	68.1U pg		
		PCB-163/138/129	89.5U pg		
		PCB-179	13.8U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR02-102	PCB-118	37.5U pg	A	bl
		Mono-CBs	115U pg		
		Di-CBs	997U pg		
		Tri-CBs	753U pg		
		Tetra-CBs	663U pg		
		Penta-CBs	380U pg		
		Hexa-CBs	320U pg		
		PCB-1	41.8U pg		
		PCB-2	35.5U pg		
		PCB-3	38U pg		
		PCB-4	75.4U pg		
		PCB-10	6.4U pg		
		PCB-9	13.6U pg		
		PCB-7	8.81U pg		
		PCB-6	53.4U pg		
		PCB-5	3.47U pg		
		PCB-8	129U pg		
		PCB-11	629U pg		
		PCB-13/12	23.5U pg		
		PCB-15	53.2U pg		
		PCB-19	19.7U pg		
		PCB-30/18	133U pg		
		PCB-17	64.5U pg		
		PCB-27	12.3U pg		
		PCB-24	2.73U pg		
		PCB-16	61.3U pg		
		PCB-32	41.8U pg		
		PCB-26/29	27.8U pg		
		PCB-25	14.1U pg		
		PCB-31	113U pg		
		PCB-28/20	132U pg		
		PCB-21/33	57.5U pg		
		PCB-22	37.8U pg		
		PCB-37	30.3U pg		
		PCB-50/53	15.6U pg		
		PCB-45	14.1U pg		
		PCB-51	18.4U pg		
		PCB-46	5.72U pg		
		PCB-52	128U pg		
		PCB-43	4.32U pg		
		PCB-69/49	50.5U pg		
		PCB-48	15.9U pg		
		PCB-44/47/65	136U pg		
		PCB-59/62/75	6.88U pg		
		PCB-42	19.2U pg		
		PCB-41	6.45U pg		
		PCB-71/40	33.1U pg		
		PCB-64	25.9U pg		
		PCB-61/70/74/76	85.3U pg		
		PCB-66	48.8U pg		
		PCB-56	21.2U pg		
		PCB-95	68.6U pg		
		PCB-91	10.2U pg		
		PCB-84	20.9U pg		
		PCB-113/90/101	61.4U pg		
		PCB-99	27.2U pg		
		PCB-108/119/86/97/125/87	36.1U pg		
		PCB-110	59.7U pg		
		PCB-136	10.6U pg		
		PCB-151/135	24.7U pg		
		PCB-147/149	57U pg		
		PCB-132	19.8U pg		
		PCB-153/168	58.6U pg		
		PCB-163/138/129	77.3U pg		
		PCB-179	10.3U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR04-101	PCB-118	18.2U pg	A	bl
		Mono-CBs	17.9U pg		
		Di-CBs	236U pg		
		Tri-CBs	178U pg		
		Tetra-CBs	158U pg		
		Penta-CBs	112U pg		
		Hexa-CBs	90U pg		
		Hepta-CBs	57.9U pg		
		PCB-1	6.46U pg		
		PCB-2	5.36U pg		
		PCB-3	6.1U pg		
		PCB-4	9.64U pg		
		PCB-10	1.14U pg		
		PCB-9	3.01U pg		
		PCB-6	5.41U pg		
		PCB-8	19.4U pg		
		PCB-11	151U pg		
		PCB-13/12	8U pg		
		PCB-15	37.8U pg		
		PCB-19	2.67U pg		
		PCB-30/18	15U pg		
		PCB-17	8.87U pg		
		PCB-27	2.28U pg		
		PCB-16	7.38U pg		
		PCB-32	6.96U pg		
		PCB-26/29	8.94U pg		
		PCB-25	5.06U pg		
		PCB-31	29.1U pg		
		PCB-28/20	41.8U pg		
		PCB-21/33	12.2U pg		
		PCB-22	10.4U pg		
		PCB-37	24.7U pg		
		PCB-50/53	2.03U pg		
		PCB-45	2.09U pg		
		PCB-51	1.2U pg		
		PCB-46	0.871U pg		
		PCB-52	20.7U pg		
		PCB-69/49	9.52U pg		
		PCB-48	2.6U pg		
		PCB-44/47/65	19.5U pg		
		PCB-59/62/75	1.68U pg		
		PCB-42	4.7U pg		
		PCB-41	1.64U pg		
		PCB-71/40	8U pg		
		PCB-64	6.15U pg		
		PCB-61/70/74/76	32.4U pg		
		PCB-66	22.3U pg		
		PCB-56	10.5U pg		
		PCB-95	13.4U pg		
		PCB-91	1.85U pg		
		PCB-84	4.24U pg		
		PCB-113/90/101	16.4U pg		
		PCB-99	8.72U pg		
		PCB-108/119/86/97/125/87	11.6U pg		
		PCB-110	20.1U pg		
		PCB-136	2.72U pg		
		PCB-151/135	7.04U pg		
		PCB-147/149	15.4U pg		
		PCB-132	6.73U pg		
		PCB-153/168	17U pg		
		PCB-163/138/129	20.8U pg		
		PCB-179	3.12U pg		
		PCB-180/193	16.5U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-XR04-102	PCB-118	18.5U pg	A	bl
		Mono-CBs	17.6U pg		
		Di-CBs	138U pg		
		Tri-CBs	166U pg		
		Tetra-CBs	168U pg		
		Penta-CBs	137U pg		
		Hexa-CBs	128U pg		
		Hepta-CBs	97.8U pg		
		PCB-1	6.56U pg		
		PCB-2	4.79U pg		
		PCB-3	6.21U pg		
		PCB-4	15.4U pg		
		PCB-10	1.41U pg		
		PCB-9	3.46U pg		
		PCB-6	5.91U pg		
		PCB-8	23.5U pg		
		PCB-11	58.3U pg		
		PCB-13/12	5.28U pg		
		PCB-15	24.9U pg		
		PCB-19	3.51U pg		
		PCB-30/18	18.9U pg		
		PCB-17	11.5U pg		
		PCB-27	2.31U pg		
		PCB-16	8.43U pg		
		PCB-32	7.24U pg		
		PCB-26/29	7.57U pg		
		PCB-25	4.42U pg		
		PCB-31	27.8U pg		
		PCB-28/20	37.8U pg		
		PCB-21/33	11.7U pg		
		PCB-22	9.33U pg		
		PCB-37	15.6U pg		
		PCB-50/53	3.11U pg		
		PCB-45	2.66U pg		
		PCB-51	1.74U pg		
		PCB-46	1.12U pg		
		PCB-52	25U pg		
		PCB-69/49	12.6U pg		
		PCB-48	3.15U pg		
		PCB-44/47/65	25.5U pg		
		PCB-59/62/75	1.85U pg		
		PCB-42	5.26U pg		
		PCB-41	1.74U pg		
		PCB-71/40	9.42U pg		
		PCB-64	6.82U pg		
		PCB-61/70/74/76	30.8U pg		
		PCB-66	19.3U pg		
		PCB-56	8.68U pg		
		PCB-95	19U pg		
		PCB-91	3.03U pg		
		PCB-84	5.94U pg		
		PCB-113/90/101	22.6U pg		
		PCB-99	9.93U pg		
		PCB-108/119/86/97/125/87	14.1U pg		
		PCB-110	24U pg		
		PCB-136	4.33U pg		
		PCB-151/135	11.1U pg		
		PCB-147/149	25.2U pg		
		PCB-132	7.84U pg		
		PCB-153/168	24.8U pg		
		PCB-163/138/129	28.2U pg		
		PCB-179	5U pg		
		PCB-180/193	26.3U pg		

CWCM Newark Bay High Volume Event #1
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5125

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TNBE-BP01	PCB-11	2250U pg	A	be
		PCB-145	1.5U pg		
		PCB-5	30.7U pg		
A5125	N08-CE05-TNBE-BM01	PCB-189	10.6U pg	A	be
		PCB-2	162U pg		
		PCB-170	448U pg		
		PCB-195	72.1U pg		
		PCB-194	147U pg		
		PCB-205	6.88U pg		
		PCB-145	2.26U pg		
		PCB-3	242U pg		
		Deca-CBs	12.6U pg		
		PCB-209	12.6U pg		
		PCB-208	26.8U pg		
		PCB-207	13U pg		
		PCB-206	54.7U pg		
		Nona-CBs	94.5U pg		
A5125	N08-CE05-TNBE-BM02	PCB-156/157	66.8U pg	A	be
		PCB-189	2.6U pg		
		Hepta-CBs	1350U pg		
		Octa-CBs	185U pg		
		Nona-CBs	22.9U pg		
		Deca-CBs	5.02U pg		
		PCB-2	96.8U pg		
		PCB-3	140U pg		
		PCB-14	4.98U pg		
		PCB-176	27.5U pg		
		PCB-178	55.6U pg		
		PCB-175	9.36U pg		
		PCB-187	294U pg		
		PCB-183	97.4U pg		
		PCB-185	25.4U pg		
		PCB-174	172U pg		
		PCB-177	101U pg		
		PCB-171/173	41.1U pg		
		PCB-172	20.8U pg		
		PCB-180/193	271U pg		
		PCB-191	4.99U pg		
		PCB-170	88.1U pg		
		PCB-190	19.3U pg		
		PCB-202	18.4U pg		
		PCB-201	12.7U pg		
		PCB-197	3.19U pg		
		PCB-200	4.59U pg		
		PCB-198/199	54.2U pg		
		PCB-196	21.4U pg		
		PCB-203	28.6U pg		
		PCB-195	12.2U pg		
		PCB-194	29.1U pg		
		PCB-205	1.29U pg		
		PCB-208	7.77U pg		
		PCB-207	2.86U pg		
		PCB-206	12.2U pg		
		PCB-209	5.02U pg		
		PCB-11	3130U pg		
		PCB-184	2.05U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TNBS-BM01	PCB-156/157	63.5U pg	A	be
		PCB-189	3.54U pg		
		Hepta-CBs	1370U pg		
		Octa-CBs	226U pg		
		Nona-CBs	33U pg		
		Deca-CBs	7.76U pg		
		PCB-2	115U pg		
		PCB-3	164U pg		
		PCB-141	154U pg		
		PCB-179	96.3U pg		
		PCB-176	20.8U pg		
		PCB-178	46.1U pg		
		PCB-175	10.5U pg		
		PCB-187	342U pg		
		PCB-183	107U pg		
		PCB-185	20.2U pg		
		PCB-174	167U pg		
		PCB-177	107U pg		
		PCB-171/173	41.9U pg		
		PCB-172	22.7U pg		
		PCB-180/193	267U pg		
		PCB-170	99.3U pg		
		PCB-190	20.3U pg		
		PCB-201	14.5U pg		
		PCB-197	3.31U pg		
		PCB-200	4.25U pg		
		PCB-198/199	58.5U pg		
		PCB-196	22.8U pg		
		PCB-203	30.1U pg		
		PCB-195	20.3U pg		
		PCB-194	48U pg		
		PCB-207	3.74U pg		
		PCB-206	18.1U pg		
		PCB-209	7.76U pg		
		PCB-11	4120U pg		
		PCB-208	11.1U pg		
A5125	N08-CE05-TNBS-BM02	Hepta-CBs	2830U pg	A	be
		Octa-CBs	541U pg		
		PCB-2	128U pg		
		PCB-3	182U pg		
		PCB-185	32U pg		
		PCB-174	328U pg		
		PCB-177	216U pg		
		PCB-171/173	91.3U pg		
		PCB-172	43.3U pg		
		PCB-180/193	631U pg		
		PCB-170	242U pg		
		PCB-190	52.8U pg		
		PCB-198/199	141U pg		
		PCB-196	68.6U pg		
		PCB-203	77.1U pg		
		PCB-195	44U pg		
		PCB-194	139U pg		
		Nona-CBs	79.5U pg		
		PCB-208	26U pg		
		PCB-206	53.5U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BM01	PCB-156/157	83.3U pg	A	be
		PCB-189	4.63U pg		
		Hepta-CBs	1800U pg		
		Octa-CBs	288U pg		
		Nona-CBs	39.9U pg		
		PCB-2	105U pg		
		PCB-3	142U pg		
		PCB-176	28.9U pg		
		PCB-183	137U pg		
		PCB-185	21.3U pg		
		PCB-174	208U pg		
		PCB-177	135U pg		
		PCB-171/173	52.4U pg		
		PCB-172	28.2U pg		
		PCB-180/193	360U pg		
		PCB-191	6.72U pg		
		PCB-170	124U pg		
		PCB-190	27.6U pg		
		PCB-201	18.9U pg		
		PCB-197	4.44U pg		
		PCB-200	6.86U pg		
		PCB-198/199	79.5U pg		
		PCB-196	32.2U pg		
		PCB-203	40.1U pg		
		PCB-195	20.9U pg		
		PCB-194	51.5U pg		
		PCB-205	2.92U pg		
		PCB-207	5.54U pg		
		PCB-206	21.2U pg		
		PCB-145	1.32U pg		
		PCB-209	8.74U pg		
		PCB-208	13.2U pg		
		PCB-184	1.92U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BM02	PCB-156/157	29.1U pg	A	be
		PCB-167	11.9U pg		
		PCB-189	1.71U pg		
		Hepta-CBs	664U pg		
		Octa-CBs	106U pg		
		Nona-CBs	14.4U pg		
		Deca-CBs	5.38U pg		
		PCB-2	58.5U pg		
		PCB-3	76.8U pg		
		PCB-7	39.4U pg		
		PCB-5	16.8U pg		
		PCB-11	2100U pg		
		PCB-68	35.1U pg		
		PCB-153/168	554U pg		
		PCB-164	47U pg		
		PCB-163/138/129	551U pg		
		PCB-158	38U pg		
		PCB-128/166	60.3U pg		
		PCB-179	54.9U pg		
		PCB-176	10.6U pg		
		PCB-178	23.2U pg		
		PCB-175	4.33U pg		
		PCB-187	159U pg		
		PCB-183	52.8U pg		
		PCB-185	8.92U pg		
		PCB-174	76.5U pg		
		PCB-177	52U pg		
		PCB-171/173	20.7U pg		
		PCB-172	10.4U pg		
		PCB-180/193	129U pg		
		PCB-191	2.14U pg		
		PCB-170	47.8U pg		
		PCB-190	10.4U pg		
		PCB-202	10.8U pg		
		PCB-201	7.1U pg		
		PCB-198/199	33.2U pg		
		PCB-196	12.8U pg		
		PCB-203	16.4U pg		
		PCB-195	6.99U pg		
		PCB-194	18.7U pg		
		PCB-208	5.33U pg		
		PCB-206	9.02U pg		
		PCB-209	5.38U pg		
		PCB-9	87.3U pg		
		PCB-6	341U pg		
		PCB-8	1040U pg		
		PCB-141	76U pg		
		PCB-155	2.55U pg		
		PCB-152	1.8U pg		
		PCB-143	1.86U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5125	N08-CE05-TKVK-BN02	PCB-156/157	62.9U pg	A	be
		Hepta-CBs	1700U pg		
		Octa-CBs	377U pg		
		PCB-2	96.7U pg		
		PCB-3	181U pg		
		PCB-141	171U pg		
		PCB-176	24.9U pg		
		PCB-178	40.4U pg		
		PCB-187	368U pg		
		PCB-183	135U pg		
		PCB-185	19U pg		
		PCB-174	225U pg		
		PCB-177	120U pg		
		PCB-171/173	52.3U pg		
		PCB-180/193	380U pg		
		PCB-170	149U pg		
		PCB-190	37.6U pg		
		PCB-202	22.1U pg		
		PCB-201	16.6U pg		
		PCB-200	16U pg		
		PCB-198/199	92.6U pg		
		PCB-196	44.8U pg		
		PCB-203	46.6U pg		
		PCB-195	41.8U pg		
		PCB-194	96.9U pg		
A5125	N08-CE05-TKVK-BN01	PCB-156/157	68.5U pg	A	be
		Hepta-CBs	1450U pg		
		Octa-CBs	213U pg		
		PCB-2	89.3U pg		
		PCB-3	127U pg		
		PCB-176	25.3U pg		
		PCB-175	10.2U pg		
		PCB-187	370U pg		
		PCB-183	120U pg		
		PCB-185	11.6U pg		
		PCB-174	165U pg		
		PCB-177	110U pg		
		PCB-171/173	41.5U pg		
		PCB-172	18U pg		
		PCB-180/193	281U pg		
		PCB-170	90.4U pg		
		PCB-190	19.9U pg		
		PCB-201	16.8U pg		
		PCB-198/199	71.2U pg		
		PCB-196	23.9U pg		
		PCB-203	34.3U pg		
		PCB-194	37.7U pg		

LDC #: 29736B31

SDG #: A5125

Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 6-3-13

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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

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: 1/8/13 → 1/10/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	≤ 20/35
IV.	Routine calibration/~~ICV~~	A	≤ 30/50
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	client
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	SW	
XI.	Compound quantitation/~~RL/LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A ~~SWh~~	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB = 11-14, 17-18

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: 6 filters / 12 PUF's

1	N08-CE05-TNNE-BP01 ✓	11	N08-CE05-TKVK-XR01-102	21		31	
2	N08-CE05-TNNE-BM01	12	N08-CE05-TKVK-XR01-101	22		32	
3	N08-CE05-TNNE-BM02	13	N08-CE05-TKVK-XR02-101	23		33	
4	N08-CE05-TNBS-BP01 ✓	14	N08-CE05-TKVK-XR02-102	24		34	
5	N08-CE05-TNBS-BM01	15	N08-CE05-TKVK-BP01 ✓	25		35	
6	N08-CE05-TNBS-BM02	16	N08-CE05-TKVK-BQ01 ✓	26		36	
7	N08-CE05-TKVK-BM01	17	N08-CE05-TKVK-XR04-101 ✓	27		37	
8	N08-CE05-TKVK-BM02	18	N08-CE05-TKVK-XR04-102 ✓	28		38	
9	N08-CE05-TKVK-BN02	19		29		39	
10	N08-CE05-TKVK-BN01	20		30		40	MB1-10596

-F

LDC #: 29736B31
SDG #: —

VALIDATION FINDINGS WORKSHEET
Initial Calibration

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

METHOD: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668B)
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) ≤ 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
	12/14/12	121214S05	PCB-4 to 15		0.00 (1.33-1.79)	1-12, MB1_10596	J/UJ/P (PCB-4, DiCBs) (c)
			~~PCB-15~~		0.00 (1.33-1.79)	1-12, MB1_10596	~~J/UJ/P (PCB-15, DiCBs) (c)~~
	07/26/12	120725X16	PCB-4		0.00 (1.33-1.79)	13-18	J/UJ/P (PCB-4, DiCBs) (c)

	Halogen	Selected ions (m/z)	Ion Abundace Ratio		Halogen	Selected ions (m/z)	Ion Abundace Ratio
	1 Cl	M/M+2	2.66-3.60		7 Cl	M/M+2	0.37-0.51
	2 Cl	M/M+2	1.33-1.81		7 Cl	M+2/M+4	0.88-1.20
	3 Cl	M/M+2	0.88-1.20		8 Cl	M+2/M+4	0.76-1.02
	4 Cl	M/M+2	0.65-0.89		9 Cl	M/M+2	1.14-1.54
	5 Cl	M+2/M+4	1.32-1.78		9 CL	M/M-2	0.66-0.90
	6 Cl	M/M+2	0.43-0.59		10 CL	M/M+2	0.99-1.35
	6 Cl	M+2/M+4	1.05-1.43				

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Mr
2nd Reviewer: 9

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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?
Blank extraction date: 01/31/13 **Blank analysis date:** 02/18/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1 10596(d10)	5x	1	2	3	4	5	6 (d10)	7	8	9 (d10)
PCB-118	25.5	127.5									
Mono-CBs	249	1245									
Di-CBs	3990*	19950									
Tri-CBs	5680*	28400									
Tetra-CBs	2130*	10650									
Penta-CBs	379*	1895									
Hexa-CBs	161*	805									
Hepta-CBs	34*	170									
Total PCB (Monon-Deca)	12600*	63000									
PCB-1	76.7	383.5									
PCB-2	62.4	312		162	96.8		115	128	105	58.5	96.7
PCB-3	110	550		242	140		164	182	142	76.8	181
PCB-4	489	2445									
PCB-10	30.2	151									
PCB-9	115	575	207		289		207	376	252	87.3	231
PCB-7	71	355	99.7		142	352	110	187	107	39.4	147*
PCB-6	292*	1460			866		678		980	341	821
PCB-5	36.2	181	30.7	174	67.6	89.4	46.3	83.9	45.3	16.8	63.3
PCB-8	1530	7650	4760		3230		2470	5240	3120	1040	3630
PCB-11	1010	5050	2250		3130		4120			2100	
PCB-13/12	64.4	322								158	

2086 [illegible]

Compound	Blank ID		Sample Identification								
	MB1_10596(d10)	5x	1	2	3	4	5	6 (d10)	7	8	9 (d10)
PCB-15	347	1735					1650			802	
PCB-19	132	660									
PCB-30/18	1170	5850	4700							4240	
PCB-17	547	2735								2430	
PCB-27	72.7	363.5									
PCB-24	13.5*	67.5	58.8							54.7	
PCB-16	521	2605	1740							1330	
PCB-32	299	1495									
PCB-26/29	172	860									
PCB-25	77.9	389.5									
PCB-31	828	4140								3000	
PCB-28/20	921	4605								3470	
PCB-21/33	526	2630	2230		2220		1690		2170	696	
PCB-22	299	1495								780	
PCB-37	93.3	466.5									
PCB-50/53	90.3	451.5									
PCB-45	88.8	444									
PCB-51	51.3	256.5									
PCB-46	31.2*	156									
PCB-52	430	2150									
PCB-43	20.7*	103.5									
PCB-69/49	218	1090									
PCB-48	104	520									
PCB-44/47/65	389	1945									
PCB-59/62/75	39.1	195.5									
PCB-42	95.5	477.5									
PCB-41	50.8	254								129	
PCB-71/40	141	705									

3of 6 Tm

Compound	Blank ID		Sample Identification								
	MB1 10596(d10)	5x	1	2	3	4	5	6 (d10)	7	8	9 (d10)
PCB-64	116	580									
PCB-61/70/74/76	170	850									
PCB-66	74	370									
PCB-56	22	110									
PCB-95	104	520									
PCB-91	14.5	72.5									
PCB-84	24.4*	122									
PCB-113/90/101	75.5	377.5									
PCB-99	29.6	148									
PCB-108/119/86/97/125/87	52.9	264.5									
PCB-110	52	260									
PCB-136	9.66	48.3									
PCB-151/135	26.4	132									
PCB-147/149	39.6*	198									
PCB-132	17.9	89.5									
PCB-153/168	33.8	169									
PCB-163/138/129	34.1*	170.5									
PCB-179	11.8	59								54.9	
PCB-180/193	22.2*	111									

*EMPC
All contaminants within five times the method blank concentration were qualified as not detected, "U".

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LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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?
Blank extraction date: 01/31/13 **Blank analysis date:** 02/18/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1 10596(d10)	5x	10 (d10)	11	12	13	14	17	18		
PCB-118	25.5	127.5		67.8	23.6	30.7	37.5	18.2	18.5		
Mono-CBs	249	1245		126	99.8	152	115	17.9	17.6		
Di-CBs	3990*	19950		934*	752*	1600	997	236	138		
Tri-CBs	5680*	28400		940	660*	1290	753	178	166*		
Tetra-CBs	2130*	10650		990*	638*	638*	663*	158*	168*		
Penta-CBs	379*	1895		568*	279*	317*	380*	112	137		
Hexa-CBs	161*	805		597*	226*	358*	320*	90*	128*		
Hepta-CBs	34*	170						57.9*	97.8*		
Total PCB (Monon-Deca)	12600*	63000		~~5050*~~	~~2950*~~	~~5010*~~	~~3780*~~	~~976*~~	~~932*~~		
PCB-1	76.7	383.5		48.9	35.6	56.4	41.8	6.46	6.56		
PCB-2	62.4	312	89.3	34.2	30	39.2	35.5	5.36	4.79		
PCB-3	110	550	127	43.2	34.2	56.3	38	6.1	6.21		
PCB-4	489	2445		114	67.9	161	75.4	9.64	15.4		
PCB-10	30.2	151		14.5	7.17*	9.94	6.4	1.14	1.41		
PCB-9	115	575	225	15.8	10.9*	24.6	13.6	3.01	3.46		
PCB-7	71	355	99.1	10.1	7.31*	19.1	8.81				
PCB-6	292*	1460	893	46.7	37.1	71.7	53.4	5.41	5.91		
PCB-5	36.2	181	38.6	4.21	3.63	6.39	3.47				
PCB-8	1530	7650	2930	162	106	284	129	19.4	23.5		
PCB-11	1010	5050		498	457	934	629	151	58.3		
PCB-13/12	64.4	322		13.8*	18.8*	23.5	23.5	8	5.28		

5/96 ym

Compound	Blank ID		Sample Identification								
	MB1 10596(d10)	5x	10 (d10)	11	12	13	14	17	18		
PCB-15	347	1735		54.2	35.2*	69.1	53.2	37.8	24.9		
PCB-19	132	660		29.4	17.9	37.1	19.7	2.67	3.51		
PCB-30/18	1170	5850		162	114	278	133	15	18.9		
PCB-17	547	2735		79.8	52.5	129	64.5	8.87	11.5		
PCB-27	72.7	363.5		17.5	9.72	18.7	12.3	2.28	2.31		
PCB-24	13.5*	67.5		2.23	2.1	3.85	2.73				
PCB-16	521	2605		77.9	59.1	133	61.3	7.38	8.43		
PCB-32	299	1495		52.3	34.7	71.2	41.8	6.96	7.24*		
PCB-26/29	172	860		31.5	21.8	36.3	27.8	8.94	7.57		
PCB-25	77.9	389.5		16	10.2	15.9	14.1	5.06	4.42		
PCB-31	828	4140		139	96	172	113	29.1	27.8		
PCB-28/20	921	4605		163	109	189	132	41.8	37.8		
PCB-21/33	526	2630	2000	77.3	61.3	110	57.5	12.2	11.7		
PCB-22	299	1495		53.7	39.8	64.1	37.8	10.4	9.33		
PCB-37	93.3	466.5		33.4	25	27.8	30.3	24.7	15.6		
PCB-50/53	90.3	451.5		23.7	14.2	20	15.6	2.03	3.11		
PCB-45	88.8	444		18.7	12.5	23.6	14.1	2.09	2.66		
PCB-51	51.3	256.5		28.7	24.3	13.2	18.4	1.2*	1.74*		
PCB-46	31.2*	156		9.3	5.4*	8.58	5.72*	0.871	1.12		
PCB-52	430	2150		163	94.2	136	128	20.7	25		
PCB-43	20.7*	103.5		3.66*	3.08	5.02	4.32				
PCB-69/49	218	1090		79.6	41.4	51.6	50.5	9.52	12.6		
PCB-48	104	520		20.9	13.5	22.3	15.9	2.6	3.15		
PCB-44/47/65	389	1945		211	188	109	136	19.5	25.5		
PCB-59/62/75	39.1	195.5		10.2	7.02	7.64	6.88	1.68	1.85		
PCB-42	95.5	477.5		29.3	16.6	21.2	19.2	4.7	5.26		
PCB-41	50.8	254		10.8	7.14	9.98	6.45	1.64	1.74		
PCB-71/40	141	705		53.6	29.5	33.9	33.1	8	9.42		

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Compound	Blank ID		Sample Identification								
	MB1 10596(d10)	5x	10 (d10)	11	12	13	14	17	18		
PCB-64	116	580		41	22.5	29.4	25.9	6.15	6.82		
PCB-61/70/74/76	170	850		133	67.7	74.6	85.3	32.4	30.8		
PCB-66	74	370		75	38.3	34.5	48.8	22.3	19.3		
PCB-56	22	110		35.8	19.4	16.3	21.2	10.5	8.68		
PCB-95	104	520		87.6	49.2	63.2	68.6	13.4	19		
PCB-91	14.5	72.5		12.1	7.29	7.19*	10.2	1.85	3.03		
PCB-84	24.4*	122		27.3	15.5	17.9	20.9	4.24	5.94		
PCB-113/90/101	75.5	377.5		91.7	44.3	52.4	61.4	16.4	22.6		
PCB-99	29.6	148		37.1	16.8	20.3	27.2	8.72	9.93		
PCB-108/119/86/97/125/87	52.9	264.5		52.1	30.7	30.1	36.1	11.6	14.1		
PCB-110	52	260		92.6	41	48.5	59.7	20.1	24		
PCB-136	9.66	48.3		14.8	8.27	10.2	10.6	2.72	4.33		
PCB-151/135	26.4	132		41.4	17.3	26	24.7	7.04	11.1		
PCB-147/149	39.6*	198		102	39.2	60.2	57	15.4	25.2		
PCB-132	17.9	89.5		37	14.3	21	19.8	6.73	7.84		
PCB-153/168	33.8	169		115	38.9	68.1	58.6	17	24.8		
PCB-163/138/129	34.1*	170.5		151	49.2	89.5	77.3	20.8	28.2		
PCB-179	11.8	59		20.8	8.29	13.8	10.3	3.12	5		
PCB-180/193	22.2*	111			64.8			16.5	26.3		

*EMPC
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
[redacted]	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-77	5.73	28.65									
PCB-105	31	155									
PCB-114	1.73*	8.65									
PCB-118	67.8	339									
PCB-123	1.17	5.85									
PCB-156/157	18.8	94			66.8	63.5		83.3	29.1	62.9	68.5
PCB-167	5.16	25.8							11.9		
PCB-189	3.42	17.1		10.6	2.6	3.54		4.63	1.71		
Mono-CBs	126	630									
Di-CBs	934*	4670									
Tri-CBs	940	4700									
Tetra-CBs	990*	4950									
Penta-CBs	568*	2840									
Hexa-CBs	597*	2985									
Hepta-CBs	684	3420			1350*	1370	2830*	1800*	664*	1700*	1450*
Octa-CBs	192*	960			185	226*	541*	288	106*	377*	213*
Nona-CBs	12.7	63.5			22.9* ✓	33*	~~79.5~~	39.9	14.4		
Deca-CB	1.72	8.6			5.02	7.76			5.38		
Total PCB (Mono-Deca)	5050*	25250									
PCB-1	48.9	244.5									
PCB-2	34.2	171		162	96.8	115	128	105	58.5	96.7	89.3
PCB-3	43.2	216			140	164	182	142	76.8	181	127

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-4	114	570									
PCB-10	14.5	72.5									
PCB-9	15.8	79									
PCB-7	10.1	50.5							39.4		
PCB-6	46.7	233.5									
PCB-5	4.21	21.05							16.8		
PCB-8	162	810									
PCB-14	1.08	5.4			4.98*						
PCB-11	498	2490	2250						2100		
PCB-13/12	13.8*	69									
PCB-15	54.2	271									
PCB-19	29.4	147									
PCB-30/18	162	810									
PCB-17	79.8	399									
PCB-27	17.5	87.5									
PCB-24	2.23	11.15									
PCB-16	77.9	389.5									
PCB-32	52.3	261.5									
PCB-26/29	31.5	157.5									
PCB-25	16	80									
PCB-31	139	695									
PCB-28/20	163	815									
PCB-21/33	77.3	386.5									
PCB-22	53.7	268.5									
PCB-35	4.73	23.65									
PCB-37	33.4	167									
PCB-54	1.25	6.25									
PCB-50/53	23.7	118.5									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-45	18.7	93.5									
PCB-51	28.7	143.5									
PCB-46	9.3	46.5									
PCB-52	163	815									
PCB-73	0.746	3.73									
PCB-43	3.66*	18.3									
PCB-69/49	79.6	398									
PCB-48	20.9	104.5									
PCB-44/47/65	211	1055									
PCB-59/62/75	10.2	51									
PCB-42	29.3	146.5									
PCB-41	10.8	54									
PCB-71/40	53.6	268									
PCB-64	41	205									
PCB-72	1.07	5.35									
PCB-68	9.5	47.5							35.1		
PCB-67	2.76	13.8									
PCB-63	2.98	14.9									
PCB-61/70/74/76	133	665									
PCB-66	75	375									
PCB-55	1	5									
PCB-56	35.8	179									
PCB-60	15.8	79									
PCB-79	1.04	5.2									
PCB-96	1.06	5.3									
PCB-103	1.33	6.65									
PCB-94	0.926	4.63									
PCB-95	87.6	438									

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9m

Compound	Blank ID	Sample Identification									
[redacted]	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-100/93	1.86	9.3									
PCB-102	3.69	18.45									
PCB-91	12.1	60.5									
PCB-84	27.3	136.5									
PCB-89	1.35	6.75									
PCB-92	16.8	84									
PCB-113/90/101	91.7	458.5									
PCB-83	5	25									
PCB-99	37.1	185.5									
PCB-108/119/86/97/125/87	52.1	260.5									
PCB-117	2.51	12.55									
PCB-116/85	10.4	52									
PCB-110	92.6	463									
PCB-115	1.83	9.15									
PCB-82	10.3	51.5									
PCB-107/124	2.52	12.6									
PCB-109	5.02	25.1									
PCB-122	0.911	4.555									
PCB-136	14.8	74									
PCB-151/135	41.4	207									
PCB-154	1.05	5.25									
PCB-144	5.65	28.25									
PCB-147/149	102	510									
PCB-134	5.27	26.35									
PCB-139/140	0.876*	4.38									
PCB-131	0.944	4.72									
PCB-132	37	185									
PCB-133	1.44	7.2									

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Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-146	15.6	78									
PCB-153/168	115	575							554		
PCB-141	34.6	173				154				171	
PCB-130	5.24	26.2									
PCB-137	2.4	12									
PCB-164	10.7	53.5							47		
PCB-163/138/129	151	755							551		
PCB-158	13.3	66.5							38		
PCB-128/166	15.4	77							60.3		
PCB-179	20.8	104				96.3			54.9		
PCB-176	6.33	31.65			27.5	20.8		28.9	10.6	24.9*	25.3
PCB-178	12.3	61.5			55.6	46.1			23.2	40.4*	
PCB-175	2.5	12.5			9.36	10.5			4.33		10.2*
PCB-187	82.6	413			294	342			159	368	370
PCB-183	39.5	197.5			97.4	107		137	52.8	135	120
PCB-185	7.3	36.5			25.4	20.2	32	21.3	8.92	19	11.6
PCB-174	96.1	480.5			172	167	328	208	76.5	225	165
PCB-177	47.4	237			101	107	216	135	52	120	110
PCB-171/173	23	115			41.1	41.9	91.3	52.4	20.7	52.3	41.5
PCB-172	15.2	76			20.8	22.7	43.3	28.2	10.4		18
PCB-180/193	214	1070			271	267	631	360	129	380	281
PCB-191	3.8	19			4.99			6.72	2.14*		
PCB-170	90.4	452		448	88.1	99.3	242	124	47.8	149	90.4
PCB-190	19.4	97			19.3	20.3	52.8	27.6	10.4	37.6*	19.9*
PCB-202	4.63*	23.15			18.4				10.8*	22.1*	
PCB-201	4.18*	20.9			12.7	14.5		18.9	7.1	16.6*	16.8
PCB-197	1.52	7.6			3.19	3.31*		4.44			
PCB-200	5.19	25.95			4.59	4.25		6.86		16	

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-102	5x	1	2	3	5	6	7	8	9	10
PCB-198/199	47.6	238			54.2	58.5	141*	79.5	33.2	92.6	71.2
PCB-196	22.9	114.5			21.4	22.8	68.6	32.2	12.8	44.8	23.9*
PCB-203	27.9	139.5			28.6	30.1	77.1*	40.1	16.4	46.6*	34.3
PCB-195	23.4	117		72.1	12.2	20.3	44	20.9	6.99*	41.8	
PCB-194	52.4	262		147	29.1	48	139	51.5	18.7	96.9	37.7
PCB-205	2.14*	10.7		6.88	1.29			2.92			
PCB-208	1.89	9.45			7.77				5.33		
PCB-207	1.33	6.65			2.86*	3.74*		5.54			
PCB-206	9.46	47.3			12.2	18.1*		21.2	9.02		
PCB-209	1.72	8.6			5.02	7.76			5.38		

*EMPC

N08-CE05-TKVK-XR01-102 (A5125)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-77	3.28	16.4									
PCB-105	10.8	54									
PCB-114	0.988*	4.94									
PCB-118	23.6	118									
PCB-123	0.968*	4.84									
PCB-156/157	6.57	32.85							29.1		
PCB-167	1.99	9.95									
PCB-189	1.47	7.35			2.6	3.54		4.63	1.71		
Mono-CBs	99.8	499									
Di-CBs	752*	3760									
Tri-CBs	660*	3300									
Tetra-CBs	638*	3190									
Penta-CBs	279*	1395									
Hexa-CBs	226*	1130									
Hepta-CBs	219*	1095							664*		
Octa-CBs	70.6*	353			185	226*		288	106*		213*
Nona-CBs	7.4	37			22.9*	33*			14.4		
Deca-CB	2.3	11.5			5.02	7.76		8.74	5.38		
Total PCB (Mono-Deca)	2950*	14750									
PCB-1	35.6	178									
PCB-2	30	150			96.8	115	128	105	58.5	96.7	89.3
PCB-3	34.2	171			140	164		142	76.8		127

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9m

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-4	67.9	339.5									
PCB-10	7.17*	35.85									
PCB-9	10.9*	54.5									
PCB-7	7.31*	36.55									
PCB-6	37.1	185.5									
PCB-5	3.63	18.15							16.8		
PCB-8	106	530									
PCB-14	1.39	6.95			4.98*						
PCB-11	457	2285	2250						2100		
PCB-13/12	18.8*	94									
PCB-15	35.2*	176									
PCB-19	17.9	89.5									
PCB-30/18	114	570									
PCB-17	52.5	262.5									
PCB-27	9.72	48.6									
PCB-24	2.1	10.5									
PCB-16	59.1	295.5									
PCB-32	34.7	173.5									
PCB-34	0.88	4.4									
PCB-26/29	21.8	109									
PCB-25	10.2	51									
PCB-31	96	480									
PCB-28/20	109	545									
PCB-21/33	61.3	306.5									
PCB-22	39.8	199									
PCB-36	1	5									
PCB-39	1.14*	5.7									
PCB-35	4.1	20.5									

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gm

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-37	25	125									
PCB-54	0.824*	4.12									
PCB-50/53	14.2	71									
PCB-45	12.5	62.5									
PCB-51	24.3	121.5									
PCB-46	5.4*	27									
PCB-52	94.2	471									
PCB-73	0.748	3.74									
PCB-43	3.08	15.4									
PCB-69/49	41.4	207									
PCB-48	13.5	67.5									
PCB-44/47/65	188	940									
PCB-59/62/75	7.02	35.1									
PCB-42	16.6	83									
PCB-41	7.14	35.7									
PCB-71/40	29.5	147.5									
PCB-64	22.5	112.5									
PCB-72	0.585*	2.925									
PCB-68	12.2	61							35.1		
PCB-57	0.67*	3.35									
PCB-67	1.82*	9.1									
PCB-63	2.09	10.45									
PCB-61/70/74/76	67.7	338.5									
PCB-66	38.3	191.5									
PCB-55	0.975*	4.875									
PCB-56	19.4	97									
PCB-60	9.41	47.05									
PCB-79	1.07	5.35									

10 of 32
gm

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-104	0.665	3.325									
PCB-96	1.33	6.65									
PCB-103	1.22	6.1									
PCB-95	49.2	246									
PCB-100/93	1.68	8.4									
PCB-102	2.66	13.3									
PCB-91	7.29	36.45									
PCB-84	15.5	77.5									
PCB-92	8.24	41.2									
PCB-113/90/101	44.3	221.5									
PCB-83	2.95	14.75									
PCB-99	16.8	84									
PCB-108/119/86/97/125/87	30.7	153.5									
PCB-117	1*	5									
PCB-116/85	6.23	31.15									
PCB-110	41	205									
PCB-115	1.16*	5.8									
PCB-82	5.13	25.65									
PCB-107/124	1.92	9.6									
PCB-109	2.54	12.7									
PCB-122	0.865	4.325									
PCB-155	1	5							2.55*		
PCB-152	0.515*	2.575							1.8		
PCB-150	0.358*	1.79									
PCB-136	8.27	41.35									
PCB-145	0.497	2.485	1.5	2.26				1.32			
PCB-148	0.661*	3.305									
PCB-151/135	17.3	86.5									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-154	1.01	5.05									
PCB-144	3.03	15.15									
PCB-147/149	39.2	196									
PCB-134	2.29*	11.45									
PCB-143	0.517*	2.585							1.86		
PCB-139/140	1.1*	5.5									
PCB-131	0.976	4.88									
PCB-132	14.3	71.5									
PCB-133	1.04*	5.2									
PCB-146	5.76	28.8									
PCB-153/168	38.9	194.5									
PCB-141	11.8	59									
PCB-130	2.98	14.9									
PCB-137	1.29	6.45									
PCB-164	4.38	21.9									
PCB-163/138/129	49.2	246									
PCB-158	4.78	23.9									
PCB-128/166	6.2	31									
PCB-179	8.29	41.45									
PCB-176	2.56	12.8							10.6		
PCB-178	4.79	23.95							23.2		
PCB-175	1.34*	6.7							4.33		
PCB-187	23.9	119.5									
PCB-183	11.4	57							52.8		
PCB-185	3.51	17.55							8.92		11.6
PCB-174	30.7	153.5							76.5		
PCB-177	15	75							52		
PCB-171/173	7.96*	39.8							20.7		

12937
Sm

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR01-101	5x	1	2	3	5	6	7	8	9	10
PCB-172	4.87	24.35			20.8	22.7			10.4		18
PCB-180/193	64.8	324			271	267			129		281
PCB-191	1.48	7.4			4.99			6.72	2.14*		
PCB-170	30.6	153			88.1	99.3		124	47.8		90.4
PCB-190	6.24	31.2			19.3	20.3		27.6	10.4		19.9*
PCB-202	2.17	10.85							10.8*		
PCB-201	1.66*	8.3							7.1		
PCB-197	0.955	4.775			3.19	3.31*		4.44			
PCB-200	2.13	10.65			4.59	4.25		6.86			
PCB-198/199	17.3	86.5			54.2	58.5		79.5	33.2		71.2
PCB-196	7.16*	35.8			21.4	22.8		32.2	12.8		23.9*
PCB-203	9.67	48.35			28.6	30.1		40.1	16.4	46.6*	34.3
PCB-195	8.37	41.85			12.2	20.3		20.9	6.99*	41.8	
PCB-194	20	100			29.1	48		51.5	18.7	96.9	37.7
PCB-205	1.27*	6.35			1.29			2.92			
PCB-208	1.36	6.8			~~7.77~~				5.33		
PCB-207	1.04	5.2			2.86*	3.74*					
PCB-206	5	25			12.2	18.1*		21.2	9.02		
PCB-209	2.3	11.5			5.02	7.76		8.74	5.38		

*EMPC

N08-CE05-TKVK-XR01-101 (A5125)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5x	1	2	3	5	6	7	8	9	10
PCB-77	2.71	13.55									
PCB-105	15.4	77									
PCB-114	0.957*	4.785									
PCB-118	30.7	153.5									
PCB-123	0.709*	3.545									
PCB-156/157	12.9	64.5				63.5			29.1	62.9	
PCB-167	3.51	17.55							11.9		
PCB-189	3.02	15.1		10.6	2.6	3.54		4.63	1.71		
Mono-CBs	152	760									
Di-CBs	1600	8000									
Tri-CBs	1290	6450									
Tetra-CBs	638*	3190									
Penta-CBs	317*	1585									
Hexa-CBs	358*	1790									
Hepta-CBs	474*	2370			1350*	1370		1800*	664*	1700*	1450*
Octa-CBs	161*	805			185	226*	541*	288	106*	377*	213*
Nona-CBs	12	60			~~20~~ 22.9	33*		39.9	14.4		
Deca-CB	1.56	7.8			5.02	7.76			5.38		
Total PCB (Mono-Deca)	5010*	25050									
PCB-1	56.4	282									
PCB-2	39.2	196		162	96.8	115	128	105	58.5	96.7	89.3
PCB-3	56.3	281.5		242	140	164	182	142	76.8	181	127

14432
9M

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5x	1	2	3	5	6	7	8	9	10
PCB-4	161	805									
PCB-10	9.94	49.7									
PCB-9	24.6	123							87.3		
PCB-7	19.1	95.5							39.4		
PCB-6	71.7	358.5							341		
PCB-5	6.39	31.95	30.7						16.8		
PCB-8	284	1420							1040		
PCB-11	934	4670	2250		3130	4120			2100		
PCB-13/12	23.5	117.5									
PCB-15	69.1	345.5									
PCB-19	37.1	185.5									
PCB-30/18	278	1390									
PCB-17	129	645									
PCB-27	18.7	93.5									
PCB-24	3.85	19.25									
PCB-16	133	665									
PCB-32	71.2	356									
PCB-26/29	36.3	181.5									
PCB-25	15.9	79.5									
PCB-31	172	860									
PCB-28/20	189	945									
PCB-21/33	110	550									
PCB-22	64.1	320.5									
PCB-35	5.47	27.35									
PCB-37	27.8	139									
PCB-50/53	20	100									
PCB-45	23.6	118									
PCB-51	13.2	66									

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m

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5x	1	2	3	5	6	7	8	9	10
PCB-46	8.58	42.9									
PCB-52	136	680									
PCB-73	0.61	3.05									
PCB-43	5.02	25.1									
PCB-69/49	51.6	258									
PCB-48	22.3	111.5									
PCB-44/47/65	109	545									
PCB-59/62/75	7.64	38.2									
PCB-42	21.2	106									
PCB-41	9.98	49.9									
PCB-71/40	33.9	169.5									
PCB-64	29.4	147									
PCB-68	2.49	12.45									
PCB-67	1.68*	8.4									
PCB-63	1.87	9.35									
PCB-61/70/74/76	74.6	373									
PCB-66	34.5	172.5									
PCB-55	1.2	6									
PCB-56	16.3	81.5									
PCB-60	9	45									
PCB-79	0.906	4.53									
PCB-96	0.957*	4.785									
PCB-95	63.2	316									
PCB-102	2.03*	10.15									
PCB-91	7.19*	35.95									
PCB-84	17.9	89.5									
PCB-92	8.6	43									
PCB-113/90/101	52.4	262									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5x	1	2	3	5	6	7	8	9	10
PCB-83	2.69	13.45									
PCB-99	20.3	101.5									
PCB-108/119/86/97/125/87	30.1	150.5									
PCB-116/85	6.67	33.35									
PCB-110	48.5	242.5									
PCB-82	5.15	25.75									
PCB-107/124	1.49	7.45									
PCB-109	2.06	10.3									
PCB-136	10.2	51									
PCB-151/135	26	130									
PCB-144	3.9	19.5									
PCB-147/149	60.2	301									
PCB-134	3.07	15.35									
PCB-131	0.833*	4.165									
PCB-132	21	105									
PCB-146	9.16	45.8									
PCB-153/168	68.1	340.5									
PCB-141	21.7	108.5							76		
PCB-130	2.97	14.85									
PCB-137	2.26	11.3									
PCB-164	5.4	27									
PCB-163/138/129	89.5	447.5									
PCB-158	8.26	41.3							38		
PCB-128/166	8.52	42.6									
PCB-179	13.8	69							54.9		
PCB-176	3.87	19.35							10.6		
PCB-178	7.04	35.2							23.2		
PCB-175	1.8	9							4.33		

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CM

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-101	5x	1	2	3	5	6	7	8	9	10
PCB-187	52.6	263							159		
PCB-183	27.7	138.5			97.4	107		137	52.8	135	120
PCB-185	4.99	24.95				20.2		21.3	8.92	19	11.6
PCB-174	65.9	329.5			172	167	328	208	76.5	225	165
PCB-177	31	155			101	107		135	52	120	110
PCB-171/173	14.8	74			41.1	41.9		52.4	20.7	52.3	41.5
PCB-172	10.1	50.5			20.8	22.7	43.3	28.2	10.4		18
PCB-180/193	152	760			271	267	631	360	129	380	281
PCB-191	2.22*	11.1			4.99			6.72	2.14*		
PCB-170	68.7	343.5			88.1	99.3	242	124	47.8	149	90.4
PCB-190	14.5	72.5			19.3	20.3	52.8	27.6	10.4	37.6*	19.9*
PCB-202	3.48	17.4							10.8*		
PCB-201	2.94	14.7			12.7	14.5			7.1		
PCB-197	1.67	8.35			3.19	3.31*		4.44			
PCB-200	2.28*	11.4			4.59	4.25		6.86			
PCB-198/199	39.7	198.5			54.2	58.5	141*	79.5	33.2	92.6	71.2
PCB-196	19.5	97.5			21.4	22.8	68.6	32.2	12.8	44.8	23.9*
PCB-203	23.4	117			28.6	30.1	77.1*	40.1	16.4	46.6*	34.3
PCB-195	18	90		72.1	12.2	20.3	44	20.9	6.99*	41.8	
PCB-194	47.5	237.5		147	29.1	48	139	51.5	18.7	96.9	37.7
PCB-205	2.7*	13.5		6.88	1.29			2.92			
PCB-208	1.66	8.3			7.77				5.33		
PCB-207	1.06	5.3			2.86*	3.74*					
PCB-206	9.33	46.65			12.2	18.1*		21.2	9.02		
PCB-209	1.56	7.8			5.02	7.76			5.38		

*EMPC

N08-CE05-TKVK-XR02-101 (A5125)

All contaminants within five times the blank concentration were qualified as not detected, "U".

V:\Field Blanks\29736B31_N08-CE05-TKVK-XR02-101.wpd

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: VM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5x	1	2	3	5	6	7	8	9	10
PCB-77	4.78*	23.9									
PCB-105	17	85									
PCB-114	1.16*	5.8									
PCB-118	37.5	187.5									
PCB-156/157	11.7	58.5							29.1		
PCB-167	3.12	15.6							11.9		
PCB-189	2.28	11.4		10.6	2.6	3.54		4.63	1.71		
Mono-CBs	115	575									
Di-CBs	997	4985									
Tri-CBs	753	3765									
Tetra-CBs	663*	3315									
Penta-CBs	380*	1900									
Hexa-CBs	320*	1600									
Hepta-CBs	383*	1915			1350*	1370		1800*	664*	1700*	1450*
Octa-CBs	147*	735			185	226*	541*	288	106*	377*	213*
Nona-CBs	13.6	68			22.9*	33*		39.9	14.4		
Deca-CB	4.3	21.5		12.6	5.02	7.76		8.74	5.38		
Total PCB (Mono-Deca)	3780*	18900									
PCB-1	41.8	209									
PCB-2	35.5	177.5		162	96.8	115	128	105	58.5	96.7	89.3
PCB-3	38	190			140	164	182	142	76.8	181	127
PCB-4	75.4	377									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5x	1	2	3	5	6	7	8	9	10
PCB-10	6.4	32									
PCB-9	13.6	68									
PCB-7	8.81	44.05							39.4		
PCB-6	53.4	267									
PCB-5	3.47	17.35							16.8		
PCB-8	129	645									
PCB-11	629	3145	2250		3130				2100		
PCB-13/12	23.5	117.5									
PCB-15	53.2	266									
PCB-19	19.7	98.5									
PCB-30/18	133	665									
PCB-17	64.5	322.5									
PCB-27	12.3	61.5									
PCB-24	2.73	13.65									
PCB-16	61.3	306.5									
PCB-32	41.8	209									
PCB-26/29	27.8	139									
PCB-25	14.1	70.5									
PCB-31	113	565									
PCB-28/20	132	660									
PCB-21/33	57.5	287.5									
PCB-22	37.8	189									
PCB-35	5.38	26.9									
PCB-37	30.3	151.5									
PCB-54	0.834	4.17									
PCB-50/53	15.6	78									
PCB-45	14.1	70.5									
PCB-51	18.4	92									

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JM

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5x	1	2	3	5	6	7	8	9	10
PCB-46	5.72*	28.6									
PCB-52	128	640									
PCB-73	0.515	2.575									
PCB-43	4.32	21.6									
PCB-69/49	50.5	252.5									
PCB-48	15.9	79.5									
PCB-44/47/65	136	680									
PCB-59/62/75	6.88	34.4									
PCB-42	19.2	96									
PCB-41	6.45	32.25									
PCB-71/40	33.1	165.5									
PCB-64	25.9	129.5									
PCB-72	0.71	3.55									
PCB-68	6.2	31									
PCB-67	1.91	9.55									
PCB-63	2.24	11.2									
PCB-61/70/74/76	85.3	426.5									
PCB-66	48.8	244									
PCB-55	1.78	8.9									
PCB-56	21.2	106									
PCB-60	9.63	48.15									
PCB-96	1.08*	5.4									
PCB-95	68.6	343									
PCB-100/93	1.17	5.85									
PCB-102	3.08	15.4									
PCB-91	10.2	51									
PCB-84	20.9	104.5									
PCB-89	0.947*	4.735									

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Jm

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5x	1	2	3	5	6	7	8	9	10
PCB-92	11.6	58									
PCB-113/90/101	61.4	307									
PCB-83	2.44*	12.2									
PCB-99	27.2	136									
PCB-108/119/86/97/125/87	36.1	180.5									
PCB-116/85	8.62	43.1									
PCB-110	59.7	298.5									
PCB-82	6.83	34.15									
PCB-107/124	1.59	7.95									
PCB-109	3.01	15.05									
PCB-136	10.6	53									
PCB-151/135	24.7	123.5									
PCB-154	0.596*	2.98									
PCB-144	3.32	16.6									
PCB-147/149	57	285									
PCB-134	3.24	16.2									
PCB-132	19.8	99									
PCB-146	9.17	45.85									
PCB-153/168	58.6	293									
PCB-141	15.7	78.5							76		
PCB-130	3.04	15.2									
PCB-137	1.61*	8.05									
PCB-164	5.08	25.4									
PCB-163/138/129	77.3	386.5									
PCB-158	6.46	32.3									
PCB-128/166	9.32	46.6									
PCB-179	10.3	51.5									
PCB-176	2.93	14.65							10.6		

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR02-102	5x	1	2	3	5	6	7	8	9	10
PCB-178	4.84	24.2							23.2		
PCB-175	1.41	7.05							4.33		
PCB-187	40.5	202.5							159		
PCB-183	18.1	90.5							52.8		
PCB-185	3.72	18.6							8.92		11.6
PCB-174	47.1	235.5			172	167		208	76.5	225	165
PCB-177	24.1	120.5			101	107			52	120	110
PCB-171/173	12.5	62.5			41.1	41.9		52.4	20.7	52.3	41.5
PCB-172	7.97	39.85			20.8	22.7		28.2	10.4		18
PCB-180/193	128	640			271	267	631	360	129	380	281
PCB-191	2.65*	13.25			4.99			6.72	2.14*		
PCB-170	62.8	314			88.1	99.3	242	124	47.8	149	90.4
PCB-190	14	70			19.3	20.3	52.8	27.6	10.4	37.6*	19.9*
PCB-202	3.04	15.2							10.8*		
PCB-201	2.48*	12.4							7.1		
PCB-197	1.03	5.15			3.19	3.31*		4.44			
PCB-200	2.51*	12.55			4.59	4.25		6.86			
PCB-198/199	38.7	193.5			54.2	58.5	141*	79.5	33.2	92.6	71.2
PCB-196	19.5	97.5			21.4	22.8	68.6	32.2	12.8	44.8	23.9*
PCB-203	23	115			28.6	30.1	77.1*	40.1	16.4	46.6*	34.3
PCB-195	15.9	79.5		72.1	12.2	20.3	44	20.9	6.99*	41.8	
PCB-194	38.6	193		147	29.1	48	139	51.5	18.7	96.9	37.7
PCB-205	2.35	11.75		6.88	1.29			2.92			
PCB-208	2.69	13.45			7.77	11.1		13.2	5.33		
PCB-207	1.27	6.35			2.86*	3.74*		5.54			
PCB-206	9.68	48.4			12.2	18.1*		21.2	9.02		
PCB-209	4.3	21.5		12.6	5.02	7.76		8.74	5.38		

*EMPC

N08-CE05-TKVK-XR02-102 (A5125) All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: 9

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-101	5x	2	3	5	6	7	8	10		
PCB-77	6.45	32.25									
PCB-105	7.95	39.75									
PCB-118	18.2	91									
PCB-156/157	2.99	14.95									
PCB-167	1.03	5.15									
Mono-CBs	17.9	89.5									
Di-CBs	236	1180									
Tri-CBs	178	890									
Tetra-CBs	158*	790									
Penta-CBs	112	560									
Hexa-CBs	90*	450									
Hepta-CBs	57.9*	289.5									
Octa-CBs	37.3	186.5		185				106*			
Nona-CBs	67.5*	337.5		22.9*	33*	79.5	39.9	14.4			
Deca-CB	22.3	111.5		5.02	7.76		8.74	5.38			
Total PCB (Mono-Deca)	976*	4880									
PCB-1	6.46	32.3									
PCB-2	5.36	26.8									
PCB-3	6.1	30.5									
PCB-4	9.64	48.2									
PCB-10	1.14	5.7									
PCB-9	3.01	15.05									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-101	5x	2	3	5	6	7	8	10		
PCB-6	5.41	27.05									
PCB-8	19.4	97									
PCB-11	151	755									
PCB-13/12	8	40									
PCB-15	37.8	189									
PCB-19	2.67	13.35									
PCB-30/18	15	75									
PCB-17	8.87	44.35									
PCB-27	2.28	11.4									
PCB-16	7.38	36.9									
PCB-32	6.96	34.8									
PCB-26/29	8.94	44.7									
PCB-25	5.06	25.3									
PCB-31	29.1	145.5									
PCB-28/20	41.8	209									
PCB-21/33	12.2	61									
PCB-22	10.4	52									
PCB-35	2.57	12.85									
PCB-37	24.7	123.5									
PCB-50/53	2.03	10.15									
PCB-45	2.09	10.45									
PCB-51	1.2*	6									
PCB-46	0.871	4.355									
PCB-52	20.7	103.5									
PCB-69/49	9.52	47.6									
PCB-48	2.6	13									
PCB-44/47/65	19.5	97.5									
PCB-59/62/75	1.68	8.4									

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-101	5x	2	3	5	6	7	8	10		
PCB-42	4.7	23.5									
PCB-41	1.64	8.2									
PCB-71/40	8	40									
PCB-64	6.15	30.75									
PCB-61/70/74/76	32.4	162									
PCB-66	22.3	111.5									
PCB-55	1.13	5.65									
PCB-56	10.5	52.5									
PCB-60	4.66	23.3									
PCB-95	13.4	67									
PCB-91	1.85	9.25									
PCB-84	4.24	21.2									
PCB-92	2.76	13.8									
PCB-113/90/101	16.4	82									
PCB-99	8.72	43.6									
PCB-108/119/86/97/125/87	11.6	58									
PCB-116/85	2.94	14.7									
PCB-110	20.1	100.5									
PCB-82	2.48	12.4									
PCB-109	1.19	5.95									
PCB-136	2.72	13.6									
PCB-151/135	7.04	35.2									
PCB-144	1.14	5.7									
PCB-147/149	15.4	77									
PCB-132	6.73	33.65									
PCB-146	2.51	12.55									
PCB-153/168	17	85									
PCB-141	4.12	20.6									

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Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-101	5x	2	3	5	6	7	8	10		
PCB-130	1.23*	6.15									
PCB-137	0.812	4.06									
PCB-164	1.4	7									
PCB-163/138/129	20.8	104									
PCB-158	1.97	9.85									
PCB-128/166	3.1	15.5									
PCB-179	3.12	15.6									
PCB-184	0.591	2.955		2.05*			1.92*				
PCB-176	0.711*	3.555									
PCB-178	1.17*	5.85									
PCB-187	7.83	39.15									
PCB-183	3.56	17.8									
PCB-185	0.783	3.915									
PCB-174	8.02	40.1									
PCB-177	4.2	21									
PCB-171/173	2.09	10.45									
PCB-180/193	16.5	82.5									
PCB-170	7.91	39.55									
PCB-190	1.35	6.75									
PCB-202	1.45	7.25									
PCB-198/199	13.7	68.5		54.2	58.5			33.2			
PCB-196	3.34	16.7						12.8			
PCB-203	8.77	43.85		28.6	30.1		40.1	16.4	34.3		
PCB-195	2.14	10.7						6.99*			
PCB-194	7.87	39.35		29.1				18.7	37.7		
PCB-208	13	65	26.8	7.77	11.1	26	13.2	5.33			
PCB-207	4.3*	21.5	13	2.86*	3.74*		5.54				
PCB-206	50.1	250.5	54.7	12.2	18.1*	53.5	21.2	9.02			

Compound	Blank ID	Sample Identification									
[redacted]	N08-CE05-TKVK-XR04-101	5x	2	3	5	6	7	8	10		
PCB-209	22.3	111.5	12.6	5.02	7.76		8.74	5.38			

*EMPC

N08-CE05-TKVK-XR04-101 (A5125) All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: SM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 01/10/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Qual U (be)

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5x	2	3	5	6	7	8	10		
PCB-77	3.96	19.8									
PCB-105	7.79	38.95									
PCB-118	18.5	92.5									
PCB-156/157	3.3	16.5									
PCB-167	1.17	5.85									
Mono-CBs	17.6	88									
Di-CBs	138	690									
Tri-CBs	166*	830									
Tetra-CBs	168*	840									
Penta-CBs	137	685									
Hexa-CBs	128*	640									
Hepta-CBs	97.8*	489									
Octa-CBs	34.7*	173.5						106*			
Nona-CBs	30.6	153	94.5	22.9*	33*	79.5	39.9	14.4			
Deca-CB	13.7	68.5	12.6	5.02	7.76		8.74	5.38			
Total PCB (Mono-Deca)	932*	4660									
PCB-1	6.56	32.8									
PCB-2	4.79	23.95									
PCB-3	6.21	31.05									
PCB-4	15.4	77									
PCB-10	1.41	7.05									
PCB-9	3.46	17.3									

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JM

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5x	2	3	5	6	7	8	10		
PCB-6	5.91	29.55									
PCB-8	23.5	117.5									
PCB-11	58.3	291.5									
PCB-13/12	5.28	26.4									
PCB-15	24.9	124.5									
PCB-19	3.51	17.55									
PCB-30/18	18.9	94.5									
PCB-17	11.5	57.5									
PCB-27	2.31	11.55									
PCB-16	8.43	42.15									
PCB-32	7.24*	36.2									
PCB-26/29	7.57	37.85									
PCB-25	4.42	22.1									
PCB-31	27.8	139									
PCB-28/20	37.8	189									
PCB-21/33	11.7	58.5									
PCB-22	9.33	46.65									
PCB-37	15.6	78									
PCB-50/53	3.11	15.55									
PCB-45	2.66	13.3									
PCB-51	1.74*	8.7									
PCB-46	1.12	5.6									
PCB-52	25	125									
PCB-69/49	12.6	63									
PCB-48	3.15	15.75									
PCB-44/47/65	25.5	127.5									
PCB-59/62/75	1.85	9.25									
PCB-42	5.26	26.3									

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TM

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5x	2	3	5	6	7	8	10		
PCB-41	1.74	8.7									
PCB-71/40	9.42	47.1									
PCB-64	6.82	34.1									
PCB-68	0.928	4.64									
PCB-61/70/74/76	30.8	154									
PCB-66	19.3	96.5									
PCB-56	8.68	43.4									
PCB-60	4.46	22.3									
PCB-95	19	95									
PCB-91	3.03	15.15									
PCB-84	5.94	29.7									
PCB-92	4.25	21.25									
PCB-113/90/101	22.6	113									
PCB-83	1.74	8.7									
PCB-99	9.93	49.65									
PCB-108/119/86/97/125/87	14.1	70.5									
PCB-116/85	3.38	16.9									
PCB-110	24	120									
PCB-82	2.83	14.15									
PCB-136	4.33	21.65									
PCB-151/135	11.1	55.5									
PCB-144	1.66	8.3									
PCB-147/149	25.2	126									
PCB-132	7.84	39.2									
PCB-146	3.82	19.1									
PCB-153/168	24.8	124									
PCB-141	6.73	33.65									
PCB-130	1.5	7.5									

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Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5x	2	3	5	6	7	8	10		
PCB-137	0.783	3.915									
PCB-164	1.45*	7.25									
PCB-163/138/129	28.2	141									
PCB-158	2.58	12.9									
PCB-128/166	3.5	17.5									
PCB-179	5	25									
PCB-176	1.03	5.15									
PCB-178	1.97*	9.85									
PCB-187	15.2	76									
PCB-183	7.83	39.15									
PCB-185	0.708*	3.54									
PCB-174	13.3	66.5									
PCB-177	6.92	34.6									
PCB-171/173	3.68	18.4									
PCB-172	2.05	10.25									
PCB-180/193	26.3	131.5						129			
PCB-170	11.5	57.5						47.8			
PCB-190	2.32	11.6						10.4			
PCB-202	1.42*	7.1									
PCB-201	1.03	5.15									
PCB-200	0.95*	4.75		4.59	4.25						
PCB-198/199	9.74	48.7						33.2			
PCB-196	4.06	20.3						12.8			
PCB-203	6.06	30.3		28.6	30.1			16.4			
PCB-195	2.73	13.65		12.2				6.99*			
PCB-194	8.7	43.5		29.1				18.7	37.7		
PCB-208	4.53	22.65		7.77	11.1		13.2	5.33			
PCB-207	1.27	6.35		2.86*	3.74*		5.54				

Compound	Blank ID	Sample Identification									
	N08-CE05-TKVK-XR04-102	5x	2	3	5	6	7	8	10		
PCB-206	24.8	124	54.7	12.2	18.1*	53.5	21.2	9.02			
PCB-209	13.7	68.5	12.6	5.02	7.76		8.74	5.38			

*EMPC

N08-CE05-TKVK-XR04-102 (A5125) All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 29829736B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(*) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		MB1_10596	13C PCB-15	112 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	110 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-54	107 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-155	156 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-189	118 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
		1	13C PCB-15	110 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
		2	13C PCB-15	113 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	111 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-155	127 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-189	117 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
		3	13C PCB-15	134 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	112 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-77	128 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	129 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-105	114 (50-111)	J/UJ/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-123	117 (49-116)	Jdets/P (PCB-82 - PCB-95,PCB-97 - PCB-103,PCB-106 - PCB-113,PCB-115 - 117, PCB-119 - PCB-125, Penta-CBs)
			13C PCB-126	120 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-189	124 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	117 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		4	13C PCB-15	113 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	121 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-126	111 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	130 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-189	133 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
		5	13C PCB-15	128 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	129 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	115 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	115 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-155	178 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-189	156 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	119 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
		6	13C PCB-3	107 (11-106)	Jdets/P (PCB-2, PCB-3, Mono-CBs)
			13C PCB-4	123 (14-107)	Jdets/P (PCB-4, PCB-10, Di-CBs)
			13C PCB-15	133 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	133 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-54	119 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-104	127 (36-115)	Jdets/P (PCB-96,PCB-104,Penta-CBs)
			13C PCB-105	118 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	114 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	121 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 - PCB-117,PCB-119 - PCB-121,PCB-123 - PCB-125, Penta-CBs)
			13C PCB-126	110 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	141 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)

LDC #: 29731, B3)

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		6	13C PCB-156/157	123 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-188	131 (23-125)	Jdets/P (PCB-176,PCB-178,PCB-179,PCB-184,PCB-186,PCB-188,Hepta-CBs
			13C PCB-189	123 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	125 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
			13C PCB-206	126 (38-122)	Jdets/P (PCB-206, Nona-CBs)
			13C PCB-208	127 (31-126)	Jdets/P (PCB-207, PCB-208, Nona-CBs)
			13C PCB-209	123 (43-115)	Jdets/P (PCB-209, Deca-CBs)
		7	13C PCB-15	122 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	109 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-37	128 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	113 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	125 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-118	114 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	116 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	133 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-167	120 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-189	127 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
					text PM 10/27/17
		8	13C PCB-178 (Static)	72.4 (75-125)	~~J/UJ/P (PCB-170 - PCB-209, Hepta-CBs, Octa-CBs, Nona-CBs and Deca-CBs)~~
			13C PCB-15	124 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	110 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-77	125 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-126	116 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	137 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-167	127 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-189	126 (47-116	Jdets/P (PCB-189, Hepta-CBs)

LDC #: 29736b31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		9	13C PCB-178 (Static)	74.7 (75-125)	~~JUJ/P (PCB-170 - PCB-209, Hepta-CBs, Octa-CBs, Nona-CBs and Deca-CBs)~~
			13C PCB-3	113 (11-106)	Jdets/P (PCB-2, PCB-3, Mono-CBs)
			13C PCB-4	126 (14-107)	Jdets/P (PCB-4, PCB-10, Di-CBs)
			13C PCB-15	130 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	134 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-54	123 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-104	133 (36-115)	Jdets/P (PCB-96,PCB-104,Penta-CBs)
			13C PCB-155	177 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-180	156 (25-150)	Jdets/P (PCB-171 - PCB-175,PCB-177,PCB-180 - PCB-183,PCB-185, PCB-187,PCB-190 - PCB-193,Hepta-CBs
			13C PCB-188	129 (23-125)	Jdets/P (PCB-176,PCB-178,PCB-179,PCB-184,PCB-186,PCB-188,Hepta-CBs
			13C PCB-189	134 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	126 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
			13C PCB-208	130 (31-126)	Jdets/P (PCB-207, PCB-208, Nona-CBs)
			13C PCB-209	125 (43-115)	Jdets/P (PCB-209, Deca-CBs)
		10	13C PCB-3	110 (11-106)	Jdets/P (PCB-2, PCB-3, Mono-CBs)
			13C PCB-4	124 (14-107)	Jdets/P (PCB-4, PCB-10, Di-CBs)
			13C PCB-15	133 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	126 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-54	119 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	113 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-104	120 (36-115)	Jdets/P (PCB-96,PCB-104,Penta-CBs)
			13C PCB-105	117 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	118 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	121 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 -
			13C PCB-155	139 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-189	121 (47-116)	Jdets/P (PCB-189, Hepta-CBs)

text TM 10/27/14

LDC #: 29736(B3)

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: SM
2nd Reviewer: K

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		10	13C PCB-205	123 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
			13C PCB-206	128 (38-122)	Jdets/P (PCB-206, Nona-CBs)
			13C PCB-208	128 (31-126)	Jdets/P (PCB-207, PCB-208, Nona-CBs)
			13C PCB-209	120 (43-115)	Jdets/P (PCB-209, Deca-CBs)
		11	13C PCB-15	142 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	122 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-37	132 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	109 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	135 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-104	118 (36-115)	Jdets/P (PCB-96,PCB-104,Penta-CBs)
			13C PCB-105	122 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-114	122 (41-121)	Jdets/P (PCB-114, PCB-122, Penta-CBs)
			13C PCB-118	123 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	121 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 - PCB-117,PCB-119 - PCB-121,PCB-123 - PCB-125, Penta-CBs)
			13C PCB-126	131 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	133 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-156/157	128 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	126 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-169	120 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	143 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	124 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
		12	13C PCB-15	137 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-19	121 (1-108)	Jdets/P (PCB-16 - PCB-19,PCB-24,PCB-27,PCB-30,PCB-32,TriCBs)
			13C PCB-37	131 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31,
			13C PCB-54	114 (13-105)	Jdets/P (PCB-54, Tetra-CBs)

LDC #: 29732B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		12	13C PCB-77	136 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	130 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-104	116 (36-115)	Jdets/P (PCB-96,PCB-104,Penta-CBs)
			13C PCB-105	124 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-114	123 (41-121)	Jdets/P (PCB-114, PCB-122, Penta-CBs)
			13C PCB-118	123 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	123 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 - PCB-117,PCB-119 - PCB-121,PCB-123 - PCB-125, Penta-CBs)
			13C PCB-126	132 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	130 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-156/157	124 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	131 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-169	127 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	130 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	123 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
			13C PCB-209	120 (43-115)	Jdets/P (PCB-209, Deca-CBs)
		13	13C PCB-15	133 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	140 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	109 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	131 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	135 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-105	114 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	116 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	120 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	130 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-156/157	123 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	127 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)

LDC #: 29736B3)

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9m
2nd Reviewer: M

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		13	13C PCB-169	119 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	128 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	118 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)
			13C PCB-209	116 (43-115)	Jdets/P (PCB-209, Deca-CBs)
		14	13C PCB-15	120 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-77	123 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-105	114 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	112 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	114 (50-106)	Jdets/P (PCB-126, Penta-CBs)
		15	13C PCB-15	124 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	144 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	107 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	141 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	145 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-105	113 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	114 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-126	128 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	131 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-156/157	128 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	133 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-169	118 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	132 (47-116)	Jdets/P (PCB-189, Hepta-CBs)

LDC #: 29726B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: VM
2nd Reviewer: M

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10?

(i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		16	13C PCB-15	125 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	146 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	111 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	126 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	128 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-126	112 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-155	137 (25-124)	Jdets/P (PCB-155,PCB-152,PCB-150,PCB-136,PCB-145,Hexa-CBs)
			13C PCB-156/157	121 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	126 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-189	131 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
		17	13C PCB-15	129 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	136 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	109 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	131 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	132 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-105	114 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-118	117 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	118 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 - PCB-117,PCB-119 - PCB-121,PCB-123 - PCB-125, Penta-CBs)
			13C PCB-126	124 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-167	122 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-169	118 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	123 (47-116)	Jdets/P (PCB-189, Hepta-CBs)

LDC #: 29873 6B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: VR
2nd Reviewer: n

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		18	13C PCB-15	133 (19-107)	Jdets/P (PCB-5 - PCB-9, PCB-11 - PCB-15, Di-CBs)
			13C PCB-37	136 (25-123)	Jdets/P (PCB-20 - PCB-23, PCB-25 - PCB-26, PCB-28 - PCB-29, PCB-31, PCB-33 - PCB-39, Tri-CBs)
			13C PCB-54	112 (13-105)	Jdets/P (PCB-54, Tetra-CBs)
			13C PCB-77	134 (31-109)	Jdets/P (PCB-77, Tetra-CBs)
			13C PCB-81	133 (14-127)	Jdets/P (PCB-40 - PCB-53,PCB-55 - PCB-76, PCB-78 - PCB-81, Tetra-CBs)
			13C PCB-105	121 (50-111)	Jdets/P (PCB-105, PCB-127, Penta-CBs)
			13C PCB-114	122 (41-121)	Jdets/P (PCB-114, PCB-122, Penta-CBs)
			13C PCB-118	122 (49-111)	Jdets/P (PCB-118, Penta-CBs)
			13C PCB-123	122 (49-116)	Jdets/P (PCB-82 - PCB-95, PCB-97 - PCB-103,PCB106 - PCB-113,PCB-115 - PCB-117,PCB-119 - PCB-121,PCB-123 - PCB-125, Penta-CBs)
			13C PCB-126	131 (50-106)	Jdets/P (PCB-126, Penta-CBs)
			13C PCB-156/157	123 (40-120)	Jdets/P (PCB-156/157, Hexa-CBs)
			13C PCB-167	125 (45-118)	Jdets/P (PCB-128,PCB-159,PCB-162,PCB-166,PCB-167,Hexa-CBs)
			13C PCB-169	122 (37-117)	Jdets/P (PCB-169, Hexa-CBs)
			13C PCB-189	125 (47-116)	Jdets/P (PCB-189, Hepta-CBs)
			13C PCB-205	117 (46-115)	Jdets/P (PCB-194,PCB-195, PCB-205, Octa-CBs)

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer:
2nd Reviewer:

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

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

N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

(c)

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		PCB-5	The laboratory indicated that congeners were	9	Jdets/P (+ Total Di-CBs)
			quantitated using single ion mode (SI). The		
		PCB-7, PCB-5	area for the secondary ion trace was not	10	Jdets/P (+ Total Di-CBs)
			integrated due to significantly elevated noise		
		PCB-5, PCB-14	levels from background PFK.	11	Jdets/P (+ Total Di-CBs)
		PCB-5, PCB-14	Quantitation should be performed using the	12	Jdets/P (+ Total Di-CBs)
			area of the primary and secondary ions.		
		PCB-10, PCB-5		13	Jdets/P (+ Total Di-CBs)
		PCB-10, PCB-9, PCB-7,PCB-5		14	Jdets/P (+ Total Di-CBs)
		PCB-4,PCB-10,PCB-9,PCB-13/12		17	Jdets/P (+ Total Di-CBs)
		PCB-4,PCB-10,PCB-9,PCB-6, PCB-13/12		18	Jdets/P (+ Total Di-CBs)

Notes:

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: SR
2nd Reviewer: A

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	7-10, 12, 13	TEXT (all compounds + Total Mono- through Nona-CBs)
				2, 3	TEXT (all compounds except PCB-179 + Total Mono- through Nona-CBs)
				11, 14	TEXT (all compounds except PCB-79 + Total Mono- through Nona-CBs)
				5, 6	TEXT (all compounds except PCB-98 + Total Mono- through Nona-CBs)

Notes:

LDC #: 29736B31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: 2nd Reviewer:

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

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

X 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	Compound	Finding	Associated Samples	Qualifications
		All	EMPC results		EMPC-Jdets/A (k)
			Congeners flagged "E" exceed upper calibration range	15	Jdets/P (+Di-CBs,Tri-CBs,Tetra-CBs) (q)
				16	Jdets/P (+Di-CBs,Tri-CBs,Tetra-CBs,Penta-CBs, Nona-CBs,DeCB) (q)

Comments: See sample calculation verification worksheet for recalculations

LDC #29736B31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9gn
2nd Reviewer: [illegible]

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

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 = $(A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) — 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	12-14-12	PCB 77 (^{13}C-PCB 77)	1.12	1.12	1.15	1.16	3.3	3.0
			PCB 105 (^{13}C-PCB 105)	1.04	1.04	1.07	1.07	3.9	3.9
			PCB 167 (^{13}C-PCB 167)	1.17	1.17	1.21	1.21	3.6	3.7
			PCB 189 (^{13}C-PCB 189)	1.02	1.02	1.05	1.05	3.2	3.1
2	ICAL	7-26-12	PCB 77 (^{13}C-PCB 77)	1.13	1.135	1.16	1.16	4.9	4.8
			PCB 105 (^{13}C-PCB 105)	1.09	1.095	1.14	1.14	5.3	5.3
			PCB 167 (^{13}C-PCB 167)	1.14	1.13	1.18	1.18	4.5	4.7
			PCB 189 (^{13}C-PCB 189)	1.06	1.06	1.08	1.08	4.3	4.3
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 29736B31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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 (BCS3)	Recalculated RRF (BCS3)	Reported %D	Recalculated %D
1	130213S12	2-13-13	PCB 77 (^{13}C-PCB 77)	1.12	1.00	1.00	-10.8	~~10.3~~ 10.7
			PCB 105 (^{13}C-PCB 105)	1.04	1.04	1.05	0.9	0
			PCB 167 (^{13}C-PCB 167)	1.17	1.06	1.06	-8.7	9.4
			PCB 189 (^{13}C-PCB 189)	1.02	1.03	1.03	0.7	0.98
2	130214S02	2-14-13	PCB 77 (^{13}C-PCB 77)	1.12	1.02	1.02	-8.9	8.9
			PCB 105 (^{13}C-PCB 105)	1.04	1.01	1.01	-2.5	2.9
			PCB 167 (^{13}C-PCB 167)	1.17	1.12	1.12	-3.6	4.3
			PCB 189 (^{13}C-PCB 189)	1.02	0.99	0.99	-2.9	2.9
3	130218S03	2-18-13	PCB 77 (^{13}C-PCB 77)	1.12	1.08	1.08	-4.0	3.6
			PCB 105 (^{13}C-PCB 105)	1.04	1.05	1.05	1.4	0.96
			PCB 167 (^{13}C-PCB 167)	1.17	1.08	1.08	-7.3	7.7
			PCB 189 (^{13}C-PCB 189)	1.02	1.04	1.045	2.1	2.0
4	130212X03	2-12-13	PCB 77 (^{13}C-PCB 77)	1.13	0.95	0.95	-15.8	15.9
			PCB 105 (^{13}C-PCB 105)	1.09	1.16	1.16	6.0	6.4
			PCB 167 (^{13}C-PCB 167)	1.14	1.06	1.06	-6.7	7.0
			PCB 189 (^{13}C-PCB 189)	1.06	0.98	0.98	-7.1	7.5

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 #: 24736031

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 8, PCB-202:

Conc. = $\frac{(1.75e5)(2000)(1)}{(3.37e7)(0.96)(1)(\ )}$

= 10.8 pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5125 SITE: CWCM - High Volume
LAB: SGS-Analytical Perspectives

CHECKLIST

I.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ✓ [ ] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] __ __

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] __ __

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] __ __
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] __ __

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] __ __

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] __ __

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] __ __

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] __ __

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] __ __

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] __ __

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] __ __

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] __ __

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] __ __
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] __ __

b. Percent peak resolution valley [✓] __ __

c. Window Defining Mixture raw data [✓] __ __

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] __ __

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] __ __

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] __ __

b. Sample Shipment Records [✓] __ __

c. Sample log-in sheets [✓] __ __

d. GC/MS Standard and Sample Run Log in chronological order [✓] __ __

e. Sample Extraction Log [✓] __ __

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] __ __

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10.000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 <u>Gas Chromatographic (GC) Column Resolution</u>

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [ ] [✓] ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for each PCB congener peak. [ ] [✓] ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [✓] ___ ___

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [✓] ___ ___

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).
2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.
3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] ✓ ___

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [✓] ___ ___

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [ ] ✓ ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)Cl}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [___] ___/___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [✓] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? [✓] [ ] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [✓] ___ ___

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [✓] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [✓] ___ ___

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [ ] ✓ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ✓ ___

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_i, using the formula:

$$\% Rec_i = \frac{(A_{i1} + A_{i2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_i}$$

$A_{i1} + A_{i2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_i = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ___ ✓

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [✓] ___ ___

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set.

13.3 Was the Ongoing Precision and Recovery (~~OPR~~ BCS3) standard analyzed at the required frequency? [✓] ___ ___

13.4 Did the OPR standard passed the concentration criteria limits in outline below? [✓] ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] ___ [✓]

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ [✓]

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ___ [✓]

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ [✓]

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. *The matrix spike data of the PE blank* sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ ✓

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ ✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, Newark Bay, Data Validation

Dear Ms. Krowitz,

Enclosed is the revised validation report for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30205:

SDG #	Fraction
A5668	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30205B21

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Newark Bay High Volume Event #2
Collection Date:	June 24 through June 25, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5668

Sample Identification

N10-CE05-TNBS-BM01
N10-CE05-TNBS-BM02
N10-CE05-TNBS-BP01
N10-CE05-TNNE-BM01
N10-CE05-TNNE-BM02
N10-CE05-TNNE-BP01
N10-CE05-TKVK-BM01
N10-CE05-TKVK-BM02
N10-CE05-TKVK-BP01
N10-CE05-TKVK-BN01
N10-CE05-TKVK-BN02
N10-CE05-TKVK-BQ01
N10-CE05-TNNE-XR03
N10-CE05-TNNE-XR04
N10-CE05-TNNE-XR02

Introduction

This data review covers 10 polyurethane foam (PUF) samples and 5 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, December 2010) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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 PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compound	Flag	A or P
7/19/13	1,2,3,4,6,7,8-HpCDF	58.3 ng/mL (45-55)	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
7/20/13 (130719P2-13)	1,2,3,4,6,7,8-HpCDF	55.7 ng/mL (45-55)	All samples in SDG A5668	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
7/20/13 (130719P3-08)	1,2,3,4,6,7,8-HpCDF	57.8 ng/mL (45-55)	N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04 N10-CE05-TNNE-XR02	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

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

Samples N10-CE05-TNNE-XR03, N10-CE05-TNNE-XR04, and N10-CE05-TNNE-XR02 and samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, and 13C-CE05-T042-XR02-103 (all 6 from SDG A5678) were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR03	6/25/13	OCDD Total HpCDD	6.8 pg 1.29 pg	N10-CE05-TNNE-BM01
N10-CE05-TNNE-XR04	6/25/13	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	1.46 pg 4.72 pg 1.46 pg	N10-CE05-TNNE-BM02
13C-CE05-T042-XR03-101	6/26/13	OCDD Total TCDD Total HpCDD	9.1 pg 1.17 pg 1.81 pg	N10-CE05-TNBS-BM01 N10-CE05-TKVK-BM01
13C-CE05-T042-XR04-101	6/26/13	OCDD	3.14 pg	N10-CE05-TNBS-BM02 N10-CE05-TKVK-BM02

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-101	6/26/13	OCDD	3.59 pg	N10-CE05-TNBS-BP01 N10-CE05-TKVK-BP01
13C-CE05-T042-XR03-103	6/26/13	OCDD Total TCDD	3.32 pg 0.916 pg	N10-CE05-TKVK-BN01
13C-CE05-T042-XR02-103	6/26/13	OCDD	5.77 pg	N10-CE05-TKVK-BQ01

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNNE-BM01	OCDD	17.5 pg	17.5U pg
N10-CE05-TNNE-BM02	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	2.09 pg 14.4 pg 6.69 pg	2.09U pg 14.4U pg 6.69U pg
N10-CE05-TNBS-BM01	OCDD	24.2 pg	24.2U pg
N10-CE05-TKVK-BM01	OCDD	33.9 pg	33.9U pg
N10-CE05-TNBS-BM02	OCDD	7 pg	7U pg
N10-CE05-TKVK-BM02	OCDD	15.7 pg	15.7U pg
N10-CE05-TKVK-BN01	OCDD	15.9 pg	15.9U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within QC limits.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04	All detected dioxins/dibenzofurans

No data were qualified due to this non-conformance.

XI. Compound Quantitation

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

Sample	Compound	Flag	A or P
All samples in SDG A5668	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Newark Bay High Volume Event #2
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5668

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04 N10-CE05-TNNE-XR02	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P	Continuing calibration (concentration) (c)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04 N10-CE05-TNNE-XR02	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (k)

CWCM Newark Bay High Volume Event #2
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5668

No Sample Data Qualified in this SDG

CWCM Newark Bay High Volume Event #2
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5668

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-BM01	OCDD	17.5U pg	A	be
A5668	N10-CE05-TNNE-BM02	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	2.09U pg 14.4U pg 6.69U pg	A	be
A5668	N10-CE05-TNBS-BM01	OCDD	24.2U pg	A	be

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BM01	OCDD	33.9U pg	A	be
A5668	N10-CE05-TNBS-BM02	OCDD	7U pg	A	be
A5668	N10-CE05-TKVK-BM02	OCDD	15.7U pg	A	be
A5668	N10-CE05-TKVK-BN01	OCDD	15.9U pg	A	be

LDC #: 30205B21

SDG #: A5668

Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 8-20-13

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 6/24/13 → 6/25/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Routine calibration/~~ICV~~	SW	QC limits
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	Dynamic + Static
X.	Target compound identifications	~~A~~ SW	TM 10/27/14
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB = 13, 14, 15 = ND *

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: 10 PUF's (air) / 5 filters (water)

1	N10-CE05-TNBS-BM01	11	N10-CE05-TKVK-BN02	21		31	
2	N10-CE05-TNBS-BM02	12	N10-CE05-TKVK-BQ01	22		32	
3	N10-CE05-TNBS-BP01	13	N10-CE05-TNNE-XR03	23		33	
4	N10-CE05-TNNE-BM01	14	N10-CE05-TNNE-XR04	24		34	
5	N10-CE05-TNNE-BM02	15	N10-CE05-TNNE-XR02	25		35	
6	N10-CE05-TNNE-BP01	16		26		36	
7	N10-CE05-TKVK-BM01	17		27		37	
8	N10-CE05-TKVK-BM02	18		28		38	
9	N10-CE05-TKVK-BP01	19		29		39	
10	N10-CE05-TKVK-BN01	20		30	MB1-11129	40	

Notes: * 13C-CE05-T042-XR03-101 (A5678), 13C-CE05-T042-XR04-101 (A5678), 13C-CE05-T042-XR02-101 (A5678), 13C-CE05-T042-XR03-103 (A5678), 13C-CE05-T042-XR04-103 (A5678 = ND), 13C-CE05-T042-XR02-103 (A5678)

LDC #: 30205B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

Reviewer: 9m
2nd Reviewer: K

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

(c)

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	07/19/13	130719P2-01	O	58.3 (45-55)		1-9, MBL-111729	Jdets/P (O, Y)
	07/20/13	130719P2-13	O	55.7 (45-55)		All	Jdets/P (O, Y)
	07/20/13	130719P3-08	O	57.8 (45-55)		10-15	Jdets/P (O, Y)

LDC #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4 Qual U (be)

Compound	Blank ID	Sample Identification								
	N10-CE05-TNNE-XR03	5X	4							
G	6.8	34.0	17.5							
U	1.29	6.5								

* EMPC

N10-CE05-TNNE-XR03 (A5668)

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:\Field Blanks\30205B21_N10-CE05-TNNE-XR03.wpd4

LDC #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: n

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 5 Qual U (be)

Compound	Blank ID	Sample Identification								
	N10-CE05-TNNE-XR04	5X	5							
F	1.46	7.3	2.09							
G	4.72	23.6	14.4							
U	1.46	7.3	6.69							

* EMPC

N10-CE05-TNNE-XR04 (A5668)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Om
2nd Reviewer: A

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 7 Qual U (be)

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-101	5X	1	7						
G	9.1*	45.5	24.2	33.9*						
R	1.17*	5.9								
U	1.81*	9.1								

* EMPC

13C-CE05-T042-XR03-101 (A5678)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2, 8 Qual U (be)

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR04-101	5X	2	8						
G	3.14*	15.7	7*	15.7						

* EMPC

13C-CE05-T042-XR04-101 (A5678)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3, 9 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-101	5X								
G	3.59*	18.0								

* EMPC

13C-CE05-T042-XR02-101 (A5678)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 10 Qual U (be)

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-103	5X	10							
G	3.32*	16.6	15.9							
R	0.916	4.6								

* EMPC

13C-CE05-T042-XR03-103 (A5678)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 12 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-103	5X								
G	5.77	28.9								

* EMPC

13C-CE05-T042-XR02-103 (A5678)

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	4, 5, ~~14~~ 13, 14	TEXT
			concentration of detected native compounds except U,V,W in secondary PUF >20% of primary PUF	1, 2	
			concentration of detected native compounds except R,V in secondary PUF >20% of primary PUF	7, 8, 10, 11	

Notes: See Attached

LDC #: 30205B21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: TM
2nd Reviewer: K

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

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	Compound	Finding	Associated Samples	Qualifications
			EMPC results	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30205B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9th
2nd Reviewer: K

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	MM1 ICAL	02/13/13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.97	0.97	0.98	0.98	4.5	4.5
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.06	1.06	1.07	1.07	4.1	4.2
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.04	1.04	1.03	1.03	5.3	5.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.02	1.02	1.02	1.02	4.8	4.75
			OCDF (^{13}C-OCDF)	1.00	1.00	1.01	1.01	5.6	5.6
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130719P2-01	7-19-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.2	11.2	12	12
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.9	11.0	9	9
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	59.7	59.5	19	19
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52.6	52.6	5	5
			OCDF (^{13}C-OCDF)	100	115	115	15	15
2	130719P2-13	7-20-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.4	11.5	14	14
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.7	10.8	7	7
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	59.3	59.1	19	19
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52.2	52.2	4	4
			OCDF (^{13}C-OCDF)	100	113	113	13	13
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				

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 #: 30205B21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CM
2nd reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 3, B:

Conc. = $\frac{(9.07e4)(2000)(1)}{(4.41e7)(1.03)(1)(\quad)}$

= 3.99pg

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5668 LAB: SGS-Analytical Perspectives
SITE: CWCM High Vol. #2, NB

I.0 Data Completeness and Deliverables

		YES	NO	N/A
1.1	Does the Traffic Report or Field Chain of Custody list all samples?	[✓]	___	___
1.2	Is the Case Narrative present?	[✓]	___	___
1.3	Are the Case Number and SDG numbers contained in the case narrative?	[✓]	___	___
1.4	Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data?	___	[✓]	___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Sample Data Summary (Form I CDD-1)	[✓]	___	___
b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2)	[✓]	___	___
c. Second Column Confirmation Summary (Form I, CDD-3)	[___]	___	✓
d. Total Homologue Concentration Summary (Form II CDD)	[✓]	___	___
e. CDD/CDF Spiked Sample Summary (Form III CDD-1)	[✓]	___	___
f. CDD/CDF Duplicate Sample Summary (Form III CDD-2)	[___]	___	✓
g. CDD/CDF Method Blank Summary (Form IV-CDD)	[✓]	___	___

	YES	NO	N/A
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	[✓]	___	___
I. Chromatographic Resolution Summary (Form V CDD-2)	[✓]	___	___
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	[✓]	___	___
k. Initial Calibration (Form VI, CDD-1, CDD-2)	[✓]	___	___
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	[✓]	___	___

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

a.	Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number	[✓]	___	___
b.	Percent peak resolution valley	[✓]	___	___
c.	Window Defining Mixture raw data	[✓]	___	___
d.	SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	[✓]	___	___
e.	Integrated area and peak height must be listed for all peaks 2.5 times above background	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a.	Chain of Custody Records	[✓]	___	___
b.	Sample Shipment Records	[✓]	___	___
c.	Sample log-in sheets	[✓]	___	___
d.	GC/MS Standard and Sample Run Log in chronological order	[✓]	___	___
e.	Sample Extraction Log	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the

YES NO N/A

effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [✓] ___ ___

b. For soil/sediment samples, 30 days from VTSR to extraction? [___] ___ ✓

c. For fish and tissue samples, one (1) year from VTSR to extraction? [___] ___ ✓

d. For all samples 45 days from time of extraction to time of analysis? [✓] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects
as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning of every 12 hour period. Was this performed accordingly? [✓] ___ ___

YES NO N/A

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] ___ ___

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] ___ ___

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining **Solution** and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9-HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent coefficient of variation must be 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve

YES NO N/A

must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [___] ___ ✓

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be

YES NO N/A

quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [___] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [___] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in Table 8 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:
For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$(A_{l1} + A_{l2}) \times Q_n$

For labeled analytes, Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2,3,7,8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [___] ✓ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4- TCDD and $^{13}C_{12}$1,2,3,7,8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) [✓] ___ ___

YES NO N/A

6.2 Isomer Specificity Test Standard

6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613**B**, Section **15**.4.2.2) [✓] ___ ___

6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. [___] ___ ✓

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.l Were the following MS/DS conditions used?

7.1.1 SIM data were acquired for each of the ions listed in Table 8 (see analytical method)

		YES	NO	N/A
	including diphenylether interfering ions.	[✓]	___	___
7.2	Were the following identification criteria met?			
7.2.1	For the 2,3,7,8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract, must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]	___	___
7.2.2	For non-2,3,7,8 substituted compounds (tetra through octa) found present, the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B, Section 16.4)	[✓]	___	___
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte, the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B, Section 16.1)	[✓]	___	___
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.5	The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[___]	[✓]	___
7.2.7	The relative retention time of the unlabeled 2,3,7,8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]	___	___
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup, and internal standard must be met (Table 9 - Method 1613B).	[✓]	___	___
7.2.9	The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]	___	___

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive, high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]	___	___

ACTION:
1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.
2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

YES NO N/A

A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance
ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6. and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_I}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_I}{V \times (A_{I1} + A_{I2}) \times RR}$$

YES NO N/A

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_l = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range **listed on Table 6 of the Analytical method?** [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

	YES	NO	N/A
7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method?	[___]	___	✓

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present?	[___]	___	___

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria?	[✓]	___	___

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [___] ___ ✓

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the

YES NO N/A

concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [___] ___ ✓

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non- detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

	YES	NO	N/A
12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard?	[/]	___	___

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed?	[___]	___	/
13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method?	[___]	___	/

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above?	[___]	___	/

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50?	[___]	___	/

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

YES NO N/A

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section **9**.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table **6** of the method? [___] ___ [✓]

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12

YES NO N/A

hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~Table 6 of the method~~ QAPP? [✓] ___ ___

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [___] ___ [✓]

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 μg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 μg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 μg/L or any other analyte at levels > 1 µg/L? [___] [✓] ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines

YES NO N/A

outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [___] ___ ___

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [___] ___ ___

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [___] ___ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [___] ___ ___

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

	YES	NO	N/A
20.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix?	[__]	__	✓
20.2 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent?	[__]	__	✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

	YES	NO	N/A
20.3 Was a matrix spike duplicate analyzed as per section 11.1 and 11.2?	[__]	__	✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

	YES	NO	N/A
21.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency?	[__]	__	✓
21.2 Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes?	[__]	__	✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills",

YES NO N/A

Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision **B**- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October **1994**

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin", 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF", National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016, Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, Newark Bay, Data Validation

Dear Ms. Krowitz,

Enclosed is the revised validation report for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30205:

SDG #	Fraction
A5668	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30205B31_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Newark Bay High Volume Event #2
Collection Date:	June 24 through June 25, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5668

Sample Identification

N10-CE05-TNBS-BM01
N10-CE05-TNBS-BM02
N10-CE05-TNBS-BP01
N10-CE05-TNNE-BM01
N10-CE05-TNNE-BM02
N10-CE05-TNNE-BP01
N10-CE05-TKVK-BM01
N10-CE05-TKVK-BM02
N10-CE05-TKVK-BP01
N10-CE05-TKVK-BN01
N10-CE05-TKVK-BN02
N10-CE05-TKVK-BQ01
N10-CE05-TNNE-XR03
N10-CE05-TNNE-XR04
N10-CE05-TNNE-XR02

Introduction

This data review covers 10 polyurethane foam (PUF) and 5 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 Toxic/LOC and labeled compounds were within validation criteria with the following exceptions:

Date	Standard ID	Compound	Ion Abundance Ratio (Limits)	Associated Samples	Affected Compounds	Flag	A or P
7/26/12	120725X16	PCB-4	0 (1.33-1.79)	All samples in SDG A5668	PCB-4 Total Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound with the exception noted above.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing 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 PCBs were within validation criteria.

V. Blanks

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

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1_11129	7/11/13	PCB-77	11.1 pg	All samples in SDG A5668
		PCB-105	33.5 pg	
		PCB-118	91.9 pg	
		PCB-156/157	12.7 pg	
		Total Mono-CBs	780 pg	
		Total Di-CBs	11500 pg	
		Total Tri-CBs	48400 pg	
		Total Tetra-CBs	30300 pg	
		Total Penta-CBs	2000 pg	
		Total Hexa-CBs	872 pg	
		Total Hepta-CBs	173 pg	
		PCB-1	352 pg	
		PCB-2	195 pg	
		PCB-3	233 pg pg	
		PCB-4	1530 pg	
		PCB-10	71 pg	
		PCB-9	348 pg	
		PCB-7	180 pg	
		PCB-6	1040 pg	
		PCB-5	127 pg	
		PCB-8	5250 pg	
		PCB-11	531 pg	
		PCB-13/12	331 pg	
		PCB-15	2080 pg	
		PCB-19	743 pg pg	
		PCB-30/18	7840 pg	
		PCB-17	3610 pg	
		PCB-27	550 pg	
		PCB-24	126 pg	
		PCB-16	4710 pg	
		PCB-32	2300 pg	
		PCB-34	35.4 pg	
		PCB-23	15.6 pg	
		PCB-26/29	1700 pg	
		PCB-25	749 pg	
		PCB-31	8060 pg	
		PCB-28/20	8400 pg	
		PCB-21/33	5470 pg	
		PCB-22	3110 pg	
		PCB-39	27.4 pg	
		PCB-38	9.3 pg	
		PCB-35	54.7 pg	
		PCB-37	897 pg	
		PCB-54	21.1 pg	
		PCB-50/53	1090 pg	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1_11129 (continued)	7/11/13	PCB-45	1280 pg	All samples in SDG A5668
		PCB-51	1680 pg	
		PCB-46	499 pg	
		PCB-52	4140 pg	
		PCB-43	235 pg	
		PCB-69/49	2410 pg	
		PCB-48	1190 pg	
		PCB-44/47/65	10200 pg	
		PCB-59/62/75	370 pg	
		PCB-42	1010 pg	
		PCB-41	540 pg	
		PCB-71/40	1490 pg	
		PCB-64	1250 pg	
		PCB-72	10.8 pg	
		PCB-68	1020 pg	
		PCB-57	10.1 pg	
		PCB-67	54.5 pg	
		PCB-63	43.7 pg	
		PCB-61/70/74/76	1130 pg	
		PCB-66	458 pg	
		PCB-56	91.2 pg	
		PCB-60	51.2 pg	
		PCB-96	28.9 pg	
		PCB-94	9.65 pg	
		PCB-95	655 pg	
		PCB-100/93	14.5 pg	
		PCB-102	41.5 pg	
		PCB-91	88.2 pg	
		PCB-84	134 pg	
		PCB-89	10.3 pg	
		PCB-92	57.8 pg	
		PCB-113/90/101	323 pg	
		PCB-83	15.7 pg	
		PCB-99	107 pg	
		PCB-108/119/86/97/125/87	149 pg	
		PCB-116/85	33.3 pg	
		PCB-110	187 pg	
		PCB-82	24.9 pg	
		PCB-136	73.6 pg	
		PCB-151/135	162 pg	
		PCB-144	21.1 pg	
		PCB-147/149	254 pg	
		PCB-134	10.5 pg	
		PCB-132	56.9 pg	
		PCB-146	17.6 pg	
		PCB-153/168	113 pg	
		PCB-141	30.6 pg	
		PCB-163/138/129	95.4 pg	
		PCB-158	12.5 pg	
		PCB-128/166	11.6 pg	
		PCB-179	43.7 pg	
		PCB-176	9.95 pg	
		PCB-187	44.7 pg	
		PCB-183	15.5 pg	
		PCB-185	7.19 pg	
		PCB-174	24.6 pg	
		PCB-177	9.48 pg	
		PCB-180/193	17.8 pg	

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNBS-BM01	PCB-2	294 pg	294U pg
	PCB-3	419 pg	419U pg
	PCB-9	1320 pg	1320U pg
	PCB-7	476 pg	476U pg
	PCB-6	4220 pg	4220U pg
	PCB-5	157 pg	157U pg
	PCB-8	13500 pg	13500U pg
	PCB-23	48.4 pg	48.4U pg
	PCB-21/33	10400 pg	10400U pg
	PCB-22	13900 pg	13900U pg
	PCB-51	8170 pg	8170U pg
	PCB-41	1860 pg	1860U pg
	PCB-68	368 pg	368U pg
N10-CE05-TNBS-BM02	Total Tri-CBs	100000 pg	100000U pg
	Total Tetra-CBs	94900 pg	94900U pg
	PCB-2	148 pg	148U pg
	PCB-3	206 pg	206U pg
	PCB-9	446 pg	446U pg
	PCB-7	153 pg	153U pg
	PCB-6	1350 pg	1350U pg
	PCB-5	58.9 pg	58.9U pg
	PCB-8	4240 pg	4240U pg
	PCB-13/12	712 pg	712U pg
	PCB-15	3340 pg	3340U pg
	PCB-30/18	17000 pg	17000U pg
	PCB-17	9930 pg	9930U pg
	PCB-24	248 pg	248U pg
	PCB-16	6250 pg	6250U pg
	PCB-32	7020 pg	7020U pg
	PCB-34	144 pg	144U pg
	PCB-23	15 pg	15U pg
	PCB-26/29	4030 pg	4030U pg
	PCB-25	2140 pg	2140U pg
	PCB-31	12600 pg	12600U pg
	PCB-28/20	14100 pg	14100U pg
	PCB-21/33	2710 pg	2710U pg
	PCB-22	3410 pg	3410U pg
	PCB-39	77.4 pg	77.4U pg
	PCB-35	170 pg	170U pg
	PCB-37	1940 pg	1940U pg
	PCB-50/53	4580 pg	4580U pg
	PCB-45	2890 pg	2890U pg
	PCB-51	1830 pg	1830U pg
	PCB-46	1420 pg	1420U pg
	PCB-52	18300 pg	18300U pg
	PCB-43	594 pg	594U pg
	PCB-69/49	10400 pg	10400U pg
	PCB-48	2120 pg	2120U pg
	PCB-44/47/65	15000 pg	15000U pg
	PCB-59/62/75	1350 pg	1350U pg
	PCB-42	3780 pg	3780U pg
	PCB-41	495 pg	495U pg
	PCB-71/40	7430 pg	7430U pg
	PCB-64	4400 pg	4400U pg
	PCB-68	95.5 pg	95.5U pg
	PCB-67	235 pg	235U pg
	PCB-96	137 pg	137U pg
	PCB-179	184 pg	184U pg
	PCB-176	42.8 pg	42.8U pg
	PCB-185	19.6 pg	19.6U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNBS-BP01	PCB-9	1380 pg	1380U pg
	PCB-7	631 pg	631U pg
	PCB-5	175 pg	175U pg
	PCB-30/18	29500 pg	29500U pg
	PCB-24	367 pg	367U pg
	PCB-16	10300 pg	10300U pg
	PCB-23	42.4 pg	42.4U pg
	PCB-21/33	11900 pg	11900U pg
	PCB-51	2830 pg	2830U pg
	PCB-46	2040 pg	2040U pg
	PCB-48	4820 pg	4820U pg
	PCB-44/47/65	38900 pg	38900U pg
	PCB-41	1270 pg	1270U pg
	PCB-68	512 pg	512U pg
N10-CE05-TNNE-BM01	PCB-2	293 pg	293U pg
	PCB-3	444 pg	444U pg
	PCB-9	1540 pg	1540U pg
	PCB-7	712 pg	712U pg
	PCB-6	5190 pg	5190U pg
	PCB-5	262 pg	262U pg
	PCB-8	16700 pg	16700U pg
	PCB-23	62.6 pg	62.6U pg
	PCB-21/33	17800 pg	17800U pg
	PCB-68	481 pg	481U pg
N10-CE05-TNNE-BM02	Total Tri-CBs	129000 pg	129000U pg
	Total Tetra-CBs	148000 pg	148000U pg
	PCB-2	198 pg	198U pg
	PCB-3	219 pg	219U pg
	PCB-9	534 pg	534U pg
	PCB-7	233 pg	233U pg
	PCB-6	1600 pg	1600U pg
	PCB-5	69.6 pg	69.6U pg
	PCB-8	5030 pg	5030U pg
	PCB-13/12	904 pg	904U pg
	PCB-15	4470 pg	4470U pg
	PCB-30/18	22100 pg	22100U pg
	PCB-17	11600 pg	11600U pg
	PCB-16	9180 pg	9180U pg
	PCB-32	8670 pg	8670U pg
	PCB-26/29	5230 pg	5230U pg
	PCB-25	3190 pg	3190U pg
	PCB-31	18500 pg	18500U pg
	PCB-28/20	22000 pg	22000U pg
	PCB-21/33	4580 pg	4580U pg
	PCB-22	5500 pg	5500U pg
	PCB-39	104 pg	104U pg
	PCB-35	263 pg	263U pg
	PCB-37	3020 pg	3020U pg
	PCB-45	4090 pg	4090U pg
	PCB-51	4170 pg	4170U pg
	PCB-46	2070 pg	2070U pg
	PCB-43	811 pg	811U pg
	PCB-48	3390 pg	3390U pg
	PCB-44/47/65	25200 pg	25200U pg
	PCB-41	868 pg	868U pg
	PCB-68	420 pg	420U pg
N10-CE05-TNNE-BP01	PCB-5	568 pg	568U pg
	PCB-68	2580 pg	2580U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BM01	Total Tri-CBs	168000 pg	168000U pg
	PCB-2	192 pg	192U pg
	PCB-3	279 pg	279U pg
	PCB-9	626 pg	626U pg
	PCB-7	197 pg	197U pg
	PCB-6	2000 pg	2000U pg
	PCB-5	70.3 pg	70.3U pg
	PCB-8	6110 pg	6110U pg
	PCB-13/12	1080 pg	1080U pg
	PCB-15	5390 pg	5390U pg
	PCB-30/18	27400 pg	27400U pg
	PCB-17	17200 pg	17200U pg
	PCB-24	400 pg	400U pg
	PCB-16	9610 pg	9610U pg
	PCB-23	20.5 pg	20.5U pg
	PCB-26/29	6820 pg	6820U pg
	PCB-25	3440 pg	3440U pg
	PCB-31	19900 pg	19900U pg
	PCB-28/20	22400 pg	22400U pg
	PCB-21/33	3850 pg	3850U pg
	PCB-22	5090 pg	5090U pg
	PCB-39	125 pg	125U pg
	PCB-38	27.2 pg	27.2U pg
	PCB-35	261 pg	261U pg
	PCB-37	3110 pg	3110U pg
	PCB-45	4790 pg	4790U pg
	PCB-51	2780 pg	2780U pg
	PCB-46	2480 pg	2480U pg
	PCB-43	975 pg	975U pg
	PCB-48	3210 pg	3210U pg
	PCB-44/47/65	24600 pg	24600U pg
	PCB-41	715 pg	715U pg
	PCB-68	167 pg	167U pg
	PCB-185	31.5 pg	31.5U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BM02	PCB-156/157	51.2 pg	51.2U pg
	Total Tri-CBs	42000 pg	42000U pg
	Total Tetra-CBs	38000 pg	38000U pg
	PCB-2	86 pg	86U pg
	PCB-3	113 pg	113U pg
	PCB-9	172 pg	172U pg
	PCB-7	54.9 pg	54.9U pg
	PCB-6	542 pg	542U pg
	PCB-5	19.1 pg	19.1U pg
	PCB-8	1660 pg	1660U pg
	PCB-13/12	280 pg	280U pg
	PCB-15	1360 pg	1360U pg
	PCB-30/18	6960 pg	6960U pg
	PCB-17	4310 pg	4310U pg
	PCB-27	2250 pg	2250U pg
	PCB-24	109 pg	109U pg
	PCB-16	2260 pg	2260U pg
	PCB-32	3060 pg	3060U pg
	PCB-34	64.1 pg	64.1U pg
	PCB-23	4.89 pg	4.89U pg
	PCB-26/29	1730 pg	1730U pg
	PCB-25	851 pg	851U pg
	PCB-31	4990 pg	4990U pg
	PCB-28/20	5510 pg	5510U pg
	PCB-21/33	987 pg	987U pg
	PCB-22	1250 pg	1250U pg
	PCB-39	32.6 pg	32.6U pg
	PCB-38	8.48 pg	8.48U pg
	PCB-35	64.1 pg	64.1U pg
	PCB-37	766 pg	766U pg
	PCB-50/53	1900 pg	1900U pg
	PCB-45	1250 pg	1250U pg
	PCB-51	584 pg	584U pg
	PCB-46	583 pg	583U pg
	PCB-52	7460 pg	7460U pg
	PCB-43	227 pg	227U pg
	PCB-69/49	4460 pg	4460U pg
	PCB-48	811 pg	811U pg
	PCB-44/47/65	6010 pg	6010U pg
	PCB-59/62/75	545 pg	545U pg
	PCB-42	1570 pg	1570U pg
	PCB-41	195 pg	195U pg
	PCB-71/40	3070 pg	3070U pg
	PCB-64	1730 pg	1730U pg
	PCB-68	40.5 pg	40.5U pg
	PCB-57	25.4 pg	25.4U pg
	PCB-67	91 pg	91U pg
	PCB-63	118 pg	118U pg
	PCB-61/70/74/76	3480 pg	3480U pg
	PCB-66	2120 pg	2120U pg
	PCB-96	61.1 pg	61.1U pg
	PCB-94	47.7 pg	47.7U pg
	PCB-95	2730 pg	2730U pg
	PCB-102	185 pg	185U pg
	PCB-89	35.7 pg	35.7U pg
	PCB-136	223 pg	223U pg
	PCB-151/135	489 pg	489U pg
	PCB-144	49.6 pg	49.6U pg
	PCB-147/149	1040 pg	1040U pg
	PCB-141	102 pg	102U pg
	PCB-179	84.5 pg	84.5U pg
	PCB-176	20.6 pg	20.6U pg
	PCB-187	223 pg	223U pg
	PCB-185	6.88 pg	6.88U pg
	PCB-174	101 pg	101U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BP01	PCB-5	367 pg	367U pg
	PCB-51	6330 pg	6330U pg
	PCB-68	1990 pg	1990U pg
N10-CE05-TKVK-BN01	Total Tri-CBs	195000 pg	195000U pg
	PCB-2	276 pg	276U pg
	PCB-3	361 pg	361U pg
	PCB-9	734 pg	734U pg
	PCB-7	233 pg	233U pg
	PCB-6	2390 pg	2390U pg
	PCB-5	81.6 pg	81.6U pg
	PCB-8	7220 pg	7220U pg
	PCB-13/12	1260 pg	1260U pg
	PCB-15	6480 pg	6480U pg
	PCB-30/18	31800 pg	31800U pg
	PCB-24	408 pg	408U pg
	PCB-16	10700 pg	10700U pg
	PCB-23	20.9 pg	20.9U pg
	PCB-26/29	8090 pg	8090U pg
	PCB-31	23300 pg	23300U pg
	PCB-28/20	26400 pg	26400U pg
	PCB-21/33	4540 pg	4540U pg
	PCB-22	5830 pg	5830U pg
	PCB-38	29.6 pg	29.6U pg
	PCB-37	3530 pg	3530U pg
	PCB-54	622 pg	622U pg
	PCB-45	6360 pg	6360U pg
	PCB-51	3250 pg	3250U pg
	PCB-43	1110 pg	1110U pg
	PCB-48	3810 pg	3810U pg
	PCB-44/47/65	30900 pg	30900U pg
	PCB-41	929 pg	929U pg
	PCB-68	496 pg	496U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BN02	PCB-156/157	60.5 pg	60.5U pg
	Total Tri-CBs	52000 pg	52000U pg
	Total Tetra-CBs	47700 pg	47700U pg
	PCB-2	129 pg	129U pg
	PCB-3	160 pg	160U pg
	PCB-9	226 pg	226U pg
	PCB-7	67.8 pg	67.8U pg
	PCB-6	678 pg	678U pg
	PCB-8	2100 pg	2100U pg
	PCB-13/12	358 pg	358U pg
	PCB-15	1640 pg	1640U pg
	PCB-30/18	8520 pg	8520U pg
	PCB-17	5210 pg	5210U pg
	PCB-24	133 pg	133U pg
	PCB-16	2700 pg	2700U pg
	PCB-32	3730 pg	3730U pg
	PCB-34	83 pg	83U pg
	PCB-26/29	2180 pg	2180U pg
	PCB-25	1070 pg	1070U pg
	PCB-31	6250 pg	6250U pg
	PCB-28/20	6930 pg	6930U pg
	PCB-21/33	1220 pg	1220U pg
	PCB-22	1540 pg	1540U pg
	PCB-37	889 pg	889U pg
	PCB-50/53	2500 pg	2500U pg
	PCB-45	1580 pg	1580U pg
	PCB-51	771 pg	771U pg
	PCB-46	767 pg pg	767U pg pg
	PCB-52	9470 pg	9470U pg
	PCB-43	300 pg	300U pg
	PCB-69/49	5510 pg	5510U pg
	PCB-48	1000 pg	1000U pg
	PCB-44/47/65	7530 pg	7530U pg
	PCB-59/62/75	690 pg	690U pg
	PCB-42	1910 pg	1910U pg
	PCB-41	231 pg	231U pg
	PCB-71/40	3870 pg	3870U pg
	PCB-64	2170 pg	2170U pg
	PCB-68	56.5 pg	56.5U pg
	PCB-57	39.7 pg	39.7U pg
	PCB-67	111 pg	111U pg
	PCB-63	154 pg	154U pg
	PCB-61/70/74/76	4340 pg	4340U pg
	PCB-96	69.1 pg	69.1U pg
	PCB-89	50.4 pg	50.4U pg
	PCB-136	253 pg	253U pg
	PCB-151/135	575 pg	575U pg
	PCB-144	58 pg	58U pg
	PCB-147/149	1210 pg	1210U pg
	PCB-141	128 pg	128U pg
	PCB-179	109 pg	109U pg
	PCB-176	25.2 pg	25.2U pg
	PCB-174	118 pg	118U pg
N10-CE05-TKVK-BQ01	PCB-5	497 pg	497U pg
	PCB-51	5970 pg	5970U pg
	PCB-68	1540 pg	1540U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNNE-XR03	PCB-77	9.09 pg	9.09U pg
	PCB-105	15.4 pg	15.4U pg
	PCB-118	33.7 pg	33.7U pg
	PCB-156/157	5.61 pg	5.61U pg
	Total Mono-CBs	391 pg	391U pg
	Total Di-CBs	3450 pg	3450U pg
	Total Tri-CBs	693 pg	693U pg
	Total Tetra-CBs	581 pg	581U pg
	Total Penta-CBs	295 pg	295U pg
	Total Hexa-CBs	161 pg	161U pg
	Total Hepta-CBs	60 pg	60U pg
	PCB-1	87.4 pg	87.4U pg
	PCB-2	164 pg	164U pg
	PCB-3	140 pg	140U pg
	PCB-4	69.8 pg	69.8U pg
	PCB-10	8.27 pg	8.27U pg
	PCB-9	10.8 pg	10.8U pg
	PCB-7	6.62 pg	6.62U pg
	PCB-6	43.5 pg	43.5U pg
	PCB-8	118 pg	118U pg
	PCB-13/12	39.2 pg	39.2U pg
	PCB-15	86.5 pg	86.5U pg
	PCB-19	16.9 pg	16.9U pg
	PCB-30/18	102 pg	102U pg
	PCB-17	51.7 pg	51.7U pg
	PCB-27	9.52 pg	9.52U pg
	PCB-16	50.5 pg	50.5U pg
	PCB-32	33.9 pg	33.9U pg
	PCB-26/29	25.1 pg	25.1U pg
	PCB-25	14.7 pg	14.7U pg
	PCB-31	108 pg	108U pg
	PCB-28/20	132 pg	132U pg
	PCB-21/33	53.9 pg	53.9U pg
	PCB-22	38.4 pg	38.4U pg
	PCB-35	11.4 pg	11.4U pg
	PCB-37	44.8 pg	44.8U pg
	PCB-50/53	13 pg	13U pg
	PCB-45	11.3 pg	11.3U pg
	PCB-51	16 pg	16U pg
	PCB-46	4.47 pg	4.47U pg
	PCB-52	92 pg	92U pg
	PCB-69/49	47.5 pg	47.5U pg
	PCB-48	15.6 pg	15.6U pg
	PCB-44/47/65	110 pg	110U pg
	PCB-59/62/75	6.98 pg	6.98U pg
	PCB-42	19.5 pg	19.5U pg
	PCB-41	7.7 pg	7.7U pg
	PCB-71/40	28.2 pg	28.2U pg
	PCB-64	24.6 pg	24.6U pg
	PCB-68	4.71 pg	4.71U pg
	PCB-61/70/74/76	88.9 pg	88.9U pg
	PCB-66	49.8 pg	49.8U pg
	PCB-56	22.9 pg	22.9U pg
	PCB-60	9.47 pg	9.47U pg
	PCB-95	46.9 pg	46.9U pg
	PCB-91	7.74 pg	7.74U pg
	PCB-84	14.7 pg	14.7U pg
	PCB-92	9.04 pg	9.04U pg
	PCB-113/90/101	47.9 pg	47.9U pg
	PCB-99	21.3 pg	21.3U pg
	PCB-108/119/86/97/125/87	32.1 pg	32.1U pg
	PCB-116/85	7.69 pg	7.69U pg
	PCB-110	49 pg	49U pg
	PCB-82	5.97 pg	5.97U pg
	PCB-136	5.81 pg	5.81U pg
	PCB-151/135	16.4 pg	16.4U pg
	PCB-147/149	33.4 pg	33.4U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNNE-XR03 (continued)	PCB-132	13.9 pg	13.9U pg
	PCB-146	6.96 pg	6.96U pg
	PCB-153/168	26.2 pg	26.2U pg
	PCB-141	7.46 pg	7.46U pg
	PCB-163/138/129	33.6 pg	33.6U pg
	PCB-128/166	6.14 pg	6.14U pg
	PCB-179	4.96 pg	4.96U pg
	PCB-187	12.7 pg	12.7U pg
	PCB-183	5.14 pg	5.14U pg
	PCB-174	9.48 pg	9.48U pg
	PCB-177	5.68 pg	5.68U pg
	PCB-180/193	14.1 pg	14.1U pg
N10-CE05-TNNE-XR04	PCB-105	15.8 pg	15.8U pg
	PCB-118	30.5 pg	30.5U pg
	Total Mono-CBs	161 pg	161U pg
	Total Di-CBs	1110 pg	1110U pg
	Total Tri-CBs	714 pg	714U pg
	Total Tetra-CBs	467 pg	467U pg
	Total Penta-CBs	258 pg	258U pg
	Total Hexa-CBs	90.2 pg	90.2U pg
	PCB-1	47.4 pg	47.4U pg
	PCB-2	59 pg	59U pg
	PCB-3	54.4 pg	54.4U pg
	PCB-4	53.4 pg	53.4U pg
	PCB-9	17.4 pg	17.4U pg
	PCB-6	32.6 pg	32.6U pg
	PCB-8	103 pg	103U pg
	PCB-11	810 pg	810U pg
	PCB-15	89.6 pg	89.6U pg
	PCB-30/18	97.4 pg	97.4U pg
	PCB-17	50.7 pg	50.7U pg
	PCB-16	51.7 pg	51.7U pg
	PCB-32	31.6 pg	31.6U pg
	PCB-26/29	29.9 pg	29.9U pg
	PCB-31	122 pg	122U pg
	PCB-28/20	152 pg	152U pg
	PCB-21/33	73.3 pg	73.3U pg
	PCB-22	46.8 pg	46.8U pg
	PCB-37	58.8 pg	58.8U pg
	PCB-52	90.2 pg	90.2U pg
	PCB-69/49	43.2 pg	43.2U pg
	PCB-44/47/65	87.6 pg	87.6U pg
	PCB-71/40	29.3 pg	29.3U pg
	PCB-64	25.4 pg	25.4U pg
	PCB-61/70/74/76	96.4 pg	96.4U pg
	PCB-66	52.4 pg	52.4U pg
	PCB-56	27.5 pg	27.5U pg
	PCB-60	15.1 pg	15.1U pg
	PCB-95	50.8 pg	50.8U pg
	PCB-113/90/101	56.1 pg	56.1U pg
	PCB-99	20.4 pg	20.4U pg
	PCB-108/119/86/97/125/87	35.8 pg	35.8U pg
	PCB-110	48.8 pg	48.8U pg
	PCB-147/149	33 pg	33U pg
	PCB-153/168	27.1 pg	27.1U pg
	PCB-163/138/129	30.1 pg	30.1U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNNE-XR02	PCB-118	32.1 pg	32.1U pg
	Total Di-CBs	188 pg	188U pg
	Total Tri-CBs	107 pg	107U pg
	Total Penta-CBs	70.2 pg	70.2U pg
	Total Hexa-CBs	69 pg	69U pg
	PCB-11	106 pg	106U pg
	PCB-15	82.1 pg	82.1U pg
	PCB-31	41.6 pg	41.6U pg
	PCB-28/20	65.6 pg	65.6U pg
	PCB-113/90/101	38.1 pg	38.1U pg
	PCB-153/168	27.8 pg	27.8U pg
	PCB-163/138/129	41.2 pg	41.2U pg

Samples N10-CE05-TNNE-XR03, N10-CE05-TNNE-XR04, and N10-CE05-TNNE-XR02 and samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, and 13C-CE05-T042-XR02-103 (all 6 from SDG A5678) were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR03	6/25/13	PCB-77	9.09 pg	N10-CE05-TNNE-BM01
		PCB-105	15.4 pg	
		PCB-118	33.7 pg	
		PCB-156/157	5.61 pg	
		Total Mono-CBs	391 pg	
		Total Di-CBs	3450 pg	
		Total Tri-CBs	693 pg	
		Total Tetra-CBs	581 pg	
		Total Penta-CBs	295 pg	
		Total Hexa-CBs	161 pg	
		Total Hepta-CBs	60 pg	
		PCB-1	87.4 pg	
		PCB-2	164 pg	
		PCB-3	140 pg	
		PCB-4	69.8 pg	
		PCB-10	8.27 pg	
		PCB-9	10.8 pg	
		PCB-7	6.62 pg	
		PCB-6	43.5 pg	
		PCB-8	118 pg	
		PCB-11	3070 pg	
		PCB-13/12	39.2 pg	
		PCB-15	86.5 pg	
		PCB-19	16.9 pg	
		PCB-30/18	102 pg	
		PCB-17	51.7 pg	
		PCB-27	9.52 pg	
		PCB-16	50.5 pg	
		PCB-32	33.9 pg	
		PCB-26/29	25.1 pg	
		PCB-25	14.7 pg	
		PCB-31	108 pg	
		PCB-28/20	132 pg	
		PCB-21/33	53.9 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR03 (continued)	6/25/13	PCB-22	38.4 pg	N10-CE05-TNNE-BM01
		PCB-35	11.4 pg	
		PCB-37	44.8 pg	
		PCB-50/53	13 pg	
		PCB-45	11.3 pg	
		PCB-51	16 pg	
		PCB-46	4.47 pg	
		PCB-52	92 pg pg	
		PCB-69/49	47.5 pg	
		PCB-48	15.6 pg	
		PCB-44/47/65	110 pg	
		PCB-59/62/75	6.98 pg	
		PCB-42	19.5 pg	
		PCB-41	7.7 pg	
		PCB-71/40	28.2 pg	
		PCB-64	24.6 pg	
		PCB-68	4.71 pg	
		PCB-61/70/74/76	88.9 pg	
		PCB-66	49.8 pg	
		PCB-56	22.9 pg	
		PCB-60	9.47 pg	
		PCB-95	46.9 pg	
		PCB-91	7.74 pg	
		PCB-84	14.7 pg	
		PCB-92	9.04 pg	
		PCB-113/90/101	47.9 pg	
		PCB-99	21.3 pg	
		PCB-108/119/86/97/125/87	32.1 pg	
		PCB-116/85	7.69 pg	
		PCB-110	49 pg	
		PCB-82	5.97 pg	
		PCB-109	3.9 pg	
		PCB-136	5.8 pg 16.4 pg	
		PCB-151/135	33.4 pg	
		PCB-147/149	13.9 pg	
		PCB-132	6.96 pg	
		PCB-146	26.2 pg	
		PCB-153/168	7.46 pg	
		PCB-141	5.42 pg	
		PCB-130	33.6 pg	
		PCB-163/138/129	6.14 pg	
		PCB-128/166	4.96 pg	
		PCB-179	12.7 pg	
		PCB-187	5.14 pg	
		PCB-183	9.48 pg	
		PCB-174	5.68 pg	
		PCB-177	14.1 pg	
		PCB-180/193	7.89 pg	
		PCB-170	4.94 pg	
		PCB-209		

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR04	6/25/13	PCB-105	15.8 pg	N10-CE05-TNNE-BM02
		PCB-118	30.5 pg	
		Total Mono-CBs	161 pg	
		Total Di-CBs	1110 pg	
		Total Tri-CBs	714 pg	
		Total Tetra-CBs	467 pg	
		Total Penta-CBs	258 pg	
		Total Hexa-CBs	90.2 pg	
		PCB-1	47.4 pg	
		PCB-2	59 pg	
		PCB-3	54.4 pg	
		PCB-4	53.4 pg	
		PCB-9	17.4 pg	
		PCB-6	32.6 pg	
		PCB-8	103 pg	
		PCB-11	810 pg	
		PCB-15	89.6 pg	
		PCB-30/18	97.4 pg	
		PCB-17	50.7 pg	
		PCB-16	51.7 pg	
		PCB-32	31.6 pg	
		PCB-26/29	29.9 pg	
		PCB-31	122 pg	
		PCB-28/20	152 pg	
		PCB-21/33	73.3 pg	
		PCB-22	46.8 pg	
		PCB-37	58.8 pg	
		PCB-52	90.2 pg	
		PCB-69/49	43.2 pg	
		PCB-44/47/65	87.6 pg	
		PCB-71/40	29.3 pg	
		PCB-64	25.4 pg	
		PCB-61/70/74/76	96.4 pg	
		PCB-66	52.4 pg	
		PCB-56	27.5 pg	
		PCB-60	15.1 pg	
		PCB-95	50.8 pg	
		PCB-113/90/101	56.1 pg	
		PCB-99	20.4 pg	
		PCB-108/119/86/97/125/87	35.8 pg	
		PCB-110	48.8 pg	
		PCB-147/149	33 pg	
		PCB-153/168	27.1 pg	
		PCB-163/138/129	30.1 pg	
N10-CE05-TNNE-XR02	6/25/13	PCB-118	32.1 pg	N10-CE05-TNNE-BP01
		Total Di-CBs	188 pg	
		Total Tri-CBs	107 pg	
		Total Penta-CBs	70.2 pg	
		Total Hexa-CBs	69 pg	
		PCB-11	106 pg	
		PCB-15	82.1 pg	
		PCB-31	41.6 pg	
		PCB-28/20	65.6 pg	
		PCB-113/90/101	38.1 pg	
		PCB-153/168	27.8 pg	
		PCB-163/138/129	41.2 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	PCB-77	7.84 pg	N10-CE05-TNBS-BM01 N10-CE05-TKVK-BM01
		PCB-105	22.2 pg	
		PCB-118	52.8 pg	
		PCB-156/157	5.67 pg	
		Total Mono-CBs	340 pg	
		Total Di-CBs	3540 pg	
		Total Tri-CBs	1020 pg	
		Total Tetra-CBs	995 pg	
		Total Penta-CBs	489 pg	
		Total Hexa-CBs	177 pg	
		Total Hepta-CBs	54.8 pg	
		Total Octa-CBs	10.3 pg	
		PCB-1	77.8 pg	
		PCB-2	149 pg	
		PCB-3	113 pg	
		PCB-4	76 pg	
		PCB-10	9.47 pg	
		PCB-9	10.8 pg	
		PCB-7	5.94 pg	
		PCB-6	28.8 pg	
		PCB-8	96.5 pg	
		PCB-11	3210 pg	
		PCB-13/12	28.5 pg	
		PCB-15	72.8 pg	
		PCB-19	17 pg	
		PCB-30/18	127 pg	
		PCB-17	72.5 pg	
		PCB-27	14.2 pg	
		PCB-24	2.95 pg	
		PCB-16	63.5 pg	
		PCB-32	51.9 pg	
		PCB-26/29	36.3 pg	
		PCB-25	25 pg	
		PCB-31	172 pg	
		PCB-28/20	233 pg	
		PCB-21/33	80.3 pg	
		PCB-22	59.3 pg	
		PCB-35	12.8 pg	
		PCB-37	48.5 pg	
		PCB-54	2.57 pg	
		PCB-50/53	22.2 pg	
		PCB-45	13.9 pg	
		PCB-51	33.9 pg	
		PCB-46	7.53 pg	
		PCB-52	141 pg	
		PCB-69/49	87.4 pg	
		PCB-48	25.6 pg	
		PCB-44/47/65	167 pg	
		PCB-59/62/75	13.5 pg	
		PCB-42	33 pg	
		PCB-41	10.1 pg	
		PCB-71/40	46.9 pg	
		PCB-64	44.4 pg	
		PCB-68	6.93 pg	
		PCB-67	3.49 pg	
		PCB-63	4.34 pg	
		PCB-61/70/74/76	169 pg	
		PCB-66	98.9 pg	
		PCB-56	38.9 pg	
		PCB-60	16.8 pg	
		PCB-103	2.63 pg	
		PCB-95	58.8 pg	
		PCB-100/93	5.51 pg	
		PCB-102	4.42 pg	
		PCB-91	11.3 pg	
		PCB-84	24.4 pg	
		PCB-92	14.1 pg	
		PCB-113/90/101	77.8 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101 (continued)	6/26/13	PCB-99	44.7 pg	N10-CE05-TNBS-BM01 N10-CE05-TKVK-BM01
		PCB-108/119/86/97/125/87	50.8 pg	
		PCB-117	3.94 pg	
		PCB-116/85	9.82 pg	
		PCB-110	87.9 pg	
		PCB-82	9.88 pg	
		PCB-107/124	3.36 pg	
		PCB-109	5.05 pg	
		PCB-136	7.37 pg	
		PCB-151/135	15.3 pg	
		PCB-144	2.3 pg	
		PCB-147/149	35.8 pg	
		PCB-132	12 pg	
		PCB-146	4.24 pg	
		PCB-153/168	29.8 pg	
		PCB-141	5.86 pg	
		PCB-164	2.24 pg	
		PCB-163/138/129	43.9 pg	
		PCB-158	3.99 pg	
		PCB-128/166	8.56 pg	
		PCB-179	3.54 pg	
		PCB-187	8.78 pg	
		PCB-183	4.53 pg	
		PCB-174	8.99 pg	
		PCB-177	5.41 pg	
		PCB-171/173	3.25 pg	
		PCB-180/193	14.6 pg	
		PCB-170	5.64 pg	
		PCB-198/199	5.22 pg	
		PCB-194	5.12 pg	
13C-CE05-T042-XR04-101	6/26/13	PCB-105	70.9 pg	N10-CE05-TNBS-BM02 N10-CE05-TKVK-BM02
		PCB-118	268 pg	
		Total Mono-CBs	1520 pg	
		Total Di-CBs	33000 pg	
		Total Tri-CBs	160000 pg	
		Total Tetra-CBs	71300 pg	
		Total Penta-CBs	6880 pg	
		Total Hexa-CBs	2640 pg	
		Total Hepta-CBs	353 pg	
		PCB-1	732 pg	
		PCB-2	336 pg	
		PCB-3	456 pg	
		PCB-4	4060 pg	
		PCB-10	170 pg	
		PCB-9	877 pg	
		PCB-7	471 pg	
		PCB-6	2820 pg	
		PCB-5	343 pg	
		PCB-8	14200 pg	
		PCB-11	1830 pg	
		PCB-13/12	1060 pg	
		PCB-15	7220 pg	
		PCB-19	2500 pg	
		PCB-30/18	28000 pg	
		PCB-17	13000 pg	
		PCB-27	2060 pg	
		PCB-24	551 pg	
		PCB-16	16000 pg	
		PCB-32	8170 pg	
		PCB-34	109 pg	
		PCB-23	48.6 pg	
		PCB-26/29	5350 pg	
		PCB-25	2390 pg	
		PCB-31	25300 pg	
		PCB-28/20	26600 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-101 (continued)	6/26/13	PCB-21/33	16800 pg	N10-CE05-TNBS-BM02 N10-CE05-TKVK-BM02
		PCB-22	9870 pg	
		PCB-39	147 pg	
		PCB-35	200 pg	
		PCB-37	3140 pg	
		PCB-54	78.7 pg	
		PCB-50/53	3530 pg	
		PCB-45	4320 pg	
		PCB-51	1150 pg	
		PCB-46	1680 pg	
		PCB-52	13500 pg	
		PCB-43	864 pg	
		PCB-69/49	7570 pg	
		PCB-48	4000 pg	
		PCB-44/47/65	12300 pg	
		PCB-59/62/75	1230 pg	
		PCB-42	3400 pg	
		PCB-41	1890 pg	
		PCB-71/40	4970 pg	
		PCB-64	4200 pg	
		PCB-67	208 pg	
		PCB-63	152 pg	
		PCB-61/70/74/76	4120 pg	
		PCB-66	1610 pg	
		PCB-56	360 pg	
		PCB-60	189 pg	
		PCB-96	89.3 pg	
		PCB-95	2390 pg	
		PCB-102	141 pg	
		PCB-91	350 pg	
		PCB-84	492 pg	
		PCB-92	184 pg	
		PCB-113/90/101	1170 pg	
		PCB-99	330 pg	
		PCB-108/119/86/97/125/87	513 pg	
		PCB-110	828 pg	
		PCB-82	60.8 pg	
		PCB-136	264 pg	
		PCB-151/135	576 pg	
		PCB-144	60 pg	
		PCB-147/149	867 pg	
		PCB-132	176 pg	
		PCB-153/168	318 pg	
		PCB-141	90.1 pg	
		PCB-163/138/129	287 pg	
		PCB-179	152 pg	
		PCB-176	33 pg	
		PCB-187	168 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-101	6/26/13	PCB-105	6.37 pg	N10-CE05-TNBS-BP01 N10-CE05-TKVK-BP01
		PCB-118	16.2 pg	
		Total Mono-CBs	16.2 pg	
		Total Di-CBs	66.4 pg	
		Total Tri-CBs	67.5 pg	
		Total Tetra-CBs	86.2 pg	
		Total Penta-CBs	119 pg	
		Total Hexa-CBs	91.1 pg	
		Total Hepta-CBs	82.6 pg	
		Total Octa-CBs	19 pg	
		PCB-1	3.27 pg	
		PCB-2	5.74 pg	
		PCB-3	7.16 pg	
		PCB-4	5.96 pg	
		PCB-9	2.79 pg	
		PCB-6	2.25 pg	
		PCB-8	7.31 pg	
		PCB-11	42 pg	
		PCB-15	6.08 pg	
		PCB-30/18	11 pg	
		PCB-17	5.94 pg	
		PCB-32	3.91 pg	
		PCB-31	13.3 pg	
		PCB-28/20	17.1 pg	
		PCB-21/33	6.69 pg	
		PCB-22	4.06 pg	
		PCB-37	5.43 pg	
		PCB-52	17.6 pg	
		PCB-69/49	8.45 pg	
		PCB-48	2.37 pg	
		PCB-44/47/65	15.3 pg	
		PCB-71/40	5.2 pg	
		PCB-64	4.17 pg	
		PCB-61/70/74/76	18.3 pg	
		PCB-66	10.1 pg	
		PCB-56	4.71 pg	
		PCB-95	16.5 pg	
		PCB-84	5.82 pg	
		PCB-113/90/101	20 pg	
		PCB-99	10.4 pg	
		PCB-108/119/86/97/125/87	15.5 pg	
		PCB-110	27.9 pg	
		PCB-136	2.09 pg	
		PCB-151/135	8.11 pg	
		PCB-147/149	21.5 pg	
		PCB-132	8.16 pg	
		PCB-153/168	20.3 pg	
		PCB-141	4.43 pg	
		PCB-163/138/129	26.5 pg	
		PCB-179	4.99 pg	
		PCB-187	13.4 pg	
		PCB-183	6.51 pg	
		PCB-174	14.8 pg	
		PCB-177	7.51 pg	
		PCB-180/193	25.1 pg	
		PCB-170	10.3 pg	
		PCB-198/199	6.84 pg	
		PCB-196	5.82 pg	
		PCB-194	6.38 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103	6/26/13	PCB-105	224 pg	N10-CE05-TKVK-BN01
		PCB-118	528 pg	
		Total Mono-CBs	562 pg	
		Total Di-CBs	9270 pg	
		Total Tri-CBs	25500 pg	
		Total Tetra-CBs	14900 pg	
		Total Penta-CBs	5800 pg	
		Total Hexa-CBs	2050 pg	
		Total Hepta-CBs	199 pg	
		PCB-1	190 pg	
		PCB-2	186 pg	
		PCB-3	185 pg	
		PCB-4	898 pg	
		PCB-10	53.7 pg	
		PCB-9	148 pg	
		PCB-7	90.6 pg	
		PCB-6	522 pg	
		PCB-5	54.7 pg	
		PCB-8	2470 pg	
		PCB-11	3670 pg	
		PCB-13/12	213 pg	
		PCB-15	1140 pg	
		PCB-19	387 pg	
		PCB-30/18	4070 pg	
		PCB-17	1960 pg	
		PCB-27	309 pg	
		PCB-24	66.4 pg	
		PCB-16	2280 pg	
		PCB-32	1240 pg	
		PCB-34	15 pg	
		PCB-26/29	867 pg	
		PCB-25	413 pg	
		PCB-31	4190 pg	
		PCB-28/20	4510 pg	
		PCB-21/33	2780 pg	
		PCB-22	1670 pg	
		PCB-35	58.3 pg	
		PCB-37	704 pg	
		PCB-54	12.6 pg	
		PCB-50/53	533 pg	
		PCB-45	687 pg	
		PCB-51	187 pg	
		PCB-46	254 pg	
		PCB-52	2780 pg	
		PCB-43	138 pg	
		PCB-69/49	1470 pg	
		PCB-48	691 pg	
		PCB-44/47/65	2520 pg	
		PCB-59/62/75	238 pg	
		PCB-42	654 pg	
		PCB-41	374 pg	
		PCB-71/40	953 pg	
		PCB-64	854 pg	
		PCB-67	41.8 pg	
		PCB-63	41.7 pg	
		PCB-61/70/74/76	1510 pg	
		PCB-66	625 pg	
		PCB-56	218 pg	
		PCB-60	113 pg	
		PCB-96	16.2 pg	
		PCB-95	1110 pg	
		PCB-102	53.5 pg	
		PCB-91	147 pg	
		PCB-84	343 pg	
		PCB-92	161 pg	
		PCB-113/90/101	949 pg	
		PCB-83	46.3 pg	
		PCB-99	372 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103 (continued)	6/26/13	PCB-108/119/86/97/125/87	605 pg	N10-CE05-TKVK-BN01
		PCB-116/85	118 pg	
		PCB-110	1040 pg	
		PCB-82	81.7 pg	
		PCB-136	121 pg	
		PCB-151/135	246 pg	
		PCB-144	37 pg	
		PCB-147/149	511 pg	
		PCB-134	46.3 pg	
		PCB-132	197 pg	
		PCB-146	43.3 pg	
		PCB-153/168	274 pg	
		PCB-141	94.1 pg	
		PCB-163/138/129	402 pg	
		PCB-158	38.4 pg	
		PCB-128/166	43.9 pg	
		PCB-179	29.4 pg	
		PCB-187	56.4 pg	
		PCB-183	26 pg	
		PCB-174	43 pg	
		PCB-180/193	44.1 pg	
13C-CE05-T042-XR04-103	6/26/13	PCB-105	54.1 pg	N10-CE05-TKVK-BN02
		PCB-118	150 pg	
		Total Mono-CBs	739 pg	
		Total Di-CBs	16100 pg	
		Total Tri-CBs	73200 pg	
		Total Tetra-CBs	29600 pg	
		Total Penta-CBs	3240 pg	
		Total Hexa-CBs	1330 pg	
		Total Hepta-CBs	142 pg	
		PCB-1	339 pg	
		PCB-2	173 pg	
		PCB-3	227 pg	
		PCB-4	2030 pg	
		PCB-10	95.4 pg	
		PCB-9	446 pg	
		PCB-7	241 pg	
		PCB-6	1360 pg	
		PCB-5	152 pg	
		PCB-8	6770 pg	
		PCB-11	1190 pg	
		PCB-13/12	504 pg	
		PCB-15	3270 pg	
		PCB-19	1140 pg	
		PCB-30/18	13300 pg	
		PCB-17	6070 pg	
		PCB-27	958 pg	
		PCB-24	222 pg	
		PCB-16	7510 pg	
		PCB-32	3970 pg	
		PCB-34	51.2 pg	
		PCB-26/29	2430 pg	
		PCB-25	1060 pg	
		PCB-31	11100 pg	
		PCB-28/20	11800 pg	
		PCB-21/33	7640 pg	
		PCB-22	4420 pg	
		PCB-39	65.7 pg	
		PCB-37	1450 pg	
		PCB-54	35 pg	
		PCB-50/53	1440 pg	
		PCB-45	1780 pg	
		PCB-51	492 pg	
		PCB-46	666 pg	
		PCB-52	5570 pg	
		PCB-43	340 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-103 (continued)	6/26/13	PCB-69/49	3150 pg	N10-CE05-TKVK-BN02
		PCB-48	1660 pg	
		PCB-44/47/65	5020 pg	
		PCB-59/62/75	537 pg	
		PCB-42	1440 pg	
		PCB-41	760 pg	
		PCB-71/40	2110 pg	
		PCB-64	1770 pg	
		PCB-67	85.3 pg	
		PCB-63	73.7 pg	
		PCB-61/70/74/76	1720 pg	
		PCB-66	678 pg	
		PCB-56	153 pg	
		PCB-60	90.8 pg	
		PCB-96	43 pg	
		PCB-95	1000 pg	
		PCB-100/93	28.5 pg	
		PCB-102	75.8 pg	
		PCB-91	160 pg	
		PCB-84	235 pg	
		PCB-92	92.2 pg	
		PCB-113/90/101	527 pg	
		PCB-99	174 pg	
		PCB-108/119/86/97/125/87	252 pg	
		PCB-116/85	51 pg	
		PCB-110	359 pg	
		PCB-82	38.9 pg	
		PCB-136	122 pg	
		PCB-151/135	280 pg	
		PCB-144	26.9 pg	
		PCB-147/149	429 pg	
		PCB-132	72.4 pg	
		PCB-146	28.7 pg	
		PCB-153/168	160 pg	
		PCB-141	36.5 pg	
		PCB-163/138/129	152 pg	
		PCB-158	19.1 pg	
		PCB-179	62.4 pg	
		PCB-176	16.5 pg	
		PCB-187	36.1 pg	
		PCB-180/193	27.2 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-103	6/26/13	PCB-105	4.1 pg	N10-CE05-TKVK-BQ01
		PCB-118	8.18 pg	
		Total Mono-CBs	14.6 pg	
		Total Di-CBs	66.8 pg	
		Total Tri-CBs	56.1 pg	
		Total Tetra-CBs	71 pg	
		Total Penta-CBs	74 pg	
		Total Hexa-CBs	49.5 pg	
		Total Hepta-CBs	30.4 pg	
		Total Octa-CBs	7.78 pg	
		PCB-1	4.49 pg	
		PCB-2	4.27 pg	
		PCB-3	5.8 pg	
		PCB-4	4.7 pg	
		PCB-8	5.92 pg	
		PCB-11	51.4 pg	
		PCB-15	4.81 pg	
		PCB-30/18	7.42 pg	
		PCB-17	4.73 pg	
		PCB-16	3.65 pg	
		PCB-32	3.47 pg	
		PCB-26/29	2.03 pg	
		PCB-31	9.78 pg	
		PCB-28/20	13.5 pg	
		PCB-21/33	4.98 pg	
		PCB-22	3.3 pg	
		PCB-37	3.22 pg	
		PCB-50/53	1.36 pg	
		PCB-52	12.8 pg	
		PCB-69/49	5.9 pg	
		PCB-48	1.45 pg	
		PCB-44/47/65	13.6 pg	
		PCB-71/40	3.82 pg	
		PCB-64	3.6 pg	
		PCB-61/70/74/76	15.7 pg	
		PCB-66	8.81 pg	
		PCB-56	4.03 pg	
		PCB-95	10.5 pg	
		PCB-91	1.96 pg	
		PCB-84	3.96 pg	
		PCB-92	2.12 pg	
		PCB-113/90/101	12.1 pg	
		PCB-99	6.45 pg	
		PCB-108/119/86/97/125/87	7.89 pg	
		PCB-116/85	2.83 pg	
		PCB-110	14 pg	
		PCB-151/135	4.1 pg	
		PCB-147/149	10.6 pg	
		PCB-132	3.55 pg	
		PCB-146	1.51 pg	
		PCB-153/168	9.85 pg	
		PCB-141	3.45 pg	
		PCB-163/138/129	14.3 pg	
		PCB-128/166	2.16 pg	
		PCB-179	1.81 pg	
		PCB-187	5.5 pg	
		PCB-183	2.08 pg	
		PCB-174	5.25 pg	
		PCB-177	2.97 pg	
		PCB-180/193	9.45 pg	
		PCB-170	3.37 pg	
		PCB-198/199	3.82 pg	
		PCB-194	3.96 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNNE-BM01	PCB-2	293 pg	293U pg
	PCB-3	444 pg	444U pg
N10-CE05-TNNE-BM02	PCB-2	198 pg	198U pg
	PCB-3	219 pg	219U pg
N10-CE05-TNBS-BM01	PCB-2	294 pg	294U pg
	PCB-3	419 pg	419U pg
N10-CE05-TKVK-BM01	PCB-2	192 pg	192U pg
	PCB-3	279 pg	279U pg
N10-CE05-TNBS-BM02	Total Di-CBs	140000 pg	140000U pg
	Total Tri-CBs	100000 pg	100000U pg
	Total Tetra-CBs	94900 pg	94900U pg
	Total Penta-CBs	34200 pg	34200U pg
	Total Hexa-CBs	10200 pg	10200U pg
	PCB-2	148 pg	148U pg
	PCB-3	206 pg	206U pg
	PCB-9	446 pg	446U pg
	PCB-7	153 pg	153U pg
	PCB-6	1350 pg	1350U pg
	PCB-5	58.9 pg	58.9U pg
	PCB-8	4240 pg	4240U pg
	PCB-13/12	712 pg	712U pg
	PCB-15	3340 pg	3340U pg
	PCB-30/18	17000 pg	17000U pg
	PCB-17	9930 pg	9930U pg
	PCB-27	4600 pg	4600U pg
	PCB-24	248 pg	248U pg
	PCB-16	6250 pg	6250U pg
	PCB-32	7020 pg	7020U pg
	PCB-34	144 pg	144U pg
	PCB-23	15 pg	15U pg
	PCB-26/29	4030 pg	4030U pg
	PCB-25	2140 pg	2140U pg
	PCB-31	12600 pg	12600U pg
	PCB-28/20	14100 pg	14100U pg
	PCB-21/33	2710 pg	2710U pg
	PCB-22	3410 pg	3410U pg
	PCB-39	77.4 pg	77.4U pg
	PCB-35	170 pg	170U pg
	PCB-37	1940 pg	1940U pg
	PCB-54	335 pg	335U pg
	PCB-50/53	4580 pg	4580U pg
	PCB-45	2890 pg	2890U pg
	PCB-51	1830 pg	1830U pg
	PCB-46	1420 pg	1420U pg
	PCB-52	18300 pg	18300U pg
	PCB-43	594 pg	594U pg
	PCB-69/49	10400 pg	10400U pg
	PCB-48	2120 pg	2120U pg
	PCB-44/47/65	15000 pg	15000U pg
	PCB-59/62/75	1350 pg	1350U pg
	PCB-42	3780 pg	3780U pg
	PCB-41	495 pg	495U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TNBS-BM02 (continued)	PCB-71/40	7430 pg	7430U pg
	PCB-64	4400 pg	4400U pg
	PCB-67	235 pg	235U pg
	PCB-63	287 pg	287U pg
	PCB-61/70/74/76	9310 pg	9310U pg
	PCB-66	5740 pg	5740U pg
	PCB-60	803 pg	803U pg
	PCB-96	137 pg	137U pg
	PCB-95	6450 pg	6450U pg
	PCB-102	377 pg	377U pg
	PCB-91	1110 pg	1110U pg
	PCB-84	2380 pg	2380U pg
	PCB-113/90/101	5280 pg	5280U pg
	PCB-136	470 pg	470U pg
	PCB-151/135	1090 pg	1090U pg
	PCB-144	114 pg	114U pg
	PCB-147/149	2370 pg	2370U pg
	PCB-132	758 pg	758U pg
	PCB-153/168	1590 pg	1590U pg
	PCB-141	262 pg	262U pg
	PCB-179	184 pg	184U pg
	PCB-176	42.8 pg	42.8U pg
	PCB-187	447 pg	447U pg
N10-CE05-TKVK-BM02	PCB-105	315 pg	315U pg
	PCB-118	928 pg	928U pg
	Total Mono-CBs	6660 pg	6660U pg
	Total Di-CBs	62600 pg	62600U pg
	Total Tri-CBs	42000 pg	42000U pg
	Total Tetra-CBs	38000 pg	38000U pg
	Total Penta-CBs	14500 pg	14500U pg
	Total Hexa-CBs	4550 pg	4550U pg
	Total Hepta-CBs	950 pg	950U pg
	PCB-2	86 pg	86U pg
	PCB-3	113 pg	113U pg
	PCB-9	172 pg	172U pg
	PCB-7	54.9 pg	54.9U pg
	PCB-6	542 pg	542U pg
	PCB-5	19.1 pg	19.1U pg
	PCB-8	1660 pg	1660U pg
	PCB-11	4250 pg	4250U pg
	PCB-13/12	280 pg	280U pg
	PCB-15	1360 pg	1360U pg
	PCB-19	6770 pg	6770U pg
	PCB-30/18	6960 pg	6960U pg
	PCB-17	4310 pg	4310U pg
	PCB-27	2250 pg	2250U pg
	PCB-24	109 pg	109U pg
	PCB-16	2260 pg	2260U pg
	PCB-32	3060 pg	3060U pg
	PCB-34	64.1 pg	64.1U pg
	PCB-23	4.89 pg	4.89U pg
	PCB-26/29	1730 pg	1730U pg
	PCB-25	851 pg	851U pg
	PCB-31	4990 pg	4990U pg
	PCB-28/20	5510 pg	5510U pg
	PCB-21/33	987 pg	987U pg
	PCB-22	1250 pg	1250U pg
	PCB-39	32.6 pg	32.6U pg
	PCB-35	64.1 pg	64.1U pg
	PCB-37	766 pg	766U pg
	PCB-54	123 pg	123U pg
	PCB-50/53	1900 pg	1900U pg
	PCB-45	1250 pg	1250U pg
	PCB-51	584 pg	584U pg
	PCB-46	583 pg	583U pg
	PCB-52	7460 pg	7460U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BM02 (continued)	PCB-43	227 pg	227U pg
	PCB-69/49	4460 pg	4460U pg
	PCB-48	811 pg	811U pg
	PCB-44/47/65	6010 pg	6010U pg
	PCB-59/62/75	545 pg	545U pg
	PCB-42	1570 pg	1570U pg
	PCB-41	195 pg	195U pg
	PCB-71/40	3070 pg	3070U pg
	PCB-64	1730 pg	1730U pg
	PCB-67	91 pg	91U pg
	PCB-63	118 pg	118U pg
	PCB-61/70/74/76	3480 pg	3480U pg
	PCB-66	2120 pg	2120U pg
	PCB-56	1010 pg	1010U pg
	PCB-60	298 pg	298U pg
	PCB-96	61.1 pg	61.1U pg
	PCB-95	2730 pg	2730U pg
	PCB-102	185 pg	185U pg
	PCB-91	536 pg	536U pg
	PCB-84	1020 pg	1020U pg
	PCB-92	523 pg	523U pg
	PCB-113/90/101	2220 pg	2220U pg
	PCB-99	1130 pg	1130U pg
	PCB-108/119/86/97/125/87	1270 pg	1270U pg
	PCB-110	2410 pg	2410U pg
	PCB-82	220 pg	220U pg
	PCB-136	223 pg	223U pg
	PCB-151/135	489 pg	489U pg
	PCB-144	49.6 pg	49.6U pg
	PCB-147/149	1040 pg	1040U pg
	PCB-132	330 pg	330U pg
	PCB-153/168	735 pg	735U pg
	PCB-141	102 pg	102U pg
	PCB-163/138/129	851 pg	851U pg
	PCB-179	84.5 pg	84.5U pg
	PCB-176	20.6 pg	20.6U pg
	PCB-187	223 pg	223U pg
N10-CE05-TKVK-BN01	PCB-2	276 pg	276U pg
	PCB-3	361 pg	361U pg
	PCB-9	734 pg	734U pg
	PCB-7	233 pg	233U pg
	PCB-6	2390 pg	2390U pg
	PCB-5	81.6 pg	81.6U pg
	PCB-8	7220 pg	7220U pg
	PCB-16	10700 pg	10700U pg
	PCB-21/33	4540 pg	4540U pg
	PCB-22	5830 pg	5830U pg
	PCB-35	287 pg	287U pg
	PCB-41	929 pg	929U pg
	PCB-141	375 pg	375U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
N10-CE05-TKVK-BN02	Total Di-CBs	80300 pg	80300U pg
	Total Tri-CBs	52000 pg	52000U pg
	Total Tetra-CBs	47700 pg	47700U pg
	Total Hexa-CBs	5320 pg	5320U pg
	PCB-2	129 pg	129U pg
	PCB-3	160 pg	160U pg
	PCB-9	226 pg	226U pg
	PCB-7	67.8 pg	67.8U pg
	PCB-6	678 pg	678U pg
	PCB-8	2100 pg	2100U pg
	PCB-11	5370 pg	5370U pg
	PCB-13/12	358 pg	358U pg
	PCB-15	1640 pg	1640U pg
	PCB-30/18	8520 pg	8520U pg
	PCB-17	5210 pg	5210U pg
	PCB-27	2810 pg	2810U pg
	PCB-24	133 pg	133U pg
	PCB-16	2700 pg	2700U pg
	PCB-32	3730 pg	3730U pg
	PCB-34	83 pg	83U pg
	PCB-26/29	2180 pg	2180U pg
	PCB-25	1070 pg	1070U pg
	PCB-31	6250 pg	6250U pg
	PCB-28/20	6930 pg	6930U pg
	PCB-21/33	1220 pg	1220U pg
	PCB-22	1540 pg	1540U pg
	PCB-37	889 pg	889U pg
	PCB-54	154 pg	154U pg
	PCB-50/53	2500 pg	2500U pg
	PCB-45	1580 pg	1580U pg
	PCB-51	771 pg	771U pg
	PCB-46	767 pg	767U pg
	PCB-52	9470 pg	9470U pg
	PCB-43	300 pg	300U pg
	PCB-69/49	5510 pg	5510U pg
	PCB-48	1000 pg	1000U pg
	PCB-44/47/65	7530 pg	7530U pg
	PCB-59/62/75	690 pg	690U pg
	PCB-42	1910 pg	1910U pg
	PCB-41	231 pg	231U pg
	PCB-71/40	3870 pg	3870U pg
	PCB-64	2170 pg	2170U pg
	PCB-67	111 pg	111U pg
	PCB-63	154 pg	154U pg
	PCB-61/70/74/76	4340 pg	4340U pg
	PCB-66	2540 pg	2540U pg
	PCB-60	375 pg	375U pg
	PCB-96	69.1 pg	69.1U pg
	PCB-95	3450 pg	3450U pg
	PCB-100/93	101 pg	101U pg
	PCB-102	243 pg	243U pg
	PCB-91	672 pg	672U pg
	PCB-136	253 pg	253U pg
	PCB-151/135	575 pg	575U pg
	PCB-144	58 pg	58U pg
	PCB-147/149	1210 pg	1210U pg
	PCB-141	128 pg	128U pg
	PCB-158	76.2 pg	76.2U pg
	PCB-179	109 pg	109U pg
	PCB-176	25.2 pg	25.2U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

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

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N10-CE05-TNBS-BM01	^{13}C-PCB-15	109 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNBS-BM02	^{13}C-PCB-15	113 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNBS-BP01	^{13}C-PCB-15	108 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
N10-CE05-TKVK-BM01	^{13}C-PCB-15	110 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TKVK-BP01	^{13}C-PCB-15 ^{13}C-PCB-77 ^{13}C-PCB-126	109 (19-107) 115 (31-109) 108 (50-106)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-77 PCB-126 Total Di-CBs Total Tetra-CBs Total Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNNE-XR02	^{13}C-PCB-19 ^{13}C-PCB-77 ^{13}C-PCB-118 ^{13}C-PCB-167 ^{13}C-PCB-189	110 (1-108) 111 (31-109) 112 (49-111) 121 (45-118) 117 (47-116)	PCB-19 PCB-30/18 PCB-17 PCB-27 PCB-24 PCB-16 PCB-32 PCB-77 PCB-118 PCB-128/166 PCB-159 PCB-162 PCB-167 PCB-189 Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
N10-CE05-TNBS-BM01 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01	PCB-14 Total Di-CBs	J (all detects) J (all detects)	P
N10-CE05-TNBS-BM02	PCB-5 PCB-14 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNNE-BM02	PCB-9 PCB-7 PCB-5 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TKVK-BM02	PCB-5 Total Di-CBs	J (all detects) J (all detects)	P
N10-CE05-TKVK-BN02	PCB-9 PCB-7 PCB-13/12 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNNE-XR03	PCB-10 PCB-9 PCB-7 PCB-6 PCB-13/12 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNNE-XR04	PCB-4 PCB-9 PCB-6 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNNE-XR02	PCB-11 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P

For the above listed samples, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04	All TCL compounds
N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02	All TCL compounds except PCB-115 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs
N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02	All TCL compounds except PCB-68 Mono-CBs Di-CBs Tri-CBs Tetra-CBs Penta-CBs Hexa-CBs Hepta-CBs Octa-CBs Nona-CBs

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5668	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A

Sample	Compound	Flag	A or P
N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01	Results were flagged “E” by the laboratory to indicate that the results exceeded the calibration range.	J (all detects)	P

Sample	Compound	Finding	Criteria	Flag	A or P
N10-CE05-TNBS-BM01 N10-CE05-TNNE-BM01	Total Di-CBs Total Tri-CBs Total Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	P
N10-CE05-TNBS-BM02 N10-CE05-TNNE-BM02 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02	Total Di-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects)	P
N10-CE05-TNBS-BP01	Total Di-CBs Total Tri-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	P
N10-CE05-TNNE-BP01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs Total Hepta-CBs	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)	P
N10-CE05-TKVK-BP01 N10-CE05-TKVK-BQ01	Total Mono-CBs Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs	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)	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 Duplicates

No field duplicates were identified in this SDG.

CWCM Newark Bay High Volume Event #2
Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A5668

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04 N10-CE05-TNNE-XR02	PCB-4 Total Di-CBs	J (all detects) UJ (all non-detects) J (all detects) UJ (all non-detects)	P	Initial calibration (ion abundance ratio) (c)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TKVK-BM01	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5668	N10-CE05-TKVK-BP01	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-77 PCB-126 Total Di-CBs Total Tetra-CBs Total Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5668	N10-CE05-TNNE-XR02	PCB-19 PCB-30/18 PCB-17 PCB-27 PCB-24 PCB-16 PCB-32 PCB-77 PCB-118 PCB-128/166 PCB-159 PCB-162 PCB-167 PCB-189 Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01	PCB-14 Total Di-CBs	J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TNBS-BM02	PCB-5 PCB-14 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TNNE-BM02	PCB-9 PCB-7 PCB-5 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TKVK-BM02	PCB-5 Total Di-CBs	J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TKVK-BN02	PCB-9 PCB-7 PCB-13/12 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TNNE-XR03	PCB-10 PCB-9 PCB-7 PCB-6 PCB-13/12 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TNNE-XR04	PCB-4 PCB-9 PCB-6 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5668	N10-CE05-TNNE-XR02	PCB-11 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01 N10-CE05-TNNE-XR03 N10-CE05-TNNE-XR04 N10-CE05-TNNE-XR02	All compounds reported as estimated maximum possible concentration (EMPC).	EMPC-J	A	Compound quantitation (EMPC) (k)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNBS-BM02 N10-CE05-TNBS-BP01 N10-CE05-TNNE-BM01 N10-CE05-TNNE-BM02 N10-CE05-TNNE-BP01 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BP01 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02 N10-CE05-TKVK-BQ01	Results were flagged “E” by the laboratory to indicate that the results exceeded the calibration range.	J (all detects)	P	Compound quantitation (q)
A5668	N10-CE05-TNBS-BM01 N10-CE05-TNNE-BM01	Total Di-CBs Total Tri-CBs Total Tetra-CBs	J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5668	N10-CE05-TNBS-BM02 N10-CE05-TNNE-BM02 N10-CE05-TKVK-BM01 N10-CE05-TKVK-BM02 N10-CE05-TKVK-BN01 N10-CE05-TKVK-BN02	Total Di-CBs	J (all detects)	P	Compound quantitation (exceeded range) (q)
A5668	N10-CE05-TNBS-BP01	Total Di-CBs Total Tri-CBs	J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5668	N10-CE05-TNNE-BP01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)
A5668	N10-CE05-TKVK-BP01 N10-CE05-TKVK-BQ01	Total Mono-CBs Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Compound quantitation (exceeded range) (q)

CWCM Newark Bay High Volume Event #2
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5668

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNBS-BM01	PCB-2	294U pg	A	bl
		PCB-3	419U pg		
		PCB-9	1320U pg		
		PCB-7	476U pg		
		PCB-6	4220U pg		
		PCB-5	157U pg		
		PCB-8	13500U pg		
		PCB-23	48.4U pg		
		PCB-21/33	10400U pg		
		PCB-22	13900U pg		
		PCB-51	8170U pg		
		PCB-41	1860U pg		
		PCB-68	368U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNBS-BM02	Total Tri-CBs	100000U pg	A	bl
		Total Tetra-CBs	94900U pg		
		PCB-2	148U pg		
		PCB-3	206U pg		
		PCB-9	446U pg		
		PCB-7	153U pg		
		PCB-6	1350U pg		
		PCB-5	58.9U pg		
		PCB-8	4240U pg		
		PCB-13/12	712U pg		
		PCB-15	3340U pg		
		PCB-30/18	17000U pg		
		PCB-17	9930U pg		
		PCB-24	248U pg		
		PCB-16	6250U pg		
		PCB-32	7020U pg		
		PCB-34	144U pg		
		PCB-23	15U pg		
		PCB-26/29	4030U pg		
		PCB-25	2140U pg		
		PCB-31	12600U pg		
		PCB-28/20	14100U pg		
		PCB-21/33	2710U pg		
		PCB-22	3410U pg		
		PCB-39	77.4U pg		
		PCB-35	170U pg		
		PCB-37	1940U pg		
		PCB-50/53	4580U pg		
		PCB-45	2890U pg		
		PCB-51	1830U pg		
		PCB-46	1420U pg		
		PCB-52	18300U pg		
		PCB-43	594U pg		
		PCB-69/49	10400U pg		
		PCB-48	2120U pg		
		PCB-44/47/65	15000U pg		
		PCB-59/62/75	1350U pg		
		PCB-42	3780U pg		
		PCB-41	495U pg		
		PCB-71/40	7430U pg		
		PCB-64	4400U pg		
		PCB-68	95.5U pg		
		PCB-67	235U pg		
		PCB-96	137U pg		
		PCB-179	184U pg		
		PCB-176	42.8U pg		
		PCB-185	19.6U pg		
A5668	N10-CE05-TNBS-BP01	PCB-9	1380U pg	A	bl
		PCB-7	631U pg		
		PCB-5	175U pg		
		PCB-30/18	29500U pg		
		PCB-24	367U pg		
		PCB-16	10300U pg		
		PCB-23	42.4U pg		
		PCB-21/33	11900U pg		
		PCB-51	2830U pg		
		PCB-46	2040U pg		
		PCB-48	4820U pg		
		PCB-44/47/65	38900U pg		
		PCB-41	1270U pg		
		PCB-68	512U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-BM01	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-23 PCB-21/33 PCB-68	293U pg 444U pg 1540U pg 712U pg 5190U pg 262U pg 16700U pg 62.6U pg 17800U pg 481U pg	A	bl
A5668	N10-CE05-TNNE-BM02	Total Tri-CBs Total Tetra-CBs PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-13/12 PCB-15 PCB-30/18 PCB-17 PCB-16 PCB-32 PCB-26/29 PCB-25 PCB-31 PCB-28/20 PCB-21/33 PCB-22 PCB-39 PCB-35 PCB-37 PCB-45 PCB-51 PCB-46 PCB-43 PCB-48 PCB-44/47/65 PCB-41 PCB-68	129000U pg 148000U pg 198U pg 219U pg 534U pg 233U pg 1600U pg 69.6U pg 5030U pg 904U pg 4470U pg 22100U pg 11600U pg 9180U pg 8670U pg 5230U pg 3190U pg 18500U pg 22000U pg 4580U pg 5500U pg 104U pg 263U pg 3020U pg 4090U pg 4170U pg 2070U pg 811U pg 3390U pg 25200U pg 868U pg 420U pg	A	bl
A5668	N10-CE05-TNNE-BP01	PCB-5 PCB-68	568U pg 2580U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BM01	Total Tri-CBs	168000U pg	A	bl
		PCB-2	192U pg		
		PCB-3	279U pg		
		PCB-9	626U pg		
		PCB-7	197U pg		
		PCB-6	2000U pg		
		PCB-5	70.3U pg		
		PCB-8	6110U pg		
		PCB-13/12	1080U pg		
		PCB-15	5390U pg		
		PCB-30/18	27400U pg		
		PCB-17	17200U pg		
		PCB-24	400U pg		
		PCB-16	9610U pg		
		PCB-23	20.5U pg		
		PCB-26/29	6820U pg		
		PCB-25	3440U pg		
		PCB-31	19900U pg		
		PCB-28/20	22400U pg		
		PCB-21/33	3850U pg		
		PCB-22	5090U pg		
		PCB-39	125U pg		
		PCB-38	27.2U pg		
		PCB-35	261U pg		
		PCB-37	3110U pg		
		PCB-45	4790U pg		
		PCB-51	2780U pg		
		PCB-46	2480U pg		
		PCB-43	975U pg		
		PCB-48	3210U pg		
		PCB-44/47/65	24600U pg		
		PCB-41	715U pg		
		PCB-68	167U pg		
		PCB-185	31.5U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BM02	PCB-156/157	51.2U pg	A	bl
		Total Tri-CBs	42000U pg		
		Total Tetra-CBs	38000U pg		
		PCB-2	86U pg		
		PCB-3	113U pg		
		PCB-9	172U pg		
		PCB-7	54.9U pg		
		PCB-6	542U pg		
		PCB-5	19.1U pg		
		PCB-8	1660U pg		
		PCB-13/12	280U pg		
		PCB-15	1360U pg		
		PCB-30/18	6960U pg		
		PCB-17	4310U pg		
		PCB-27	2250U pg		
		PCB-24	109U pg		
		PCB-16	2260U pg		
		PCB-32	3060U pg		
		PCB-34	64.1U pg		
		PCB-23	4.89U pg		
		PCB-26/29	1730U pg		
		PCB-25	851U pg		
		PCB-31	4990U pg		
		PCB-28/20	5510U pg		
		PCB-21/33	987U pg		
		PCB-22	1250U pg		
		PCB-39	32.6U pg		
		PCB-38	8.48U pg		
		PCB-35	64.1U pg		
		PCB-37	766U pg		
		PCB-50/53	1900U pg		
		PCB-45	1250U pg		
		PCB-51	584U pg		
		PCB-46	583U pg		
		PCB-52	7460U pg		
		PCB-43	227U pg		
		PCB-69/49	4460U pg		
		PCB-48	811U pg		
		PCB-44/47/65	6010U pg		
		PCB-59/62/75	545U pg		
		PCB-42	1570U pg		
		PCB-41	195U pg		
		PCB-71/40	3070U pg		
		PCB-64	1730U pg		
		PCB-68	40.5U pg		
		PCB-57	25.4U pg		
		PCB-67	91U pg		
		PCB-63	118U pg		
		PCB-61/70/74/76	3480U pg		
		PCB-66	2120U pg		
		PCB-96	61.1U pg		
		PCB-94	47.7U pg		
		PCB-95	2730U pg		
		PCB-102	185U pg		
		PCB-89	35.7U pg		
		PCB-136	223U pg		
		PCB-151/135	489U pg		
		PCB-144	49.6U pg		
		PCB-147/149	1040U pg		
		PCB-141	102U pg		
		PCB-179	84.5U pg		
		PCB-176	20.6U pg		
		PCB-187	223U pg		
		PCB-185	6.88U pg		
		PCB-174	101U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BP01	PCB-5 PCB-51 PCB-68	367U pg 6330U pg 1990U pg	A	bl
A5668	N10-CE05-TKVK-BN01	Total Tri-CBs PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-13/12 PCB-15 PCB-30/18 PCB-24 PCB-16 PCB-23 PCB-26/29 PCB-31 PCB-28/20 PCB-21/33 PCB-22 PCB-38 PCB-37 PCB-54 PCB-45 PCB-51 PCB-43 PCB-48 PCB-44/47/65 PCB-41 PCB-68	195000U pg 276U pg 361U pg 734U pg 233U pg 2390U pg 81.6U pg 7220U pg 1260U pg 6480U pg 31800U pg 408U pg 10700U pg 20.9U pg 8090U pg 23300U pg 26400U pg 4540U pg 5830U pg 29.6U pg 3530U pg 622U pg 6360U pg 3250U pg 1110U pg 3810U pg 30900U pg 929U pg 496U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BN02	PCB-156/157	60.5U pg	A	bl
		Total Tri-CBs	52000U pg		
		Total Tetra-CBs	47700U pg		
		PCB-2	129U pg		
		PCB-3	160U pg		
		PCB-9	226U pg		
		PCB-7	67.8U pg		
		PCB-6	678U pg		
		PCB-8	2100U pg		
		PCB-13/12	358U pg		
		PCB-15	1640U pg		
		PCB-30/18	8520U pg		
		PCB-17	5210U pg		
		PCB-24	133U pg		
		PCB-16	2700U pg		
		PCB-32	3730U pg		
		PCB-34	83U pg		
		PCB-26/29	2180U pg		
		PCB-25	1070U pg		
		PCB-31	6250U pg		
		PCB-28/20	6930U pg		
		PCB-21/33	1220U pg		
		PCB-22	1540U pg		
		PCB-37	889U pg		
		PCB-50/53	2500U pg		
		PCB-45	1580U pg		
		PCB-51	771U pg		
		PCB-46	767U pg pg		
		PCB-52	9470U pg		
		PCB-43	300U pg		
		PCB-69/49	5510U pg		
		PCB-48	1000U pg		
		PCB-44/47/65	7530U pg		
		PCB-59/62/75	690U pg		
		PCB-42	1910U pg		
		PCB-41	231U pg		
		PCB-71/40	3870U pg		
		PCB-64	2170U pg		
		PCB-68	56.5U pg		
		PCB-57	39.7U pg		
		PCB-67	111U pg		
		PCB-63	154U pg		
		PCB-61/70/74/76	4340U pg		
		PCB-96	69.1U pg		
		PCB-89	50.4U pg		
		PCB-136	253U pg		
		PCB-151/135	575U pg		
		PCB-144	58U pg		
		PCB-147/149	1210U pg		
		PCB-141	128U pg		
		PCB-179	109U pg		
		PCB-176	25.2U pg		
		PCB-174	118U pg		
A5668	N10-CE05-TKVK-BQ01	PCB-5	497U pg	A	bl
		PCB-51	5970U pg		
		PCB-68	1540U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-XR03	PCB-77	9.09U pg	A	bl
		PCB-105	15.4U pg		
		PCB-118	33.7U pg		
		PCB-156/157	5.61U pg		
		Total Mono-CBs	391U pg		
		Total Di-CBs	3450U pg		
		Total Tri-CBs	693U pg		
		Total Tetra-CBs	581U pg		
		Total Penta-CBs	295U pg		
		Total Hexa-CBs	161U pg		
		Total Hepta-CBs	60U pg		
		PCB-1	87.4U pg		
		PCB-2	164U pg		
		PCB-3	140U pg		
		PCB-4	69.8U pg		
		PCB-10	8.27U pg		
		PCB-9	10.8U pg		
		PCB-7	6.62U pg		
		PCB-6	43.5U pg		
		PCB-8	118U pg		
		PCB-13/12	39.2U pg		
		PCB-15	86.5U pg		
		PCB-19	16.9U pg		
		PCB-30/18	102U pg		
		PCB-17	51.7U pg		
		PCB-27	9.52U pg		
		PCB-16	50.5U pg		
		PCB-32	33.9U pg		
		PCB-26/29	25.1U pg		
		PCB-25	14.7U pg		
		PCB-31	108U pg		
		PCB-28/20	132U pg		
		PCB-21/33	53.9U pg		
		PCB-22	38.4U pg		
		PCB-35	11.4U pg		
		PCB-37	44.8U pg		
		PCB-50/53	13U pg		
		PCB-45	11.3U pg		
		PCB-51	16U pg		
		PCB-46	4.47U pg		
		PCB-52	92U pg		
		PCB-69/49	47.5U pg		
		PCB-48	15.6U pg		
		PCB-44/47/65	110U pg		
		PCB-59/62/75	6.98U pg		
		PCB-42	19.5U pg		
		PCB-41	7.7U pg		
		PCB-71/40	28.2U pg		
		PCB-64	24.6U pg		
		PCB-68	4.71U pg		
		PCB-61/70/74/76	88.9U pg		
		PCB-66	49.8U pg		
		PCB-56	22.9U pg		
		PCB-60	9.47U pg		
		PCB-95	46.9U pg		
		PCB-91	7.74U pg		
		PCB-84	14.7U pg		
		PCB-92	9.04U pg		
		PCB-113/90/101	47.9U pg		
		PCB-99	21.3U pg		
		PCB-108/119/86/97/125/87	32.1U pg		
		PCB-116/85	7.69U pg		
		PCB-110	49U pg		
		PCB-82	5.97U pg		
		PCB-136	5.81U pg		
		PCB-151/135	16.4U pg		
		PCB-147/149	33.4U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-XR03 (continued)	PCB-132	13.9U pg	A	bl
		PCB-146	6.96U pg		
		PCB-153/168	26.2U pg		
		PCB-141	7.46U pg		
		PCB-163/138/129	33.6U pg		
		PCB-128/166	6.14U pg		
		PCB-179	4.96U pg		
		PCB-187	12.7U pg		
		PCB-183	5.14U pg		
		PCB-174	9.48U pg		
		PCB-177	5.68U pg		
		PCB-180/193	14.1U pg		
A5668	N10-CE05-TNNE-XR04	PCB-105	15.8U pg	A	bl
		PCB-118	30.5U pg		
		Total Mono-CBs	161U pg		
		Total Di-CBs	1110U pg		
		Total Tri-CBs	714U pg		
		Total Tetra-CBs	467U pg		
		Total Penta-CBs	258U pg		
		Total Hexa-CBs	90.2U pg		
		PCB-1	47.4U pg		
		PCB-2	59U pg		
		PCB-3	54.4U pg		
		PCB-4	53.4U pg		
		PCB-9	17.4U pg		
		PCB-6	32.6U pg		
		PCB-8	103U pg		
		PCB-11	810U pg		
		PCB-15	89.6U pg		
		PCB-30/18	97.4U pg		
		PCB-17	50.7U pg		
		PCB-16	51.7U pg		
		PCB-32	31.6U pg		
		PCB-26/29	29.9U pg		
		PCB-31	122U pg		
		PCB-28/20	152U pg		
		PCB-21/33	73.3U pg		
		PCB-22	46.8U pg		
		PCB-37	58.8U pg		
		PCB-52	90.2U pg		
		PCB-69/49	43.2U pg		
		PCB-44/47/65	87.6U pg		
		PCB-71/40	29.3U pg		
		PCB-64	25.4U pg		
		PCB-61/70/74/76	96.4U pg		
		PCB-66	52.4U pg		
		PCB-56	27.5U pg		
		PCB-60	15.1U pg		
		PCB-95	50.8U pg		
		PCB-113/90/101	56.1U pg		
		PCB-99	20.4U pg		
		PCB-108/119/86/97/125/87	35.8U pg		
		PCB-110	48.8U pg		
		PCB-147/149	33U pg		
		PCB-153/168	27.1U pg		
		PCB-163/138/129	30.1U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-XR02	PCB-118 Total Di-CBs Total Tri-CBs Total Penta-CBs Total Hexa-CBs PCB-11 PCB-15 PCB-31 PCB-28/20 PCB-113/90/101 PCB-153/168 PCB-163/138/129	32.1U pg 188U pg 107U pg 70.2U pg 69U pg 106U pg 82.1U pg 41.6U pg 65.6U pg 38.1U pg 27.8U pg 41.2U pg	A	bl

CWCM Newark Bay High Volume Event #2
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5668

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNNE-BM01	PCB-2 PCB-3	293U pg 444U pg	A	be
A5668	N10-CE05-TNNE-BM02	PCB-2 PCB-3	198U pg 219U pg	A	Be
A5668	N10-CE05-TNBS-BM01	PCB-2 PCB-3	294U pg 419U pg	A	be
A5668	N10-CE05-TKVK-BM01	PCB-2 PCB-3	192U pg 279U pg	A	be
A5668	N10-CE05-TNBS-BM02	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-13/12 PCB-15 PCB-30/18 PCB-17 PCB-27 PCB-24 PCB-16 PCB-32 PCB-34 PCB-23 PCB-26/29 PCB-25 PCB-31 PCB-28/20	140000U pg 100000U pg 94900U pg 34200U pg 10200U pg 148U pg 206U pg 446U pg 153U pg 1350U pg 58.9U pg 4240U pg 712U pg 3340U pg 17000U pg 9930U pg 4600U pg 248U pg 6250U pg 7020U pg 144U pg 15U pg 4030U pg 2140U pg 12600U pg 14100U pg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TNBS-BM02 (continued)	PCB-21/33	2710U pg	A	be
		PCB-22	3410U pg		
		PCB-39	77.4U pg		
		PCB-35	170U pg		
		PCB-37	1940U pg		
		PCB-54	335U pg		
		PCB-50/53	4580U pg		
		PCB-45	2890U pg		
		PCB-51	1830U pg		
		PCB-46	1420U pg		
		PCB-52	18300U pg		
		PCB-43	594U pg		
		PCB-69/49	10400U pg		
		PCB-48	2120U pg		
		PCB-44/47/65	15000U pg		
		PCB-59/62/75	1350U pg		
		PCB-42	3780U pg		
		PCB-41	495U pg		
		PCB-71/40	7430U pg		
		PCB-64	4400U pg		
		PCB-67	235U pg		
		PCB-63	287U pg		
		PCB-61/70/74/76	9310U pg		
		PCB-66	5740U pg		
		PCB-60	803U pg		
		PCB-96	137U pg		
		PCB-95	6450U pg		
		PCB-102	377U pg		
		PCB-91	1110U pg		
		PCB-84	2380U pg		
		PCB-113/90/101	5280U pg		
		PCB-136	470U pg		
		PCB-151/135	1090U pg		
		PCB-144	114U pg		
		PCB-147/149	2370U pg		
		PCB-132	758U pg		
		PCB-153/168	1590U pg		
		PCB-141	262U pg		
		PCB-179	184U pg		
		PCB-176	42.8U pg		
		PCB-187	447U pg		
A5668	N10-CE05-TKVK-BM02	PCB-105	315U pg	A	be
		PCB-118	928U pg		
		Total Mono-CBs	6660U pg		
		Total Di-CBs	62600U pg		
		Total Tri-CBs	42000U pg		
		Total Tetra-CBs	38000U pg		
		Total Penta-CBs	14500U pg		
		Total Hexa-CBs	4550U pg		
		Total Hepta-CBs	950U pg		
		PCB-2	86U pg		
		PCB-3	113U pg		
		PCB-9	172U pg		
		PCB-7	54.9U pg		
		PCB-6	542U pg		
		PCB-5	19.1U pg		
		PCB-8	1660U pg		
		PCB-11	4250U pg		
		PCB-13/12	280U pg		
		PCB-15	1360U pg		
		PCB-19	6770U pg		
		PCB-30/18	6960U pg		
		PCB-17	4310U pg		
		PCB-27	2250U pg		
		PCB-24	109U pg		
		PCB-16	2260U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BM02 (continued)	PCB-32	3060U pg	A	be
		PCB-34	64.1U pg		
		PCB-23	4.89U pg		
		PCB-26/29	1730U pg		
		PCB-25	851U pg		
		PCB-31	4990U pg		
		PCB-28/20	5510U pg		
		PCB-21/33	987U pg		
		PCB-22	1250U pg		
		PCB-39	32.6U pg		
		PCB-35	64.1U pg		
		PCB-37	766U pg		
		PCB-54	123U pg		
		PCB-50/53	1900U pg		
		PCB-45	1250U pg		
		PCB-51	584U pg		
		PCB-46	583U pg		
		PCB-52	7460U pg		
		PCB-43	227U pg		
		PCB-69/49	4460U pg		
		PCB-48	811U pg		
		PCB-44/47/65	6010U pg		
		PCB-59/62/75	545U pg		
		PCB-42	1570U pg		
		PCB-41	195U pg		
		PCB-71/40	3070U pg		
		PCB-64	1730U pg		
		PCB-67	91U pg		
		PCB-63	118U pg		
		PCB-61/70/74/76	3480U pg		
		PCB-66	2120U pg		
		PCB-56	1010U pg		
		PCB-60	298U pg		
		PCB-96	61.1U pg		
		PCB-95	2730U pg		
		PCB-102	185U pg		
		PCB-91	536U pg		
		PCB-84	1020U pg		
		PCB-92	523U pg		
		PCB-113/90/101	2220U pg		
		PCB-99	1130U pg		
		PCB-108/119/86/97/125/87	1270U pg		
		PCB-110	2410U pg		
		PCB-82	220U pg		
		PCB-136	223U pg		
		PCB-151/135	489U pg		
		PCB-144	49.6U pg		
		PCB-147/149	1040U pg		
		PCB-132	330U pg		
		PCB-153/168	735U pg		
		PCB-141	102U pg		
		PCB-163/138/129	851U pg		
		PCB-179	84.5U pg		
		PCB-176	20.6U pg		
		PCB-187	223U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BN01	PCB-2 PCB-3 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-16 PCB-21/33 PCB-22 PCB-35 PCB-41 PCB-141	276U pg 361U pg 734U pg 233U pg 2390U pg 81.6U pg 7220U pg 10700U pg 4540U pg 5830U pg 287U pg 929U pg 375U pg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5668	N10-CE05-TKVK-BN02	Total Di-CBs	80300U pg	A	be
		Total Tri-CBs	52000U pg		
		Total Tetra-CBs	47700U pg		
		Total Hexa-CBs	5320U pg		
		PCB-2	129U pg		
		PCB-3	160U pg		
		PCB-9	226U pg		
		PCB-7	67.8U pg		
		PCB-6	678U pg		
		PCB-8	2100U pg		
		PCB-11	5370U pg		
		PCB-13/12	358U pg		
		PCB-15	1640U pg		
		PCB-30/18	8520U pg		
		PCB-17	5210U pg		
		PCB-27	2810U pg		
		PCB-24	133U pg		
		PCB-16	2700U pg		
		PCB-32	3730U pg		
		PCB-34	83U pg		
		PCB-26/29	2180U pg		
		PCB-25	1070U pg		
		PCB-31	6250U pg		
		PCB-28/20	6930U pg		
		PCB-21/33	1220U pg		
		PCB-22	1540U pg		
		PCB-37	889U pg		
		PCB-54	154U pg		
		PCB-50/53	2500U pg		
		PCB-45	1580U pg		
		PCB-51	771U pg		
		PCB-46	767U pg		
		PCB-52	9470U pg		
		PCB-43	300U pg		
		PCB-69/49	5510U pg		
		PCB-48	1000U pg		
		PCB-44/47/65	7530U pg		
		PCB-59/62/75	690U pg		
		PCB-42	1910U pg		
		PCB-41	231U pg		
		PCB-71/40	3870U pg		
		PCB-64	2170U pg		
		PCB-67	111U pg		
		PCB-63	154U pg		
		PCB-61/70/74/76	4340U pg		
		PCB-66	2540U pg		
		PCB-60	375U pg		
		PCB-96	69.1U pg		
		PCB-95	3450U pg		
		PCB-100/93	101U pg		
		PCB-102	243U pg		
		PCB-91	672U pg		
		PCB-136	253U pg		
		PCB-151/135	575U pg		
		PCB-144	58U pg		
		PCB-147/149	1210U pg		
		PCB-141	128U pg		
		PCB-158	76.2U pg		
		PCB-179	109U pg		
		PCB-176	25.2U pg		

LDC #: 30205B31 **VALIDATION COMPLETENESS WORKSHEET** Date: 8-19-13
SDG #: A5668 Full Page: 1 of 1
Laboratory: SGS-Analytical Perspectives Reviewer: CM
2nd Reviewer: AL

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

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: 6/24/13 -> 6/25/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	≤ 20/35
IV.	Routine calibration/~~ICV~~	A	≤ 30/50
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	SW	
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB=13,14,15*

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: 10PUF's/5 Filters

1	N10-CE05-TNBS-BM01	11	N10-CE05-TKVK-BN02	21		31	
2	N10-CE05-TNBS-BM02	12	N10-CE05-TKVK-BQ01	22		32	
3	N10-CE05-TNBS-BP01	13	N10-CE05-TNNE-XR03	23		33	
4	N10-CE05-TNNE-BM01	14	N10-CE05-TNNE-XR04	24		34	
5	N10-CE05-TNNE-BM02	15	N10-CE05-TNNE-XR02	25		35	
6	N10-CE05-TNNE-BP01	16		26		36	
7	N10-CE05-TKVK-BM01	17		27		37	
8	N10-CE05-TKVK-BM02	18		28		38	
9	N10-CE05-TKVK-BP01	19		29		39	
10	N10-CE05-TKVK-BN01	20		30	MB1-11129	40	

* 13C-CE05-T042-XR03-101 (A5678), 13C-CE05-T042-XR04-101 (A5678), 13C-CE05-T042-XR02-101 (A5678), 13C-CE05-T042-XR03-103 (A5678), 13C-CE05-T042-XR04-103 (A5678), 13C-CE05-T042-XR02-103 (A5678)

LDC #: 36205B31

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: TM
2nd Reviewer: E

METHOD: HRGC/HRMS Polychlorinated Biphenyls (EPA Method 1668B)
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) ≤ 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
	07/26/12	120725X16	PCB-4		0.00 (1.33-1.79)	All	J/UJ/P (PCB-4,Total Di-CBs) (c)

	Halogen	Selected ions (m/z)	Ion Abundace Ratio		Halogen	Selected ions (m/z)	Ion Abundace Ratio
	1 Cl	M/M+2	2.66-3.60		7 Cl	M/M+2	0.37-0.51
	2 Cl	M/M+2	1.33-1.81		7 Cl	M+2/M+4	0.88-1.20
	3 Cl	M/M+2	0.88-1.20		8 Cl	M+2/M+4	0.76-1.02
	4 Cl	M/M+2	0.65-0.89		9 Cl	M/M+2	1.14-1.54
	5 Cl	M+2/M+4	1.32-1.78		9 CL	M/M-2	0.66-0.90
	6 Cl	M/M+2	0.43-0.59		10 CL	M/M+2	0.99-1.35
	6 Cl	M+2/M+4	1.05-1.43				

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: TM
2nd Reviewer: [illegible]

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

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?
Blank extraction date: 07/11/13 **Blank analysis date:** 07/19/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	1	2	3	4	5	6	7	8	9
PCB-77	11.1	55.5									
PCB-105	33.5	167.5									
PCB-118	91.9	459.5									
PCB-156/157	12.7	63.5								51.2	
Total Mono-CBs	780	3900									
Total Di-CBs	11500	57500									
Total Tri-CBs	48400*	242000		100000			129000*		168000	42000	
Total Tetra-CBs	30300*	151500		94900			148000*			38000*	
Total Penta-CBs	2000*	10000									
Total Hexa-CBs	872*	4360									
Total Hepta-CBs	173	865									
PCB-1	352	1760									
PCB-2	195	975	294	148		293	198		192	86	
PCB-3	233	1165	419	206		444	219*		279	113	
PCB-4	1530	7650									
PCB-10	71	355									
PCB-9	348	1740	1320	446	1380	1540	534		626	172	
PCB-7	180	900	476	153	631	712	233		197	54.9	
PCB-6	1040	5200	4220	1350		5190	1600		2000	542	
PCB-5	127	635	157	58.9	175	262	69.6	568	70.3	19.1	367

20f10 ym

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	1	2	3	4	5	6	7	8	9
PCB-8	5250	26250	13500	4240		16700	5030		6110	1660	
PCB-11	531	2655									
PCB-13/12	331	1655		712			904		1080	280	
PCB-15	2080	10400		3340			4470		5390	1360	
PCB-19	743	3715									
PCB-30/18	7840	39200		17000	29500		22100		27400	6960	
PCB-17	3610	18050		9930			11600		17200	4310	
PCB-27	550	2750								2250	
PCB-24	126	630		248	367				400	109	
PCB-16	4710	23550		6250	10300		9180		9610	2260	
PCB-32	2300	11500		7020			8670			3060	
PCB-34	35.4	177		144						64.1	
PCB-23	15.6*	78	48.4	15	42.4	62.6			20.5	4.89	
PCB-26/29	1700	8500		4030			5230		6820	1730	
PCB-25	749	3745		2140			3190		3440	851	
PCB-31	8060	40300		12600			18500		19900	4990	
PCB-28/20	8400	42000		14100			22000		22400	5510	
PCB-21/33	5470	27350	10400	2710	11900	17800	4580		3850	987	
PCB-22	3110	15550	13900	3410			5500		5090	1250	
PCB-39	27.4	137		77.4			104*		125	32.6	
PCB-38	9.3	46.5							27.2	8.48	
PCB-35	54.7	273.5		170			263		261	64.1	
PCB-37	897	4485		1940			3020		3110	766	
PCB-54	21.1	105.5									
PCB-50/53	1090	5450		4580						1900	
PCB-45	1280	6400		2890			4090		4790	1250	
PCB-51	1680	8400	8170	1830	2830		4170		2780	584	6330

3 of 10 TM

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	1	2	3	4	5	6	7	8	9
PCB-46	499	2495		1420	2040		2070		2480	583	
PCB-52	4140	20700		18300						7460	
PCB-43	235	1175		594			811		975	227	
PCB-69/49	2410	12050		10400						4460	
PCB-48	1190	5950		2120	4820		3390		3210	811	
PCB-44/47/65	10200	51000		15000	38900		25200		24600	6010	
PCB-59/62/75	370	1850		1350						545	
PCB-42	1010	5050		3780						1570	
PCB-41	540	2700	1860	495	1270		868		715	195	
PCB-71/40	1490	7450		7430						3070	
PCB-64	1250	6250		4400						1730	
PCB-72	10.8	54									
PCB-68	1020	5100	368	95.5	512	481	420	2580	167	40.5	1990
PCB-57	10.1*	51								25.4	
PCB-67	54.5	272.5		235						91	
PCB-63	43.7	218.5								118	
PCB-61/70/74/76	1130	5650								3480	
PCB-66	458	2290								2120	
PCB-56	91.2	456									
PCB-60	51.2	256									
PCB-96	28.9	144.5		137						61.1	
PCB-94	9.65*	48.25								47.7	
PCB-95	655	3275								2730	
PCB-100/93	14.5*	72.5									
PCB-102	41.5	207.5								185	
PCB-91	88.2	441									

4 of 10 YM

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	1	2	3	4	5	6	7	8	9
PCB-84	134	670									
PCB-89	10.3	51.5								35.7	
PCB-92	57.8	289									
PCB-113/90/101	323	1615									
PCB-83	15.7	78.5									
PCB-99	107	535									
PCB-108/119/86/97/125/87	149	745									
PCB-116/85	33.3	166.5									
PCB-110	187	935									
PCB-82	24.9	124.5									
PCB-136	73.6	368								223	
PCB-151/135	162	810								489	
PCB-144	21.1	105.5								49.6	
PCB-147/149	254	1270								1040	
PCB-134	10.5*	52.5									
PCB-132	56.9	284.5									
PCB-146	17.6	88									
PCB-153/168	113	565									
PCB-141	30.6*	153								102	
PCB-163/138/129	95.4	477									
PCB-158	12.5	62.5									
PCB-128/166	11.6	58									
PCB-179	43.7	218.5		184						84.5	
PCB-176	9.95	49.8		42.8						20.6	
PCB-187	44.7	223.5								223	
PCB-183	15.5	77.5									

5 of 10 ym

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	1	2	3	4	5	6	7	8	9
PCB-185	7.19	36.0		19.6					31.5	6.88	
PCB-174	24.6	123								101	
PCB-177	9.48	47.4									
PCB-180/193	17.8	89									

*EMPC

All contaminants within five times the method blank concentration were qualified as not detected.

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Th
2nd Reviewer: [illegible]

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

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?
Blank extraction date: 07/11/13 **Blank analysis date:** 07/19/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	10	11	12	13	14	15			
PCB-77	11.1	55.5				9.09					
PCB-105	33.5	167.5				15.4	15.8				
PCB-118	91.9	459.5				33.7	30.5	32.1			
PCB-156/157	12.7	63.5		60.5*		5.61					
Total Mono-CBs	780	3900				391	161*				
Total Di-CBs	11500	57500				3450	1110	188			
Total Tri-CBs	48400*	242000	195000	52000		693	714	107*			
Total Tetra-CBs	30300*	151500		47700*		581*	467*				
Total Penta-CBs	2000*	10000				295*	258*	70.2*			
Total Hexa-CBs	872*	4360				161*	90.2*	69*			
Total Hepta-CBs	173	865				60					
PCB-1	352	1760				87.4	47.4*				
PCB-2	195	975	276	129		164	59				
PCB-3	233	1165	361	160		140	54.4				
PCB-4	1530	7650				69.8	53.4				
PCB-10	71	355				8.27					
PCB-9	348	1740	734	226		10.8	17.4				
PCB-7	180	900	233	67.8		6.62					
PCB-6	1040	5200	2390	678		43.5	32.6				
PCB-5	127	635	81.6		497						

78/10 YM

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	10	11	12	13	14	15			
PCB-8	5250	26250	7220	2100		118	103				
PCB-11	531	2655					810	106			
PCB-13/12	331	1655	1260	358		39.2					
PCB-15	2080	10400	6480	1640		86.5	89.6	82.1			
PCB-19	743	3715				16.9					
PCB-30/18	7840	39200	31800	8520		102	97.4				
PCB-17	3610	18050		5210		51.7	50.7				
PCB-27	550	2750				9.52					
PCB-24	126	630	408	133							
PCB-16	4710	23550	10700	2700		50.5	51.7				
PCB-32	2300	11500		3730		33.9	31.6				
PCB-34	35.4	177		83							
PCB-23	15.6*	78	20.9								
PCB-26/29	1700	8500	8090	2180		25.1	29.9				
PCB-25	749	3745		1070		14.7					
PCB-31	8060	40300	23300	6250		108	122	41.6*			
PCB-28/20	8400	42000	26400	6930		132	152	65.6			
PCB-21/33	5470	27350	4540	1220		53.9	73.3				
PCB-22	3110	15550	5830	1540		38.4	46.8				
PCB-39	27.4	137									
PCB-38	9.3	46.5	29.6								
PCB-35	54.7	273.5				11.4					
PCB-37	897	4485	3530	889		44.8	58.8				
PCB-54	21.1	105.5	622								
PCB-50/53	1090	5450		2500		13					
PCB-45	1280	6400	6360	1580		11.3					
PCB-51	1680	8400	3250	771	5970	16					

8010 TM

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	10	11	12	13	14	15			
PCB-46	499	2495		767		4.47*					
PCB-52	4140	20700		9470		92	90.2				
PCB-43	235	1175	1110	300							
PCB-69/49	2410	12050		5510		47.5	43.2				
PCB-48	1190	5950	3810	1000		15.6					
PCB-44/47/65	10200	51000	30900	7530		110	87.6				
PCB-59/62/75	370	1850		690		6.98					
PCB-42	1010	5050		1910		19.5					
PCB-41	540	2700	929	231		7.7					
PCB-71/40	1490	7450		3870		28.2	29.3*				
PCB-64	1250	6250		2170		24.6	25.4				
PCB-72	10.8	54									
PCB-68	1020	5100	496	56.5	1540	4.71					
PCB-57	10.1*	51		39.7							
PCB-67	54.5	272.5		111							
PCB-63	43.7	218.5		154							
PCB-61/70/74/76	1130	5650		4340		88.9	96.4				
PCB-66	458	2290				49.8	52.4				
PCB-56	91.2	456				22.9	27.5				
PCB-60	51.2	256				9.47*	15.1*				
PCB-96	28.9	144.5		69.1*							
PCB-94	9.65*	48.25									
PCB-95	655	3275				46.9	50.8				
PCB-100/93	14.5*	72.5									
PCB-102	41.5	207.5									
PCB-91	88.2	441				7.74					

9810 TM

Compound	Blank ID		Sample Identification								
	MB1_11129	5x	10	11	12	13	14	15			
PCB-84	134	670				14.7					
PCB-89	10.3	51.5		50.4							
PCB-92	57.8	289				9.04					
PCB-113/90/101	323	1615				47.9	56.1	38.1*			
PCB-83	15.7	78.5									
PCB-99	107	535				21.3	20.4*				
PCB-108/119/86/97/125/87	149	745				32.1	35.8*				
PCB-116/85	33.3	166.5				7.69					
PCB-110	187	935				49	48.8				
PCB-82	24.9	124.5				5.97*					
PCB-136	73.6	368		253		5.81					
PCB-151/135	162	810		575		16.4					
PCB-144	21.1	105.5		58							
PCB-147/149	254	1270		1210		33.4	33*				
PCB-134	10.5*	52.5									
PCB-132	56.9	284.5				13.9					
PCB-146	17.6	88				6.96					
PCB-153/168	113	565				26.2	27.1	27.8*			
PCB-141	30.6*	153		128		7.46*					
PCB-163/138/129	95.4	477				33.6	30.1	41.2			
PCB-158	12.5	62.5									
PCB-128/166	11.6	58				6.14*					
PCB-179	43.7	218.5		109		4.96					
PCB-176	9.95	49.8		25.2							
PCB-187	44.7	223.5				12.7					
PCB-183	15.5	77.5				5.14					

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Compound	Blank ID		Sample Identification								
	MB1_11129	5x	10	11	12	13	14	15			
PCB-185	7.19	36.0									
PCB-174	24.6	123		118*		9.48					
PCB-177	9.48	47.4				5.68					
PCB-180/193	17.8	89				14.1					

*EMPC

All contaminants within five times the method blank concentration were qualified as not detected.

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4 Qual U (be)

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	4								
PCB-77	9.09	45.45									
PCB-105	15.4	77									
PCB-118	33.7	168.5									
PCB-156/157	5.61	28.05									
Total Mono-CBs	391	1955									
Total Di-CBs	3450	17250									
Total Tri-CBs	693	3465									
Total Tetra-CBs	581*	2905									
Total Penta-CBs	295*	1475									
Total Hexa-CBs	161*	805									
Total Hepta-CBs	60	300									
PCB-1	87.4	437									
PCB-2	164	820	293								
PCB-3	140	700	444								
PCB-4	69.8	349									
PCB-10	8.27	41.35									
PCB-9	10.8	54									
PCB-7	6.62	33.1									
PCB-6	43.5	217.5									
PCB-8	118	590									
PCB-11	3070	15350									
PCB-13/12	39.2	196									

2 of 4
Gm

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	4								
PCB-15	86.5	432.5									
PCB-19	16.9	84.5									
PCB-30/18	102	510									
PCB-17	51.7	258.5									
PCB-27	9.52	47.6									
PCB-16	50.5	252.5									
PCB-32	33.9	169.5									
PCB-26/29	25.1	125.5									
PCB-25	14.7	73.5									
PCB-31	108	540									
PCB-28/20	132	660									
PCB-21/33	53.9	269.5									
PCB-22	38.4	192									
PCB-35	11.4	57									
PCB-37	44.8	224									
PCB-50/53	13	65									
PCB-45	11.3	56.5									
PCB-51	16	80									
PCB-46	4.47*	22.35									
PCB-52	92	460									
PCB-69/49	47.5	237.5									
PCB-48	15.6	78									
PCB-44/47/65	110	550									
PCB-59/62/75	6.98	34.9									
PCB-42	19.5	97.5									
PCB-41	7.7	38.5									
PCB-71/40	28.2	141									
PCB-64	24.6	123									

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JM

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	4								
PCB-68	4.71	23.55									
PCB-61/70/74/76	88.9	444.5									
PCB-66	49.8	249									
PCB-56	22.9	114.5									
PCB-60	9.47*	47.35									
PCB-95	46.9	234.5									
PCB-91	7.74	38.7									
PCB-84	14.7	73.5									
PCB-92	9.04	45.2									
PCB-113/90/101	47.9	239.5									
PCB-99	21.3	106.5									
PCB-108/119/86/97/125/87	32.1	160.5									
PCB-116/85	7.69	38.45									
PCB-110	49	245									
PCB-82	5.97*	29.85									
PCB-109	3.9	19.5									
PCB-136	5.81	29.05									
PCB-151/135	16.4	82									
PCB-147/149	33.4	167									
PCB-132	13.9	69.5									
PCB-146	6.96	34.8									
PCB-153/168	26.2	131									
PCB-141	7.46*	37.3									
PCB-130	5.42*	27.1									
PCB-163/138/129	33.6	168									
PCB-128/166	6.14*	30.7									
PCB-179	4.96	24.8									
PCB-187	12.7	63.5									

4 of 4

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	4								
PCB-183	5.14	25.7									
PCB-174	9.48	47.4									
PCB-177	5.68	28.4									
PCB-180/193	14.1	70.5									
PCB-170	7.89	39.45									
PCB-209	4.94	24.7									

*EMPC

N10-CE05-TNNE-XR03 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: GM
2nd Reviewer: M

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 5 Qual U (be)

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR04	5x	5								
PCB-105	15.8	79									
PCB-118	30.5	152.5									
Total Mono-CBs	161*	805									
Total Di-CBs	1110	5550									
Total Tri-CBs	714	3570									
Total Tetra-CBs	467*	2335									
Total Penta-CBs	258*	1290									
Total Hexa-CBs	90.2*	451									
PCB-1	47.4*	237									
PCB-2	59	295	198								
PCB-3	54.4	272	219*								
PCB-4	53.4	267									
PCB-9	17.4	87									
PCB-6	32.6	163									
PCB-8	103	515									
PCB-11	810	4050									
PCB-15	89.6	448									
PCB-30/18	97.4	487									
PCB-17	50.7	253.5									
PCB-16	51.7	258.5									
PCB-32	31.6	158									
PCB-26/29	29.9	149.5									

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR04	5x	5								
PCB-31	122	610									
PCB-28/20	152	760									
PCB-21/33	73.3	366.5									
PCB-22	46.8	234									
PCB-37	58.8	294									
PCB-52	90.2	451									
PCB-69/49	43.2	216									
PCB-44/47/65	87.6	438									
PCB-71/40	29.3*	146.5									
PCB-64	25.4	127									
PCB-61/70/74/76	96.4	482									
PCB-66	52.4	262									
PCB-56	27.5	137.5									
PCB-60	15.1*	75.5									
PCB-95	50.8	254									
PCB-113/90/101	56.1	280.5									
PCB-99	20.4*	102									
PCB-108/119/86/97/125/87	35.8*	179									
PCB-110	48.8	244									
PCB-147/149	33*	165									
PCB-153/168	27.1	135.5									
PCB-163/138/129	30.1	150.5									

*EMPC

N10-CE05-TNNE-XR04 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

V:\Field Blanks\30205B31_N10-CE05-TNNE-XR04.wpd

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6 >5x

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR02	5x	6								
PCB-118	32.1	160.5									
Total Di-CBs	188	940									
Total Tri-CBs	107*	535									
Total Penta-CBs	70.2*	351									
Total Hexa-CBs	69*	345									
PCB-11	106	530									
PCB-15	82.1	410.5									
PCB-31	41.6*	208									
PCB-28/20	65.6	328									
PCB-113/90/101	38.1*	190.5									
PCB-153/168	27.8*	139									
PCB-163/138/129	41.2	206									

*EMPC

N10-CE05-TNNE-XR02 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 4
Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1, 7 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1	7							
PCB-77	7.84	39.2									
PCB-105	22.2	111									
PCB-118	52.8	264									
PCB-156/157	5.67*	28.35									
Total Mono-CBs	340	1700									
Total Di-CBs	3540	17700									
Total Tri-CBs	1020	5100									
Total Tetra-CBs	995*	4975									
Total Penta-CBs	489*	2445									
Total Hexa-CBs	177*	885									
Total Hepta-CBs	54.8*	274									
Total Octa-CBs	10.3*	51.5									
PCB-1	77.8	389									
PCB-2	149	745	294	192							
PCB-3	113	565	419	279							
PCB-4	76	380									
PCB-10	9.47	47.35									
PCB-9	10.8	54									
PCB-7	5.94	29.7									
PCB-6	28.8	144									
PCB-8	96.5	482.5									
PCB-11	3210	16050									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1	7							
PCB-13/12	28.5	142.5									
PCB-15	72.8	364									
PCB-19	17	85									
PCB-30/18	127	635									
PCB-17	72.5	362.5									
PCB-27	14.2	71									
PCB-24	2.95	14.75									
PCB-16	63.5	317.5									
PCB-32	51.9	259.5									
PCB-26/29	36.3	181.5									
PCB-25	25	125									
PCB-31	172	860									
PCB-28/20	233	1165									
PCB-21/33	80.3	401.5									
PCB-22	59.3	296.5									
PCB-35	12.8	64									
PCB-37	48.5	242.5									
PCB-54	2.57*	12.85									
PCB-50/53	22.2	111									
PCB-45	13.9	69.5									
PCB-51	33.9	169.5									
PCB-46	7.53	37.65									
PCB-52	141	705									
PCB-69/49	87.4	437									
PCB-48	25.6	128									
PCB-44/47/65	167	835									
PCB-59/62/75	13.5	67.5									
PCB-42	33	165									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1	7							
PCB-41	10.1	50.5									
PCB-71/40	46.9	234.5									
PCB-64	44.4	222									
PCB-68	6.93	34.65									
PCB-67	3.49*	17.45									
PCB-63	4.34	21.7									
PCB-61/70/74/76	169	845									
PCB-66	98.9	494.5									
PCB-56	38.9	194.5									
PCB-60	16.8	84									
PCB-103	2.63	13.15									
PCB-95	58.8	294									
PCB-100/93	5.51	27.55									
PCB-102	4.42*	22.1									
PCB-91	11.3	56.5									
PCB-84	24.4	122									
PCB-92	14.1	70.5									
PCB-113/90/101	77.8	389									
PCB-99	44.7	223.5									
PCB-108/119/86/97/125/87	50.8	254									
PCB-117	3.94	19.7									
PCB-116/85	9.82*	49.1									
PCB-110	87.9	439.5									
PCB-82	9.88	49.4									
PCB-107/124	3.36	16.8									
PCB-109	5.05	25.25									
PCB-136	7.37	36.85									
PCB-151/135	15.3	76.5									

4 of 4

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1	7							
PCB-144	2.3	11.5									
PCB-147/149	35.8	179									
PCB-132	12	60									
PCB-146	4.24	21.2									
PCB-153/168	29.8	149									
PCB-141	5.86*	29.3									
PCB-164	2.24*	11.2									
PCB-163/138/129	43.9	219.5									
PCB-158	3.99	19.95									
PCB-128/166	8.56	42.8									
PCB-179	3.54*	17.7									
PCB-187	8.78*	43.9									
PCB-183	4.53*	22.65									
PCB-174	8.99	44.95									
PCB-177	5.41	27.05									
PCB-171/173	3.25	16.25									
PCB-180/193	14.6	73									
PCB-170	5.64*	28.2									
PCB-198/199	5.22	26.1									
PCB-194	5.12*	25.6									

*EMPC

13C-CE05-T042-XR03-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: n

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2, 8 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2	8							
PCB-105	70.9*	354.5		315							
PCB-118	268	1340		928							
Total Mono-CBs	1520	7600		6660							
Total Di-CBs	33000	165000	140000	62600							
Total Tri-CBs	160000*	800000	100000	42000							
Total Tetra-CBs	71300*	356500	94900	38000*							
Total Penta-CBs	6880*	34400	34200*	14500*							
Total Hexa-CBs	2640	13200	10200*	4550*							
Total Hepta-CBs	353	1765		950*							
PCB-1	732	3660									
PCB-2	336	1680	148	86							
PCB-3	456	2280	206	113							
PCB-4	4060	20300									
PCB-10	170	850									
PCB-9	877	4385	446	172							
PCB-7	471	2355	153	54.9							
PCB-6	2820	14100	1350	542							
PCB-5	343	1715	58.9	19.1							
PCB-8	14200	71000	4240	1660							
PCB-11	1830	9150		4250							
PCB-13/12	1060	5300	712	280							
PCB-15	7220	36100	3340	1360							

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9m

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2	8							
PCB-19	2500	12500		6770							
PCB-30/18	28000	140000	17000	6960							
PCB-17	13000	65000	9930	4310							
PCB-27	2060	10300	4600	2250							
PCB-24	551	2755	248	109							
PCB-16	16000	80000	6250	2260							
PCB-32	8170	40850	7020	3060							
PCB-34	109	545	144	64.1							
PCB-23	48.6*	243	15	4.89							
PCB-26/29	5350	26750	4030	1730							
PCB-25	2390	11950	2140	851							
PCB-31	25300	126500	12600	4990							
PCB-28/20	26600	133000	14100	5510							
PCB-21/33	16800	84000	2710	987							
PCB-22	9870	49350	3410	1250							
PCB-39	147	735	77.4	32.6							
PCB-35	200	1000	170	64.1							
PCB-37	3140	15700	1940	766							
PCB-54	78.7	393.5	335	123							
PCB-50/53	3530	17650	4580	1900							
PCB-45	4320	21600	2890	1250							
PCB-51	1150	5750	1830	584							
PCB-46	1680	8400	1420	583							
PCB-52	13500	67500	18300	7460							
PCB-43	864	4320	594	227							
PCB-69/49	7570	37850	10400	4460							
PCB-48	4000	20000	2120	811							
PCB-44/47/65	12300	61500	15000	6010							

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gm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2	8							
PCB-59/62/75	1230	6150	1350	545							
PCB-42	3400	17000	3780	1570							
PCB-41	1890	9450	495	195							
PCB-71/40	4970	24850	7430	3070							
PCB-64	4200	21000	4400	1730							
PCB-67	208	1040	235	91							
PCB-63	152*	760	287	118							
PCB-61/70/74/76	4120	20600	9310	3480							
PCB-66	1610	8050	5740	2120							
PCB-56	360	1800		1010							
PCB-60	189	945	803	298							
PCB-96	89.3*	446.5	137	61.1							
PCB-95	2390	11950	6450	2730							
PCB-102	141*	705	377	185							
PCB-91	350	1750	1110	536							
PCB-84	492	2460	2380	1020							
PCB-92	184	920		523							
PCB-113/90/101	1170	5850	5280	2220							
PCB-99	330	1650		1130							
PCB-108/119/86/97/125/87	513	2565		1270							
PCB-110	828	4140		2410							
PCB-82	60.8	304		220							
PCB-136	264	1320	470	223							
PCB-151/135	576	2880	1090	489							
PCB-144	60	300	114	49.6							
PCB-147/149	867	4335	2370	1040							
PCB-132	176	880	758	330							
PCB-153/168	318	1590	1590	735							

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CM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2	8							
PCB-141	90.1	450.5	262	102							
PCB-163/138/129	287	1435		851							
PCB-179	152	760	184	84.5							
PCB-176	33	165	42.8	20.6							
PCB-187	168	840	447	223							

*EMPC

13C-CE05-T042-XR04-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3, 9 >5x

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-105	6.37	31.85									
PCB-118	16.2	81									
Total Mono-CBs	16.2*	81									
Total Di-CBs	66.4	332									
Total Tri-CBs	67.5*	337.5									
Total Tetra-CBs	86.2*	431									
Total Penta-CBs	119*	595									
Total Hexa-CBs	91.1*	455.5									
Total Hepta-CBs	82.6*	413									
Total Octa-CBs	19	95									
PCB-1	3.27*	16.35									
PCB-2	5.74	28.7									
PCB-3	7.16	35.8									
PCB-4	5.96	29.8									
PCB-9	2.79	13.95									
PCB-6	2.25	11.25									
PCB-8	7.31	36.55									
PCB-11	42	210									
PCB-15	6.08	30.4									
PCB-30/18	11	55									
PCB-17	5.94	29.7									
PCB-32	3.91	19.55									

Compound	Blank ID	Sample Identification									2of3
	13C-CE05-T042-XR02-101	5x									
PCB-31	13.3	66.5									
PCB-28/20	17.1	85.5									
PCB-21/33	6.69	33.45									
PCB-22	4.06*	20.3									
PCB-37	5.43*	27.15									
PCB-52	17.6	88									
PCB-69/49	8.45	42.25									
PCB-48	2.37*	11.85									
PCB-44/47/65	15.3	76.5									
PCB-71/40	5.2	26									
PCB-64	4.17*	20.85									
PCB-61/70/74/76	18.3	91.5									
PCB-66	10.1	50.5									
PCB-56	4.71	23.55									
PCB-95	16.5	82.5									
PCB-84	5.82*	29.1									
PCB-113/90/101	20	100									
PCB-99	10.4	52									
PCB-108/119/86/97/125/87	15.5	77.5									
PCB-110	27.9	139.5									
PCB-136	2.09*	10.45									
PCB-151/135	8.11*	40.55									
PCB-147/149	21.5	107.5									
PCB-132	8.16	40.8									
PCB-153/168	20.3	101.5									
PCB-141	4.43*	22.15									
PCB-163/138/129	26.5*	132.5									
PCB-179	4.99	24.95									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-187	13.4	67									
PCB-183	6.51*	32.55									
PCB-174	14.8	74									
PCB-177	7.51	37.55									
PCB-180/193	25.1	125.5									
PCB-170	10.3	51.5									
PCB-198/199	6.84	34.2									
PCB-196	5.82	29.1									
PCB-194	6.38	31.9									

*EMPC

13C-CE05-T042-XR02-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 10 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	10								
PCB-105	224	1120									
PCB-118	528	2640									
Total Mono-CBs	562	2810									
Total Di-CBs	9270*	46350									
Total Tri-CBs	25500*	127500									
Total Tetra-CBs	14900*	74500									
Total Penta-CBs	5800*	29000									
Total Hexa-CBs	2050*	10250									
Total Hepta-CBs	199*	995									
PCB-1	190	950									
PCB-2	186	930	276								
PCB-3	185	925	361								
PCB-4	898	4490									
PCB-10	53.7	268.5									
PCB-9	148*	740	734								
PCB-7	90.6	453	233								
PCB-6	522	2610	2390								
PCB-5	54.7	273.5	81.6								
PCB-8	2470	12350	7220								
PCB-11	3670	18350									
PCB-13/12	213	1065									
PCB-15	1140	5700									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	10								
PCB-19	387	1935									
PCB-30/18	4070	20350									
PCB-17	1960	9800									
PCB-27	309	1545									
PCB-24	66.4	332									
PCB-16	2280	11400	10700								
PCB-32	1240	6200									
PCB-34	15*	75									
PCB-26/29	867	4335									
PCB-25	413	2065									
PCB-31	4190	20950									
PCB-28/20	4510	22550									
PCB-21/33	2780	13900	4540								
PCB-22	1670	8350	5830								
PCB-35	58.3	291.5	287								
PCB-37	704	3520									
PCB-54	12.6	63									
PCB-50/53	533	2665									
PCB-45	687	3435									
PCB-51	187	935									
PCB-46	254	1270									
PCB-52	2780	13900									
PCB-43	138	690									
PCB-69/49	1470	7350									
PCB-48	691	3455									
PCB-44/47/65	2520	12600									
PCB-59/62/75	238	1190									
PCB-42	654	3270									

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Cm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	10								
PCB-41	374	1870	929								
PCB-71/40	953	4765									
PCB-64	854	4270									
PCB-67	41.8*	209									
PCB-63	41.7	208.5									
PCB-61/70/74/76	1510	7550									
PCB-66	625	3125									
PCB-56	218	1090									
PCB-60	113	565									
PCB-96	16.2*	81									
PCB-95	1110	5550									
PCB-102	53.5	267.5									
PCB-91	147	735									
PCB-84	343	1715									
PCB-92	161	805									
PCB-113/90/101	949	4745									
PCB-83	46.3	231.5									
PCB-99	372	1860									
PCB-108/119/86/97/125/87	605	3025									
PCB-116/85	118*	590									
PCB-110	1040	5200									
PCB-82	81.7	408.5									
PCB-136	121	605									
PCB-151/135	246	1230									
PCB-144	37*	185									
PCB-147/149	511	2555									
PCB-134	46.3	231.5									
PCB-132	197	985									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	10								
PCB-146	43.3*	216.5									
PCB-153/168	274	1370									
PCB-141	94.1	470.5	375								
PCB-163/138/129	402	2010									
PCB-158	38.4	192									
PCB-128/166	43.9*	219.5									
PCB-179	29.4*	147									
PCB-187	56.4	282									
PCB-183	26	130									
PCB-174	43*	215									
PCB-180/193	44.1*	220.5									

*EMPC

13C-CE05-T042-XR03-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CM
2nd Reviewer: M

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 11 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	11								
PCB-105	54.1	270.5									
PCB-118	150	750									
Total Mono-CBs	739	3695									
Total Di-CBs	16100	80500	80300								
Total Tri-CBs	73200	366000	52000								
Total Tetra-CBs	29600	148000	47700*								
Total Penta-CBs	3240*	16200									
Total Hexa-CBs	1330*	6650	5320*								
Total Hepta-CBs	142*	710									
PCB-1	339	1695									
PCB-2	173	865	129								
PCB-3	227	1135	160								
PCB-4	2030	10150									
PCB-10	95.4	477									
PCB-9	446	2230	226								
PCB-7	241	1205	67.8								
PCB-6	1360	6800	678								
PCB-5	152	760									
PCB-8	6770	33850	2100								
PCB-11	1190	5950	5370								
PCB-13/12	504	2520	358								
PCB-15	3270	16350	1640								

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	11								
PCB-19	1140	5700									
PCB-30/18	13300	66500	8520								
PCB-17	6070	30350	5210								
PCB-27	958	4790	2810								
PCB-24	222	1110	133								
PCB-16	7510	37550	2700								
PCB-32	3970	19850	3730								
PCB-34	51.2	256	83								
PCB-26/29	2430	12150	2180								
PCB-25	1060	5300	1070								
PCB-31	11100	55500	6250								
PCB-28/20	11800	59000	6930								
PCB-21/33	7640	38200	1220								
PCB-22	4420	22100	1540								
PCB-39	65.7	328.5									
PCB-37	1450	7250	889								
PCB-54	35	175	154								
PCB-50/53	1440	7200	2500								
PCB-45	1780	8900	1580								
PCB-51	492	2460	771								
PCB-46	666	3330	767								
PCB-52	5570	27850	9470								
PCB-43	340	1700	300								
PCB-69/49	3150	15750	5510								
PCB-48	1660	8300	1000								
PCB-44/47/65	5020	25100	7530								
PCB-59/62/75	537	2685	690								
PCB-42	1440	7200	1910								

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	11								
PCB-41	760	3800	231								
PCB-71/40	2110	10550	3870								
PCB-64	1770	8850	2170								
PCB-67	85.3	426.5	111								
PCB-63	73.7	368.5	154								
PCB-61/70/74/76	1720	8600	4340								
PCB-66	678	3390	2540								
PCB-56	153	765									
PCB-60	90.8	454	375								
PCB-96	43	215	69.1*								
PCB-95	1000	5000	3450								
PCB-100/93	28.5*	142.5	101								
PCB-102	75.8	379	243								
PCB-91	160	800	672								
PCB-84	235	1175									
PCB-92	92.2	461									
PCB-113/90/101	527	2635									
PCB-99	174	870									
PCB-108/119/86/97/125/87	252	1260									
PCB-116/85	51	255									
PCB-110	359	1795									
PCB-82	38.9	194.5									
PCB-136	122	610	253								
PCB-151/135	280	1400	575								
PCB-144	26.9	134.5	58								
PCB-147/149	429	2145	1210								
PCB-132	72.4	362									
PCB-146	28.7	143.5									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	11								
PCB-153/168	160	800									
PCB-141	36.5*	182.5	128								
PCB-163/138/129	152*	760									
PCB-158	19.1	95.5	76.2								
PCB-179	62.4*	312	109								
PCB-176	16.5	82.5	25.2								
PCB-187	36.1*	180.5									
PCB-180/193	27.2*	136									

*EMPC

13C-CE05-T042-XR04-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: M
2nd Reviewer: n

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 12 >5x

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-105	4.1	20.5									
PCB-118	8.18	40.9									
Total Mono-CBs	14.6	73									
Total Di-CBs	66.8	334									
Total Tri-CBs	56.1*	280.5									
Total Tetra-CBs	71*	355									
Total Penta-CBs	74*	370									
Total Hexa-CBs	49.5	247.5									
Total Hepta-CBs	30.4*	152									
Total Octa-CBs	7.78	38.9									
PCB-1	4.49	22.45									
PCB-2	4.27	21.35									
PCB-3	5.8	29									
PCB-4	4.7	23.5									
PCB-8	5.92	29.6									
PCB-11	51.4	257									
PCB-15	4.81	24.05									
PCB-30/18	7.42	37.1									
PCB-17	4.73	23.65									
PCB-16	3.65	18.25									
PCB-32	3.47	17.35									
PCB-26/29	2.03	10.15									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-31	9.78	48.9									
PCB-28/20	13.5	67.5									
PCB-21/33	4.98	24.9									
PCB-22	3.3*	16.5									
PCB-37	3.22*	16.1									
PCB-50/53	1.36*	6.8									
PCB-52	12.8	64									
PCB-69/49	5.9	29.5									
PCB-48	1.45*	7.25									
PCB-44/47/65	13.6	68									
PCB-71/40	3.82	19.1									
PCB-64	3.6	18									
PCB-61/70/74/76	15.7	78.5									
PCB-66	8.81	44.05									
PCB-56	4.03*	20.15									
PCB-95	10.5	52.5									
PCB-91	1.96*	9.8									
PCB-84	3.96	19.8									
PCB-92	2.12	10.6									
PCB-113/90/101	12.1	60.5									
PCB-99	6.45	32.25									
PCB-108/119/86/97/125/87	7.89	39.45									
PCB-116/85	2.83	14.15									
PCB-110	14	70									
PCB-151/135	4.1	20.5									
PCB-147/149	10.6	53									
PCB-132	3.55	17.75									
PCB-146	1.51	7.55									

3013

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-153/168	9.85	49.25									
PCB-141	3.45	17.25									
PCB-163/138/129	14.3	71.5									
PCB-128/166	2.16	10.8									
PCB-179	1.81*	9.05									
PCB-187	5.5	27.5									
PCB-183	2.08*	10.4									
PCB-174	5.25	26.25									
PCB-177	2.97	14.85									
PCB-180/193	9.45	47.25									
PCB-170	3.37	16.85									
PCB-198/199	3.82	19.1									
PCB-194	3.96	19.8									

*EMPC

13C-CE05-T042-XR02-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

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

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	* all except 8, 11	TEXT (all compounds + Total Mono- through Nona-CBs)
				7, 8	TEXT (all compounds except PCB-115+ Total Mono- through Nona-CBs)
				10, 11	TEXT (all compounds except PCB-68 + Total Mono- through Nona-CBs)
			*	1, 2, 4, 5, 7, 8, 10, 11, 13, 14	

Notes: _____

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: Am
2nd Reviewer: M

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		1	13C PCB-15	109 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		2	13C PCB-15	113 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		3	13C PCB-15	108 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		7	13C PCB-15	110 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		9	13C PCB-15	109 (19-107)	Jdets/P (see attached, +Total Di-CBs)
			13C PCB-77	115 (31-109)	Jdets/P (PCB-77, +Total Tetra-CBs)
			13C PCB-126	108 (50-106)	Jdets/P (PCB-126, +Total Penta-CBs)
		15	13C PCB-19	110 (1-108)	Jdets/P (see attached, +Total Tri-CBs)
			13C PCB-77	111 (31-109)	Jdets/P (PCB-77, +Total Tetra-CBs)
			13C PCB-118	112 (49-111)	Jdets/P (PCB-118, +Total Penta-CBs)
			13C PCB-167	121 (45-118)	Jdets/P (see attached, +Total Hexa-CBs)
			13C PCB-189	117 (47-116)	Jdets/P (PCB-189, +Total Hepta-CBs)

Table 3. Quantitation References for Analytes

2022 Tm

AP Quantitation References

ES PCB-1
PCB-1

ES PCB-3
PCB-2
PCB-3

ES PCB-4
PCB-4
PCB-10

ES PCB-15
PCB-9
PCB-7
PCB-6
PCB-5
PCB-8
PCB-14
PCB-11
PCB-13/12
PCB-15

ES PCB-19
PCB-19
PCB-30/18
PCB-17
PCB-27
PCB-24
PCB-16
PCB-32

ES PCB-37
PCB-34
PCB-23
PCB-26/29
PCB-25
PCB-31
PCB-28/20
PCB-21/33
PCB-22
PCB-36
PCB-39
PCB-38
PCB-35
PCB-37

ES PCB-54
PCB-54

ES PCB-77
PCB-77

ES PCB-81
PCB-52
PCB-73
PCB-43
PCB-69/49
PCB-48
PCB-44/47/65
PCB-59/62/75
PCB-42
PCB-41
PCB-71/40
PCB-64
PCB-72
PCB-68
PCB-57
PCB-58
PCB-67
PCB-63
PCB-61/70/74/76
PCB-66
PCB-55
PCB-56
PCB-60
PCB-80
PCB-79
PCB-78
PCB-50/53*
PCB-45*
PCB-51*
PCB-46*
PCB-81

ES PCB-104
PCB-104
PCB-96

ES PCB-105
PCB-105
PCB-127

ES PCB-114
PCB-122
PCB-114

ES PCB-118
PCB-118

ES PCB-123
PCB-103
PCB-94
PCB-95
PCB-100/93
PCB-102
PCB-98
PCB-88
PCB-91
PCB-84
PCB-89
PCB-121
PCB-92
PCB-113/90/101
PCB-83
PCB-99
PCB-112
PCB-108/119/86/97/125/87
PCB-117
PCB-116/85
PCB-110
PCB-115
PCB-82
PCB-111
PCB-120
PCB-107/124
PCB-109
PCB-123
PCB-106

ES PCB-126
PCB-126

ES PCB-155
PCB-155
PCB-152
PCB-150
PCB-136
PCB-145

ES PCB-153
PCB-148
PCB-151/135
PCB-154
PCB-144
PCB-147/149
PCB-134
PCB-143
PCB-139/140
PCB-131
PCB-142
PCB-132
PCB-133
PCB-165
PCB-146
PCB-161
PCB-153/168
PCB-141
PCB-130
PCB-137
PCB-164
PCB-163/138/129
PCB-160
PCB-158

ES PCB-156/157
PCB-156/157

ES PCB-167
PCB-128/166
PCB-159
PCB-162
PCB-167

ES PCB-169
PCB-169

ES PCB-188
PCB-188
PCB-179
PCB-184
PCB-176
PCB-186
PCB-178

ES PCB-180
PCB-175
PCB-187
PCB-182
PCB-183
PCB-185
PCB-174
PCB-177
PCB-181
PCB-171/173
PCB-172
PCB-192
PCB-180/193
PCB-191

ES PCB-170
PCB-170
PCB-190

ES PCB-189
PCB-189

ES PCB-202
PCB-202
PCB-201
PCB-204
PCB-197
PCB-200
PCB-198/199
PCB-196
PCB-203

ES PCB-205
PCB-195
PCB-194
PCB-205

ES PCB-206
PCB-206

ES PCB-208
PCB-208
PCB-207

ES PCB-209
PCB-209

Note: Quantitation Reference for those congeners without a Labeled Standard is based on the nearest ES @ the same level of chlorination within the same function.
Quantitation of those congeners within a function where there is no ES is based on the nearest ES in the other functions of that homologue .
** Based on analytical observations PCB's 50/53, 45,51& 46 were moved to ES 81 when the additional ES's were added.*

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: TM
2nd Reviewer: A

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		PCB-14	The laboratory indicated that congeners were	1, 3, 4, 6, 7, 9, 10	Jdets/P (+ Total Di-CBs) (q)
			quantitated using single ion mode (SI). The		
		PCB-5, PCB-14	area for the secondary ion trace was not	2	
			integrated due to significantly elevated noise		
		PCB-9, PCB-7, PCB-5	levels from background PFK.	5	
			Quantitation should be performed using the		
		PCB-5	area of the primary and secondary ions.	8	
		PCB-9, PCB-7, PCB-13/12		11	
		PCB-10, PCB-9, PCB-7, PCB-6, PCB-13/12		13	
		PCB-4, PCB-9, PCB-6, PCB-8, PCB-15		14	
		PCB-11, PCB-15		15	

Notes:

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer:
2nd Reviewer:

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

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	Compound	Finding	Associated Samples	Qualifications
			results reported as EMPC	All	EMPC-J/A (k)
			Congeners flagged "E" exceed upper calibration range	1, 4	Jdets/P (+Total Di-CBs, Tri-CBs, Tetra-CBs) (q)
				2, 5, 7, 8, 10, 11	Jdets/P (+Total Di-CBs)
				3	Jdets/P (+Total Di-CBs, Tri-CBs)
				6	Jdets/P (+Total Di-CBs, Tri-CBs, Tetra-CBs, Penta-CBs, Hexa-CBS, Hepta-CBs)
				9, 12	Jdets/P (+Total Mono-CBs, Di-CBs, Tri-CBs, Tetra-CBs, Penta-CBs)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30205B31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: GM
2nd Reviewer: M

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

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

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) 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	07/25/12	PCB 77 (^{13}C-PCB 77)	1.13	1.135	1.16	1.16	4.9	4.8
			PCB 105 (^{13}C-PCB 105)	1.09	1.095	1.14	1.14	5.3	5.3
			PCB 167 (^{13}C-PCB 167)	1.14	1.13	1.18	1.18	4.5	4.7
			PCB 189 (^{13}C-PCB 189)	1.06	1.06	1.08	1.08	4.3	4.3
2			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 30205B31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: TM
2nd Reviewer: KL

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

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	130720X01	7-19-13	PCB 77 (^{13}C-PCB 77)	1.13	1.00	1.00	-12.0	11.9
			PCB 105 (^{13}C-PCB 105)	1.09	1.08	1.08	-1.4	1.3
			PCB 167 (^{13}C-PCB 167)	1.14	1.08	1.08	-4.6	4.9
			PCB 189 (^{13}C-PCB 189)	1.06	0.97	0.97	-8.2	8.4
2	130720X12	7-20-13	PCB 77 (^{13}C-PCB 77)	1.13	1.01	1.01	-11.3	10.6
			PCB 105 (^{13}C-PCB 105)	1.09	1.13	1.12	2.9	3.1
			PCB 167 (^{13}C-PCB 167)	1.14	1.10	1.09	-3.3	4.0
			PCB 189 (^{13}C-PCB 189)	1.06	0.97	0.97	-7.8	8.0
3			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					
4			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					

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 #: 30205B31

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 4, PCB4:

Conc. = $\frac{(1.21e9)(2000)(1)}{(1.38e7)(1.16)(1)(\quad)}$

= 151,174pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5668 SITE: CWCM High Vol #2, NB
LAB: SGS Analytical Perspectives

CHECKLIST

I.0 **Data Completeness and Deliverables**

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 **Reporting Requirements and Deliverables**

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] ___ ___

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] ___ ___

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] ___ ___

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] ___ ___

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [✓] ___ ___

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 **Initial Calibration**

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [ ] [✓] ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in **Table 8** (see analytical method) must be met for each PCB congener peak. [ ] [✓] ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [ ] ___ [✓]

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [ ] ___ ✓

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] ___ [✓]

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [ ] ___ [✓]

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [/] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [ ] [/] ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [/] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [/] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)CI}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [X] [ ]

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [✓] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [ ] ___ [✓]

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [✓] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ ✓

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [ ] ✓ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_i, using the formula:

$$\% \, Rec_i = \frac{(A_{i1} + A_{i2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_i}$$

$A_{i1} + A_{i2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_i = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ✓ ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [ ] ___ ___

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set.

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? ☑ ___ ___

13.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~outline below?~~ QAPP ☑ ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] ✓ ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] ✓ ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ___

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ ___

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ ___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206A21_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 26, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5674

Sample Identification

13C-CE05-T042-BM01
13C-CE05-T042-BM02
13C-CE05-T042-BP01
13C-CE05-T042-BN01
13C-CE05-T042-BN02
13C-CE05-T042-BQ01

Introduction

This data review covers 4 polyurethane foam (PUF) samples and 2 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, December 2010) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
7/16/13 (130716P2-01)	1,2,3,4,6,7,8-HpCDF	57.3 ng/mL (45-55)	All samples in SDG A5674	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
7/16/13 (130716P2-13)	1,2,3,4,6,7,8-HpCDF	56.5 ng/mL (45-55)	All samples in SDG A5674	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

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

Samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, and 13C-CE05-T042-XR02-103 (all from SDG A5678) were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	OCDD Total TCDD Total HpCDD	9.1 pg 1.17 pg 1.81 pg	13C-CE05-T042-BM01
13C-CE05-T042-XR04-101	6/26/13	OCDD	3.14 pg	13C-CE05-T042-BM02
13C-CE05-T042-XR02-101	6/26/13	OCDD	3.59 pg	13C-CE05-T042-BP01
13C-CE05-T042-XR03-103	6/26/13	OCDD Total TCDD	3.32 pg 0.916 pg	13C-CE05-T042-BN01
13C-CE05-T042-XR02-103	6/26/13	OCDD	5.77 pg	13C-CE05-T042-BQ01

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-BM01	OCDD	31.9 pg	31.9U pg
13C-CE05-T042-BM02	OCDD	12.2 pg	12.2U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BN01 13C-CE05-T042-BN02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5674	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5674

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5674	13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BP01 13C-CE05-T042-BN01 13C-CE05-T042-BN02 13C-CE05-T042-BQ01	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P	Continuing calibration (concentration) (c)
A5674	13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BP01 13C-CE05-T042-BN01 13C-CE05-T042-BN02 13C-CE05-T042-BQ01	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (EMPC) (k)

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5674

No Sample Data Qualified in this SDG

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5674

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5674	13C-CE05-T042-BM01	OCDD	31.9U pg	A	be
A5674	13C-CE05-T042-BM02	OCDD	12.2U pg	A	be

LDC #: 30206A21

SDG #: A5674

Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 8-20-13

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤20/35
IV.	Routine calibration/~~ICV~~	SW	QC limits
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	~~A~~ SW	TM 10/28/14
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	*

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: 4 PUFs / 2 Filters

1	13C-CE05-T042-BM01	11		21		31	
2	13C-CE05-T042-BM02	12		22		32	
3	13C-CE05-T042-BP01	13		23		33	
4	13C-CE05-T042-BN01	14		24		34	
5	13C-CE05-T042-BN02	15		25		35	
6	13C-CE05-T042-BQ01	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20	MBI-11113	30		40	

*Notes: 13C-CE05-T042-XR03-101 (A5678), 13C-CE05-T042-XR04-101 (A5678), 13C-CE05-T042-XR02-101 (A5678), 13C-CE05-T042-XR03-103 (A5678), 13C-CE05-T042-XR04-103 (A5678 = ND), 13C-CE05-T042-XR02-103 (A5678)

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria? (c)

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	07/16/13	130716P2-01	O	57.3 (45-55)		All	Jdets/P (O, Y)
	07/16/13	130716P2-13	O	56.5 (45-55)		All	Jdets/P (O, Y)

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 Qual U (be)

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-101	5X	1							
G	9.1*	45.5	31.9							
R	1.17*	5.9								
U	1.81*	9.1								

* EMPC

13C-CE05-T042-XR03-101 (A5678)

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:\Field Blanks\30206A21_13C-CE05-T042-XR03-101.wpd4

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2 Qual U (be)

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR04-101	5X	2							
G	3.14*	15.7	12.2							

* EMPC

13C-CE05-T042-XR04-101 (A5678)

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 #: 30206A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-101	5X								
G	3.59*	18.0								

* EMPC

13C-CE05-T042-XR02-101 (A5678)

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:\Field Blanks\30206A21_13C-CE05-T042-XR02-101.wpd4

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-103	5X								
G	3.32*	16.6								
R	0.916	4.6								

* EMPC

13C-CE05-T042-XR03-103 (A5678)

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:\Field Blanks\30206A21_13C-CE05-T042-XR03-103.wpd4

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Field Blanks

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

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-103	5X								
G	5.77	28.9								

* EMPC

13C-CE05-T042-XR02-103 (A5678)

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:\Field Blanks\30206A21_13C-CE05-T042-XR02-103.wpd4

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: TM
2nd Reviewer: K

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	~~all~~ 1, 2, 4, 5	TEXT

Notes: See Attached

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

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	Compound	Finding	Associated Samples	Qualifications
			EMPC results	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30206A21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	MM1 ICAL	02/13/13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.97	0.97	0.98	0.98	4.5	4.5
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.06	1.06	1.07	1.07	4.1	4.2
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.04	1.04	1.03	1.03	5.3	5.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.02	1.02	1.02	1.02	4.8	4.75
			OCDF (^{13}C-OCDF)	1.00	1.00	1.01	1.01	5.6	5.6
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 30206A21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130716P2-01	7-16-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.8	11.8	18	18
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.5	10.5	5	5
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	54.3	54.1	9	9
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52	52	4	4
			OCDF (^{13}C-OCDF)	100	116	116	16	16
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				

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 #: 30206A21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer:
2nd reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 2, H:

Conc. = $\frac{(1.05e5)(2000)(1)}{(1.14e8)(1.14)(1)(\quad)}$

= 1.62 pg

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5674 LAB: SGS- Analytical Perspectives
SITE: CWCM High Vol. #2, LPR

I.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Sample Data Summary (Form I CDD-1) [✓] ___ ___

b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2) [✓] ___ ___

c. Second Column Confirmation Summary (Form I, CDD-3) [___] ___ ✓

d. Total Homologue Concentration Summary (Form II CDD) [✓] ___ ___

e. CDD/CDF Spiked Sample Summary (Form III CDD-1) [✓] ___ ___

f. CDD/CDF Duplicate Sample Summary (Form III CDD-2) [___] ___ ✓

g. CDD/CDF Method Blank Summary (Form IV-CDD) [✓] ___ ___

	YES	NO	N/A
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	[✓]	___	___
I. Chromatographic Resolution Summary (Form V CDD-2)	[✓]	___	___
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	[✓]	___	___
k. Initial Calibration (Form VI, CDD-1, CDD-2)	[✓]	___	___
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	[___]	___	___

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

	YES	NO	N/A
a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number	[✓]	___	___
b. Percent peak resolution valley	[✓]	___	___
c. Window Defining Mixture raw data	[✓]	___	___
d. SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	[✓]	___	___
e. Integrated area and peak height must be listed for all peaks 2.5 times above background	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

	YES	NO	N/A
a. Chain of Custody Records	[✓]	___	___
b. Sample Shipment Records	[✓]	___	___
c. Sample log-in sheets	[✓]	___	___
d. GC/MS Standard and Sample Run Log in chronological order	[✓]	___	___
e. Sample Extraction Log	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the

YES NO N/A

effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [✓] ___ ___

b. For soil/sediment samples, 30 days from VTSR to extraction? [___] ___ ✓

c. For fish and tissue samples, one (1) year from VTSR to extraction? [___] ___ ✓

d. For all samples 45 days from time of extraction to time of analysis? [✓] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects
as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning of every 12 hour period. Was this performed accordingly? [✓] ___ ___

YES NO N/A

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] ___ ___

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] ___ ___

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining **Solution** and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9-HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent coefficient of variation must be 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve

YES NO N/A

must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [___] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be

YES NO N/A

quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [___] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [___] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in Table 8 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:
For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$(A_{l1} + A_{l2}) \times Q_n$

For labeled analytes, Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2,3,7,8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of $\geq$ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [___] ✓ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4- TCDD and $^{13}C_{12}$1,2,3,7,8,9- HxCDD within $\pm$ 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) [✓] ___ ___

YES NO N/A

6.2 Isomer Specificity Test Standard

6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613**B**, Section **15**.4.2.2) [✓] ___ ___

6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. [___] ___ [✓]

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.I Were the following MS/DS conditions used?

7.1.1 SIM data were acquired for each of the ions listed in Table 8 (see analytical method)

		YES	NO	N/A
	including diphenylether interfering ions.	[✓]	___	___
7.2	Were the following identification criteria met?			
7.2.1	For the 2,3,7,8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract, must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]	___	___
7.2.2	For non-2,3,7,8 substituted compounds (tetra through octa) found present, the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B, Section 16.4)	[✓]	___	___
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte, the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B, Section 16.1)	[✓]	___	___
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.5	The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[___]	[✓]	___
7.2.7	The relative retention time of the unlabeled 2,3,7,8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]	___	___
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup, and internal standard must be met (Table 9 - Method 1613B).	[✓]	___	___
7.2.9	The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]	___	___

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive, high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]	___	___

ACTION:
1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.
2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

YES NO N/A

A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance
ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6. and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_l}{W \times (A_{l1} + A_{l2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_l}{V \times (A_{l1} + A_{l2}) \times RR}$$

YES NO N/A

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{I1} + A_{I2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_I = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range **listed on Table 6 of the Analytical method?** [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

	YES	NO	N/A
7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method?	[___]	___	✓

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

	YES	NO	N/A
8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present?	[✓]	___	___

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

	YES	NO	N/A
9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria?	[✓]	___	___

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [___] ___ ✓

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the

YES NO N/A

concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [___] ___ ✓

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non- detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

YES NO N/A

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [___] ___ ✓

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [___] ___ ✓

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [___] ___ ✓

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [___] ___ ✓

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

YES NO N/A

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section **9**.2 required by the analytical method? [/] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table **6** of the method? [___] ___ /

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12

YES NO N/A

hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~Table 8 of the method?~~ QAPP [✓] ___ ___

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [___] ___ [✓]

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 μg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 μg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 μg/L or any other analyte at levels > 1 µg/L? [___] [✓] ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines

YES NO N/A

outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [___] ___ ___

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [___] ___ ___

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [___] ___ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [___] ___ ___

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

		YES	NO	N/A
20.1	Was a matrix spike analyzed at the frequency of one per SDG samples per matrix?	[__]	__	✓
20.2	Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent?	[__]	__	✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3	Was a matrix spike duplicate analyzed as per section 11.1 and 11.2?	[__]	__	✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1	For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency?	[__]	✓	__
21.2	Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes?	[__]	__	✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills",

YES NO N/A

Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision **B**- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October **1994**

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin", 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF", National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016, Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206A31_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 26, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5674

Sample Identification

13C-CE05-T042-BM01
13C-CE05-T042-BM02
13C-CE05-T042-BP01
13C-CE05-T042-BN01
13C-CE05-T042-BN02
13C-CE05-T042-BQ01

Introduction

This data review covers 4 polyurethane foam (PUF) samples and 2 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 Toxic/LOC and labeled compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing 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 PCBs 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
MB_11113	7/8/13	PCB-77	4.33 pg	All samples in SDG A5674
		PCB-105	9.41 pg	
		PCB-118	28.3 pg	
		Total Mono-CBs	77.5 pg	
		Total Di-CBs	1180 pg	
		Total Tri-CBs	3360 pg	
		Total Tetra-CBs	2370 pg	
		Total Penta-CBs	687 pg	
		Total Hexa-CBs	159 pg	
		Total Hepta-CBs	23.8 pg	
		PCB-1	24.9 pg	
		PCB-2	23.3 pg	
		PCB-3	29.3 pg	
		PCB-4	92.9 pg	
		PCB-10	6.09 pg	
		PCB-9	17.5 pg	
		PCB-7	12.6 pg	
		PCB-6	55.6 pg	
		PCB-5	6.04 pg	
		PCB-8	290 pg	
		PCB-11	517 pg	
		PCB-13/12	28.5 pg	
		PCB-15	158 pg	
		PCB-19	39 pg	
		PCB-30/18	487 pg	
		PCB-17	241 pg	
		PCB-27	37.6 pg	
		PCB-24	9.36 pg	
		PCB-16	288 pg	
		PCB-32	167 pg	
		PCB-34	2.21 pg	
		PCB-26/29	118 pg	
		PCB-25	52.8 pg	
		PCB-31	574 pg	
		PCB-28/20	605 pg	
		PCB-21/33	380 pg	
		PCB-22	229 pg	
		PCB-39	3.57 pg	
		PCB-35	10.8 pg	
		PCB-37	113 pg	
		PCB-54	1.58 pg	
		PCB-50/53	72.1 pg	
		PCB-45	89.8 pg	
		PCB-51	27 pg	
		PCB-46	36.7 pg	
		PCB-52	446 pg	
		PCB-43	20.2 pg	
		PCB-69/49	226 pg	
		PCB-48	107 pg	
		PCB-44/47/65	383 pg	
		PCB-59/62/75	35 pg	
		PCB-42	104 pg	
		PCB-41	55.7 pg	
		PCB-71/40	151 pg	
		PCB-64	133 pg	
		PCB-68	3.52 pg	
		PCB-67	7.64 pg	
		PCB-63	6.93 pg	
		PCB-61/70/74/76	262 pg	
		PCB-66	116 pg	
		PCB-56	50.2 pg	
		PCB-60	28.5 pg	
		PCB-96	3.03 pg	
		PCB-95	166 pg	
		PCB-102	6.8 pg	
		PCB-91	22.3 pg	
		PCB-84	50.2 pg	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB_11113 (continued)	7/8/13	PCB-92	23.7 pg	All samples in SDG A5674
		PCB-113/90/101	122 pg	
		PCB-83	6.98 pg	
		PCB-99	49 pg	
		PCB-108/119/86/97/125/87	71.2 pg	
		PCB-117	2.59 pg	
		PCB-116/85	13.2 pg	
		PCB-110	101 pg	
		PCB-82	9.54 pg	
		PCB-109	1.82 pg	
		PCB-136	16.3 pg	
		PCB-151/135	27.8 pg	
		PCB-144	3.75 pg	
		PCB-147/149	47.3 pg	
		PCB-134	3.44 pg	
		PCB-132	15.7 pg	
		PCB-146	2.45 pg	
		PCB-153/168	15.9 pg	
		PCB-141	5.55 pg	
		PCB-163/138/129	18.9 pg	
		PCB-158	2.44 pg	
		PCB-179	5.06 pg	
		PCB-176	0.991 pg	
		PCB-187	7.07 pg	
		PCB-174	4.47 pg	
		PCB-180/193	6.22 pg	

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.

Samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, and 13C-CE05-T042-XR02-103 (all 6 from SDG A5678) were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	PCB-77	7.84 pg	13C-CE05-T042-BM01
		PCB-105	22.2 pg	
		PCB-118	52.8 pg	
		PCB-156/157	5.67 pg	
		Total Mono-CBs	340 pg	
		Total Di-CBs	3540 pg	
		Total Tri-CBs	1020 pg	
		Total Tetra-CBs	995 pg	
		Total Penta-CBs	489 pg	
		Total Hexa-CBs	177 pg	
		Total Hepta-CBs	54.8 pg	
		Total Octa-CBs	10.3 pg	
		PCB-1	77.8 pg	
		PCB-2	149 pg	
		PCB-3	113 pg	
		PCB-4	76 pg	
		PCB-10	9.47 pg	
		PCB-9	10.8 pg	
		PCB-7	5.94 pg	
		PCB-6	28.8 pg	
		PCB-8	96.5 pg	
		PCB-11	3210 pg	
		PCB-13/12	28.5 pg	
		PCB-15	72.8 pg	
		PCB-19	17 pg	
		PCB-30/18	127 pg	
		PCB-17	72.5 pg	
		PCB-27	14.2 pg	
		PCB-24	2.95 pg	
		PCB-16	63.5 pg	
		PCB-32	51.9 pg	
		PCB-26/29	36.3 pg	
		PCB-25	25 pg	
		PCB-31	172 pg	
		PCB-28/20	233 pg	
		PCB-21/33	80.3 pg	
		PCB-22	59.3 pg	
		PCB-35	12.8 pg	
		PCB-37	48.5 pg	
		PCB-54	2.57 pg	
		PCB-50/53	22.2 pg	
		PCB-45	13.9 pg	
		PCB-51	33.9 pg	
		PCB-46	7.53 pg	
		PCB-52	141 pg	
		PCB-69/49	87.4 pg	
		PCB-48	25.6 pg	
		PCB-44/47/65	167 pg	
		PCB-59/62/75	13.5 pg	
		PCB-42	33 pg	
		PCB-41	10.1 pg	
		PCB-71/40	46.9 pg	
		PCB-64	44.4 pg	
		PCB-68	6.93 pg	
		PCB-67	3.49 pg	
		PCB-63	4.34 pg	
		PCB-61/70/74/76	169 pg	
		PCB-66	98.9 pg	
		PCB-56	38.9 pg	
		PCB-60	16.8 pg	
		PCB-103	2.63 pg	
		PCB-95	58.8 pg	
		PCB-100/93	5.51 pg	
		PCB-102	4.42 pg	
		PCB-91	11.3 pg	
		PCB-84	24.4 pg	
		PCB-92	14.1 pg	
		PCB-113/90/101	77.8 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101 (continued)	6/26/13	PCB-99	44.7 pg	13C-CE05-T042-BM01
		PCB-108/119/86/97/125/87	50.8 pg	
		PCB-117	3.94 pg	
		PCB-116/85	9.82 pg	
		PCB-110	87.9 pg	
		PCB-82	9.88 pg	
		PCB-107/124	3.36 pg	
		PCB-109	5.05 pg	
		PCB-136	7.37 pg	
		PCB-151/135	15.3 pg	
		PCB-144	2.3 pg	
		PCB-147/149	35.8 pg	
		PCB-132	12 pg	
		PCB-146	4.24 pg	
		PCB-153/168	29.8 pg	
		PCB-141	5.86 pg	
		PCB-164	2.24 pg	
		PCB-163/138/129	43.9 pg	
		PCB-158	3.99 pg	
		PCB-128/166	8.56 pg	
		PCB-179	3.54 pg	
		PCB-187	8.78 pg	
		PCB-183	4.53 pg	
		PCB-174	8.99 pg	
		PCB-177	5.41 pg	
		PCB-171/173	3.25 pg	
		PCB-180/193	14.6 pg	
		PCB-170	5.64 pg	
		PCB-198/199	5.22 pg	
		PCB-194	5.12 pg	
13C-CE05-T042-XR04-101	6/26/13	PCB-105	70.9 pg	13C-CE05-T042-BM02
		PCB-118	268 pg	
		Total Mono-CBs	1520 pg	
		Total Di-CBs	33000 pg	
		Total Tri-CBs	160000 pg	
		Total Tetra-CBs	71300 pg	
		Total Penta-CBs	6880 pg	
		Total Hexa-CBs	2640 pg	
		Total Hepta-CBs	353 pg	
		PCB-1	732 pg	
		PCB-2	336 pg	
		PCB-3	456 pg	
		PCB-4	4060 pg	
		PCB-10	170 pg	
		PCB-9	877 pg	
		PCB-7	471 pg	
		PCB-6	2820 pg	
		PCB-5	343 pg	
		PCB-8	14200 pg	
		PCB-11	1830 pg	
		PCB-13/12	1060 pg	
		PCB-15	7220 pg	
		PCB-19	2500 pg	
		PCB-30/18	28000 pg	
		PCB-17	13000 pg	
		PCB-27	2060 pg	
		PCB-24	551 pg	
		PCB-16	16000 pg	
		PCB-32	8170 pg	
		PCB-34	109 pg	
		PCB-23	48.6 pg	
		PCB-26/29	5350 pg	
		PCB-25	2390 pg	
		PCB-31	25300 pg	
		PCB-28/20	26600 pg	
		PCB-21/33	16800 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-101 (continued)	6/26/13	PCB-22	9870 pg	13C-CE05-T042-BM02
		PCB-39	147 pg	
		PCB-35	200 pg	
		PCB-37	3140 pg	
		PCB-54	78.7 pg	
		PCB-50/53	3530 pg	
		PCB-45	4320 pg	
		PCB-51	1150 pg	
		PCB-46	1680 pg	
		PCB-52	13500 pg	
		PCB-43	864 pg	
		PCB-69/49	7570 pg	
		PCB-48	4000 pg	
		PCB-44/47/65	12300 pg	
		PCB-59/62/75	1230 pg	
		PCB-42	3400 pg	
		PCB-41	1890 pg	
		PCB-71/40	4970 pg	
		PCB-64	4200 pg	
		PCB-67	208 pg	
		PCB-63	152 pg	
		PCB-61/70/74/76	4120 pg	
		PCB-66	1610 pg	
		PCB-56	360 pg	
		PCB-60	189 pg	
		PCB-96	89.3 pg	
		PCB-95	2390 pg	
		PCB-102	141 pg	
		PCB-91	350 pg	
		PCB-84	492 pg	
		PCB-92	184 pg	
		PCB-113/90/101	1170 pg	
		PCB-99	330 pg	
		PCB-108/119/86/97/125/87	513 pg	
		PCB-110	828 pg	
		PCB-82	60.8 pg	
		PCB-136	264 pg	
		PCB-151/135	576 pg	
		PCB-144	60 pg	
		PCB-147/149	867 pg	
		PCB-132	176 pg	
		PCB-153/168	318 pg	
		PCB-141	90.1 pg	
		PCB-163/138/129	287 pg	
		PCB-179	152 pg	
		PCB-176	33 pg	
		PCB-187	168 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-101	6/26/13	PCB-105	6.37 pg	13C-CE05-T042-BP01
		PCB-118	16.2 pg	
		Total Mono-CBs	16.2 pg	
		Total Di-CBs	66.4 pg	
		Total Tri-CBs	67.5 pg	
		Total Tetra-CBs	86.2 pg	
		Total Penta-CBs	119 pg	
		Total Hexa-CBs	91.1 pg	
		Total Hepta-CBs	82.6 pg	
		Total Octa-CBs	19 pg	
		PCB-1	3.27 pg	
		PCB-2	5.74 pg	
		PCB-3	7.16 pg	
		PCB-4	5.96 pg	
		PCB-9	2.79 pg	
		PCB-6	2.25 pg	
		PCB-8	7.31 pg	
		PCB-11	42 pg	
		PCB-15	6.08 pg	
		PCB-30/18	11 pg	
		PCB-17	5.94 pg	
		PCB-32	3.91 pg	
		PCB-31	13.3 pg	
		PCB-28/20	17.1 pg	
		PCB-21/33	6.69 pg	
		PCB-22	4.06 pg	
		PCB-37	5.43 pg	
		PCB-52	17.6 pg	
		PCB-69/49	8.45 pg	
		PCB-48	2.37 pg	
		PCB-44/47/65	15.3 pg	
		PCB-71/40	5.2 pg	
		PCB-64	4.17 pg	
		PCB-61/70/74/76	18.3 pg	
		PCB-66	10.1 pg	
		PCB-56	4.71 pg	
		PCB-95	16.5 pg	
		PCB-84	5.82 pg	
		PCB-113/90/101	20 pg	
		PCB-99	10.4 pg	
		PCB-108/119/86/97/125/87	15.5 pg	
		PCB-110	27.9 pg	
		PCB-136	2.09 pg	
		PCB-151/135	8.11 pg	
		PCB-147/149	21.5 pg	
		PCB-132	8.16 pg	
		PCB-153/168	20.3 pg	
		PCB-141	4.43 pg	
		PCB-163/138/129	26.5 pg	
		PCB-179	4.99 pg	
		PCB-187	13.4 pg	
		PCB-183	6.51 pg	
		PCB-174	14.8 pg	
		PCB-177	7.51 pg	
		PCB-180/193	25.1 pg	
		PCB-170	10.3 pg	
		PCB-198/199	6.84 pg	
		PCB-196	5.82 pg	
		PCB-194	6.38 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103	6/26/13	PCB-105	224 pg	13C-CE05-T042-BN01
		PCB-118	528 pg	
		Total Mono-CBs	562 pg	
		Total Di-CBs	9270 pg	
		Total Tri-CBs	25500 pg	
		Total Tetra-CBs	14900 pg	
		Total Penta-CBs	5800 pg	
		Total Hexa-CBs	2050 pg	
		Total Hepta-CBs	199 pg	
		PCB-1	190 pg	
		PCB-2	186 pg	
		PCB-3	185 pg	
		PCB-4	898 pg	
		PCB-10	53.7 pg	
		PCB-9	148 pg	
		PCB-7	90.6 pg	
		PCB-6	522 pg	
		PCB-5	54.7 pg	
		PCB-8	2470 pg	
		PCB-11	3670 pg	
		PCB-13/12	213 pg	
		PCB-15	1140 pg	
		PCB-19	387 pg	
		PCB-30/18	4070 pg	
		PCB-17	1960 pg	
		PCB-27	309 pg	
		PCB-24	66.4 pg	
		PCB-16	2280 pg	
		PCB-32	1240 pg	
		PCB-34	15 pg	
		PCB-26/29	867 pg	
		PCB-25	413 pg	
		PCB-31	4190 pg	
		PCB-28/20	4510 pg	
		PCB-21/33	2780 pg	
		PCB-22	1670 pg	
		PCB-35	58.3 pg	
		PCB-37	704 pg	
		PCB-54	12.6 pg	
		PCB-50/53	533 pg	
		PCB-45	687 pg	
		PCB-51	187 pg	
		PCB-46	254 pg	
		PCB-52	2780 pg	
		PCB-43	138 pg	
		PCB-69/49	1470 pg	
		PCB-48	691 pg	
		PCB-44/47/65	2520 pg	
		PCB-59/62/75	238 pg	
		PCB-42	654 pg	
		PCB-41	374 pg	
		PCB-71/40	953 pg	
		PCB-64	854 pg	
		PCB-67	41.8 pg	
		PCB-63	41.7 pg	
		PCB-61/70/74/76	1510 pg	
		PCB-66	625 pg	
		PCB-56	218 pg	
		PCB-60	113 pg	
		PCB-96	16.2 pg	
		PCB-95	1110 pg	
		PCB-102	53.5 pg	
		PCB-91	147 pg	
		PCB-84	343 pg	
		PCB-92	161 pg	
		PCB-113/90/101	949 pg	
		PCB-83	46.3 pg	
		PCB-99	372 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103 (continued)	6/26/13	PCB-108/119/86/97/125/87 PCB-116/85 PCB-110 PCB-82 PCB-136 PCB-151/135 PCB-144 PCB-147/149 PCB-134 PCB-132 PCB-146 PCB-153/168 PCB-141 PCB-163/138/129 PCB-158 PCB-128/166 PCB-179 PCB-187 PCB-183 PCB-174 PCB-180/193	605 pg 118 pg 1040 pg 81.7 pg 121 pg 246 pg 37 pg 511 pg 46.3 pg 197 pg 43.3 pg 274 pg 94.1 pg 402 pg 38.4 pg 43.9 pg 29.4 pg 56.4 pg 26 pg 43 pg 44.1 pg	13C-CE05-T042-BN01
13C-CE05-T042-XR04-103	6/26/13	PCB-105 PCB-118 Total Mono-CBs Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs Total Hepta-CBs PCB-1 PCB-2 PCB-3 PCB-4 PCB-10 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-11 PCB-13/12 PCB-15 PCB-19 PCB-30/18 PCB-17 PCB-27 PCB-24 PCB-16 PCB-32 PCB-34 PCB-26/29 PCB-25 PCB-31 PCB-28/20 PCB-21/33 PCB-22 PCB-39 PCB-37 PCB-54 PCB-50/53 PCB-45 PCB-51 PCB-46 PCB-52 PCB-43	54.1 pg 150 pg 739 pg 16100 pg 73200 pg 29600 pg 3240 pg 1330 pg 142 pg 339 pg 173 pg 227 pg 2030 pg 95.4 pg 446 pg 241 pg 1360 pg 152 pg 6770 pg 1190 pg 504 pg 3270 pg 1140 pg 13300 pg 6070 pg 958 pg 222 pg 7510 pg 3970 pg 51.2 pg 2430 pg 1060 pg 11100 pg 11800 pg 7640 pg 4420 pg 65.7 pg 1450 pg 35 pg 1440 pg 1780 pg 492 pg 666 pg 5570 pg 340 pg	13C-CE05-T042-BN02

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-103 (continued)	6/26/13	PCB-69/49	3150 pg	13C-CE05-T042-BN02
		PCB-48	1660 pg	
		PCB-44/47/65	5020 pg	
		PCB-59/62/75	537 pg	
		PCB-42	1440 pg	
		PCB-41	760 pg	
		PCB-71/40	2110 pg	
		PCB-64	1770 pg	
		PCB-67	85.3 pg	
		PCB-63	73.7 pg	
		PCB-61/70/74/76	1720 pg	
		PCB-66	678 pg	
		PCB-56	153 pg	
		PCB-60	90.8 pg	
		PCB-96	43 pg	
		PCB-95	1000 pg	
		PCB-100/93	28.5 pg	
		PCB-102	75.8 pg	
		PCB-91	160 pg	
		PCB-84	235 pg	
		PCB-92	92.2 pg	
		PCB-113/90/101	527 pg	
		PCB-99	174 pg	
		PCB-108/119/86/97/125/87	252 pg	
		PCB-116/85	51 pg	
		PCB-110	359 pg	
		PCB-82	38.9 pg	
		PCB-136	122 pg	
		PCB-151/135	280 pg	
		PCB-144	26.9 pg	
		PCB-147/149	429 pg	
		PCB-132	72.4 pg	
		PCB-146	28.7 pg	
		PCB-153/168	160 pg	
		PCB-141	36.5 pg	
		PCB-163/138/129	152 pg	
		PCB-158	19.1 pg	
		PCB-179	62.4 pg	
		PCB-176	16.5 pg	
		PCB-187	36.1 pg	
		PCB-180/193	27.2 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-103	6/26/13	PCB-105	4.1 pg	13C-CE05-T042-BQ01
		PCB-118	8.18 pg	
		Total Mono-CBs	14.6 pg	
		Total Di-CBs	66.8 pg	
		Total Tri-CBs	56.1 pg	
		Total Tetra-CBs	71 pg	
		Total Penta-CBs	74 pg	
		Total Hexa-CBs	49.5 pg	
		Total Hepta-CBs	30.4 pg	
		Total Octa-CBs	7.78 pg	
		PCB-1	4.49 pg	
		PCB-2	4.27 pg	
		PCB-3	5.8 pg	
		PCB-4	4.7 pg	
		PCB-8	5.92 pg	
		PCB-11	51.4 pg	
		PCB-15	4.81 pg	
		PCB-30/18	7.42 pg	
		PCB-17	4.73 pg	
		PCB-16	3.65 pg	
		PCB-32	3.47 pg	
		PCB-26/29	2.03 pg	
		PCB-31	9.78 pg	
		PCB-28/20	13.5 pg	
		PCB-21/33	4.98 pg	
		PCB-22	3.3 pg	
		PCB-37	3.22 pg	
		PCB-50/53	1.36 pg	
		PCB-52	12.8 pg	
		PCB-69/49	5.9 pg	
		PCB-48	1.45 pg	
		PCB-44/47/65	13.6 pg	
		PCB-71/40	3.82 pg	
		PCB-64	3.6 pg	
		PCB-61/70/74/76	15.7 pg	
		PCB-66	8.81 pg	
		PCB-56	4.03 pg	
		PCB-95	10.5 pg	
		PCB-91	1.96 pg	
		PCB-84	3.96 pg	
		PCB-92	2.12 pg	
		PCB-113/90/101	12.1 pg	
		PCB-99	6.45 pg	
		PCB-108/119/86/97/125/87	7.89 pg	
		PCB-116/85	2.83 pg	
		PCB-110	14 pg	
		PCB-151/135	4.1 pg	
		PCB-147/149	10.6 pg	
		PCB-132	3.55 pg	
		PCB-146	1.51 pg	
		PCB-153/168	9.85 pg	
		PCB-141	3.45 pg	
		PCB-163/138/129	14.3 pg	
		PCB-128/166	2.16 pg	
		PCB-179	1.81 pg	
		PCB-187	5.5 pg	
		PCB-183	2.08 pg	
		PCB-174	5.25 pg	
		PCB-177	2.97 pg	
		PCB-180/193	9.45 pg	
		PCB-170	3.37 pg	
		PCB-198/199	3.82 pg	
		PCB-194	3.96 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-BM01	PCB-2	362 pg	362U pg
	PCB-11	11900 pg	11900U pg
13C-CE05-T042-BM02	Total Mono-CBs	3410 pg	3410U pg
	Total Di-CBs	105000 pg	105000U pg
	Total Tri-CBs	460000 pg	460000U pg
	Total Tetra-CBs	279000 pg	279000U pg
	PCB-1	2130 pg	2130U pg
	PCB-2	517 pg	517U pg
	PCB-3	764 pg	764U pg
	PCB-9	2260 pg	2260U pg
	PCB-7	1220 pg	1220U pg
	PCB-6	8020 pg	8020U pg
	PCB-5	801 pg	801U pg
	PCB-8	35800 pg	35800U pg
	PCB-11	5970 pg	5970U pg
	PCB-13/12	3020 pg	3020U pg
	PCB-15	17400 pg	17400U pg
	PCB-19	10200 pg	10200U pg
	PCB-30/18	83100 pg	83100U pg
	PCB-17	38100 pg	38100U pg
	PCB-27	6780 pg	6780U pg
	PCB-24	1380 pg	1380U pg
	PCB-16	45100 pg	45100U pg
	PCB-32	25500 pg	25500U pg
	PCB-34	395 pg	395U pg
	PCB-23	124 pg	124U pg
	PCB-26/29	16200 pg	16200U pg
	PCB-25	7920 pg	7920U pg
	PCB-31	70600 pg	70600U pg
	PCB-28/20	73600 pg	73600U pg
	PCB-21/33	42900 pg	42900U pg
	PCB-22	27200 pg	27200U pg
	PCB-39	436 pg	436U pg
	PCB-35	654 pg	654U pg
	PCB-37	9570 pg	9570U pg
	PCB-50/53	14000 pg	14000U pg
	PCB-45	14500 pg	14500U pg
	PCB-46	5730 pg	5730U pg
	PCB-52	50000 pg	50000U pg
	PCB-43	2720 pg	2720U pg
	PCB-69/49	29400 pg	29400U pg
	PCB-48	12600 pg	12600U pg
	PCB-44/47/65	47300 pg	47300U pg
	PCB-59/62/75	4440 pg	4440U pg
	PCB-42	12600 pg	12600U pg
	PCB-41	5400 pg	5400U pg
	PCB-71/40	19600 pg	19600U pg
	PCB-64	15400 pg	15400U pg
	PCB-67	753 pg	753U pg
	PCB-63	642 pg	642U pg
	PCB-61/70/74/76	20100 pg	20100U pg
	PCB-96	405 pg	405U pg
	PCB-136	1070 pg	1070U pg
	PCB-179	542 pg	542U pg
	PCB-176	99.6 pg	99.6U pg
	PCB-187	837 pg	837U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-BN01	PCB-2 PCB-3 PCB-11	496 pg 765 pg 12500 pg	496U pg 765U pg 12500U pg
13C-CE05-T042-BN02	Total Mono-CBs PCB-2 PCB-3 PCB-9 PCB-7 PCB-5 PCB-8 PCB-11 PCB-15 PCB-24 PCB-31 PCB-28/20 PCB-21/33 PCB-22 PCB-176	3440 pg 512 pg 755 pg 1990 pg 1090 pg 722 pg 31100 pg 5200 pg 15200 pg 1070 pg 54700 pg 57900 pg 33700 pg 20800 pg 77.3 pg	3440U pg 512U pg 755U pg 1990U pg 1090U pg 722U pg 31100U pg 5200U pg 15200U pg 1070U pg 54700U pg 57900U pg 33700U pg 20800U pg 77.3U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
MB_11113	^{13}C-PCB-15	115 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
13C-CE05-T042-BM02	^{13}C-PCB-155	149 (25-124)	PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Total Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T042-BP01	^{13}C-PCB-15	112 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T042-BN01	^{13}C-PCB-15	110 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T042-BN02	^{13}C-PCB-4 ^{13}C-PCB-15 ^{13}C-PCB-155 ^{13}C-PCB-189	108 (14-107) 129 (19-107) 166 (25-124) 119 (47-116)	PCB-4 PCB-10 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 PCB-189 Total Di-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BN01 13C-CE05-T042-BN02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5674	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A
13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BP01 13C-CE05-T042-BN01 13C-CE05-T042-BN02 13C-CE05-T042-BQ01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
13C-CE05-T042-BM01 13C-CE05-T042-BN01	Total Di-CBs Total Tri-CBs Total Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A
13C-CE05-T042-BM02 13C-CE05-T042-BN02	Total Tri-CBs Total Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
13C-CE05-T042-BP01	Total Tri-CBs Total Tetra-CBs Total Penta-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A
13C-CE05-T042-BQ01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs	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)	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.

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A5674

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5674	13C-CE05-T042-BM02	PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 Total Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5674	13C-CE05-T042-BP01 13C-CE05-T042-BN01	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5674	13C-CE05-T042-BN02	PCB-4 PCB-10 PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 PCB-189 Total Di-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5674	13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BP01 13C-CE05-T042-BN01 13C-CE05-T042-BN02 13C-CE05-T042-BQ01	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (EMPC) (k)
A5674	13C-CE05-T042-BM01 13C-CE05-T042-BM02 13C-CE05-T042-BP01 13C-CE05-T042-BN01 13C-CE05-T042-BN02 13C-CE05-T042-BQ01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	A	Compound quantitation (exceeded range) (q)
A5674	13C-CE05-T042-BM01 13C-CE05-T042-BN01	Total Di-CBs Total Tri-CBs Total Tetra-CBs	J (all detects) J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5674	13C-CE05-T042-BM02 13C-CE05-T042-BN02	Total Tri-CBs Total Tetra-CBs	J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)
A5674	13C-CE05-T042-BP01	Total Tri-CBs Total Tetra-CBs Total Penta-CBs	J (all detects) J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)
A5674	13C-CE05-T042-BQ01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs Total Hexa-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5674

No Sample Data Qualified in this SDG

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5674

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5674	13C-CE05-T042-BM01	PCB-2 PCB-11	362U pg 11900U pg	A	be

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5674	13C-CE05-T042-BM02	Total Mono-CBs	3410U pg	A	be
		Total Di-CBs	105000U pg		
		Total Tri-CBs	460000U pg		
		Total Tetra-CBs	279000U pg		
		PCB-1	2130U pg		
		PCB-2	517U pg		
		PCB-3	764U pg		
		PCB-9	2260U pg		
		PCB-7	1220U pg		
		PCB-6	8020U pg		
		PCB-5	801U pg		
		PCB-8	35800U pg		
		PCB-11	5970U pg		
		PCB-13/12	3020U pg		
		PCB-15	17400U pg		
		PCB-19	10200U pg		
		PCB-30/18	83100U pg		
		PCB-17	38100U pg		
		PCB-27	6780U pg		
		PCB-24	1380U pg		
		PCB-16	45100U pg		
		PCB-32	25500U pg		
		PCB-34	395U pg		
		PCB-23	124U pg		
		PCB-26/29	16200U pg		
		PCB-25	7920U pg		
		PCB-31	70600U pg		
		PCB-28/20	73600U pg		
		PCB-21/33	42900U pg		
		PCB-22	27200U pg		
		PCB-39	436U pg		
		PCB-35	654U pg		
		PCB-37	9570U pg		
		PCB-50/53	14000U pg		
		PCB-45	14500U pg		
		PCB-46	5730U pg		
		PCB-52	50000U pg		
		PCB-43	2720U pg		
		PCB-69/49	29400U pg		
		PCB-48	12600U pg		
		PCB-44/47/65	47300U pg		
		PCB-59/62/75	4440U pg		
		PCB-42	12600U pg		
		PCB-41	5400U pg		
		PCB-71/40	19600U pg		
		PCB-64	15400U pg		
		PCB-67	753U pg		
		PCB-63	642U pg		
		PCB-61/70/74/76	20100U pg		
		PCB-96	405U pg		
		PCB-136	1070U pg		
		PCB-179	542U pg		
		PCB-176	99.6U pg		
		PCB-187	837U pg		
A5674	13C-CE05-T042-BN01	PCB-2	496U pg	A	be
		PCB-3	765U pg		
		PCB-11	12500U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5674	13C-CE05-T042-BN02	Total Mono-CBs	3440U pg	A	be
		PCB-2	512U pg		
		PCB-3	755U pg		
		PCB-9	1990U pg		
		PCB-7	1090U pg		
		PCB-5	722U pg		
		PCB-8	31100U pg		
		PCB-11	5200U pg		
		PCB-15	15200U pg		
		PCB-24	1070U pg		
		PCB-31	54700U pg		
		PCB-28/20	57900U pg		
		PCB-21/33	33700U pg		
		PCB-22	20800U pg		
		PCB-176	77.3U pg		

LDC #: 30206A31 **VALIDATION COMPLETENESS WORKSHEET** Date: 8-20-13
SDG #: A5674 Full Page: 1 of 1
Laboratory: SGS-Analytical Perspectives Reviewer: Jm
2nd Reviewer: CL

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Routine calibration/~~ICV~~	A	≤ 30/50
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	~~A~~ SW TM 10/28/14	
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	*

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: 4 DUFIS / 2 Filters

1	13C-CE05-T042-BM01	11		21		31	
2	13C-CE05-T042-BM02	12		22		32	
3	13C-CE05-T042-BP01	13		23		33	
4	13C-CE05-T042-BN01	14		24		34	
5	13C-CE05-T042-BN02	15		25		35	
6	13C-CE05-T042-BQ01	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20	MB1-11113	30		40	

* 13C-CE05-T042-XR03-101 (A5678)
13C-CE05-T042-XR04-101 (A5678)
13C-CE05-T042-XR02-101 (A5678)
13C-CE05-T042-XR03-103 (A5678)
13C-CE05-T042-XR04-103 (A5678)
13C-CE05-T042-XR02-103 (A5678)

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: 9m
2nd Reviewer: 9

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

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?
Blank extraction date: 07/08/13 **Blank analysis date:** 07/29/13 **Associated samples:** All >5x
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1_111~~29~~ 13	5x									
PCB-77	4.33	21.7									
PCB-105	9.41	47.1									
PCB-118	28.3	141.5									
Total Mono-CBs	77.5	388									
Total Di-CBs	1180*	5900									
Total Tri-CBs	3360	16800									
Total Tetra-CBs	2370	11850									
Total Penta-CBs	687*	3435									
Total Hexa-CBs	159*	795									
Total Hepta-CBs	23.8*	119									
PCB-1	24.9	125									
PCB-2	23.3	117									
PCB-3	29.3	147									
PCB-4	92.9	465									
PCB-10	6.09	30									
PCB-9	17.5*	88									
PCB-7	12.6	63									
PCB-6	55.6	278									
PCB-5	6.04	30									
PCB-8	290	1450									

2084

Compound	Blank ID		Sample Identification								
	MB1_111~~29~~ 13	5x									
PCB-11	517	2585									
PCB-13/12	28.5	143									
PCB-15	158	790									
PCB-19	39	195									
PCB-30/18	487	2435									
PCB-17	241	1205									
PCB-27	37.6	188									
PCB-24	9.36	47									
PCB-16	288	1440									
PCB-32	167	835									
PCB-34	2.21	11									
PCB-26/29	118	590									
PCB-25	52.8	264									
PCB-31	574	2870									
PCB-28/20	605	3025									
PCB-21/33	380	1900									
PCB-22	229	1145									
PCB-39	3.57	18									
PCB-35	10.8	54.0									
PCB-37	113	565									
PCB-54	1.58	7.9									
PCB-50/53	72.1	361									
PCB-45	89.8	449									
PCB-51	27	135									
PCB-46	36.7	184									
PCB-52	446	2230									
PCB-43	20.2	101									

3084

Compound	Blank ID		Sample Identification								
	MB1_111~~29~~ 13	5x									
PCB-69/49	226	1130									
PCB-48	107	535									
PCB-44/47/65	383	1915									
PCB-59/62/75	35	175									
PCB-42	104	520									
PCB-41	55.7	279									
PCB-71/40	151	755									
PCB-64	133	665									
PCB-68	3.52	18									
PCB-67	7.64	38.2									
PCB-63	6.93	34.7									
PCB-61/70/74/76	262	1310									
PCB-66	116	580									
PCB-56	50.2	251									
PCB-60	28.5	143									
PCB-96	3.03	15.2									
PCB-95	166	830									
PCB-102	6.8	34.0									
PCB-91	22.3	112									
PCB-84	50.2	251									
PCB-92	23.7	119									
PCB-113/90/101	122	610									
PCB-83	6.98	34.9									
PCB-99	49	245									
PCB-108/119/86/97/125/87	71.2	356									
PCB-117	2.59	13.0									

4 of 4
TM

Compound	Blank ID		Sample Identification								
	MB1_111~~29~~ 13	5x									
PCB-116/85	13.2	66.0									
PCB-110	101	505									
PCB-82	9.54*	47.7									
PCB-109	1.82	9									
PCB-136	16.3	82									
PCB-151/135	27.8	139									
PCB-144	3.75	18.8									
PCB-147/149	47.3	237									
PCB-134	3.44	17.2									
PCB-132	15.7	78.5									
PCB-146	2.45*	12									
PCB-153/168	15.9	80									
PCB-141	5.55	28									
PCB-163/138/129	18.9	95									
PCB-158	2.44	12.2									
PCB-179	5.06*	25.3									
PCB-176	0.991	5.0									
PCB-187	7.07	35.4									
PCB-174	4.47	22									
PCB-180/193	6.22	31									

*EMPC

All contaminants within five times the method blank concentration were qualified as not detected.

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-77	7.84	39.2									
PCB-105	22.2	111									
PCB-118	52.8	264									
PCB-156/157	5.67*	28.35									
Total Mono-CBs	340	1700									
Total Di-CBs	3540	17700									
Total Tri-CBs	1020	5100									
Total Tetra-CBs	995*	4975									
Total Penta-CBs	489*	2445									
Total Hexa-CBs	177*	885									
Total Hepta-CBs	54.8*	274									
Total Octa-CBs	10.3*	51.5									
PCB-1	77.8	389									
PCB-2	149	745	362								
PCB-3	113	565									
PCB-4	76	380									
PCB-10	9.47	47.35									
PCB-9	10.8	54									
PCB-7	5.94	29.7									
PCB-6	28.8	144									
PCB-8	96.5	482.5									
PCB-11	3210	16050	11900								

2004
YM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-13/12	28.5	142.5									
PCB-15	72.8	364									
PCB-19	17	85									
PCB-30/18	127	635									
PCB-17	72.5	362.5									
PCB-27	14.2	71									
PCB-24	2.95	14.75									
PCB-16	63.5	317.5									
PCB-32	51.9	259.5									
PCB-26/29	36.3	181.5									
PCB-25	25	125									
PCB-31	172	860									
PCB-28/20	233	1165									
PCB-21/33	80.3	401.5									
PCB-22	59.3	296.5									
PCB-35	12.8	64									
PCB-37	48.5	242.5									
PCB-54	2.57*	12.85									
PCB-50/53	22.2	111									
PCB-45	13.9	69.5									
PCB-51	33.9	169.5									
PCB-46	7.53	37.65									
PCB-52	141	705									
PCB-69/49	87.4	437									
PCB-48	25.6	128									
PCB-44/47/65	167	835									
PCB-59/62/75	13.5	67.5									
PCB-42	33	165									

SUD4
Cym

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-41	10.1	50.5									
PCB-71/40	46.9	234.5									
PCB-64	44.4	222									
PCB-68	6.93	34.65									
PCB-67	3.49*	17.45									
PCB-63	4.34	21.7									
PCB-61/70/74/76	169	845									
PCB-66	98.9	494.5									
PCB-56	38.9	194.5									
PCB-60	16.8	84									
PCB-103	2.63	13.15									
PCB-95	58.8	294									
PCB-100/93	5.51	27.55									
PCB-102	4.42*	22.1									
PCB-91	11.3	56.5									
PCB-84	24.4	122									
PCB-92	14.1	70.5									
PCB-113/90/101	77.8	389									
PCB-99	44.7	223.5									
PCB-108/119/86/97/125/87	50.8	254									
PCB-117	3.94	19.7									
PCB-116/85	9.82*	49.1									
PCB-110	87.9	439.5									
PCB-82	9.88	49.4									
PCB-107/124	3.36	16.8									
PCB-109	5.05	25.25									
PCB-136	7.37	36.85									
PCB-151/135	15.3	76.5									

4 of 4

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-144	2.3	11.5									
PCB-147/149	35.8	179									
PCB-132	12	60									
PCB-146	4.24	21.2									
PCB-153/168	29.8	149									
PCB-141	5.86*	29.3									
PCB-164	2.24*	11.2									
PCB-163/138/129	43.9	219.5									
PCB-158	3.99	19.95									
PCB-128/166	8.56	42.8									
PCB-179	3.54*	17.7									
PCB-187	8.78*	43.9									
PCB-183	4.53*	22.65									
PCB-174	8.99	44.95									
PCB-177	5.41	27.05									
PCB-171/173	3.25	16.25									
PCB-180/193	14.6	73									
PCB-170	5.64*	28.2									
PCB-198/199	5.22	26.1									
PCB-194	5.12*	25.6									

*EMPC

13C-CE05-T042-XR03-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 9m
2nd Reviewer: C

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-105	70.9*	354.5									
PCB-118	268	1340									
Total Mono-CBs	1520	7600	3410								
Total Di-CBs	33000	165000	105000								
Total Tri-CBs	160000*	800000	460000								
Total Tetra-CBs	71300*	356500	279000								
Total Penta-CBs	6880*	34400									
Total Hexa-CBs	2640	13200									
Total Hepta-CBs	353	1765									
PCB-1	732	3660	2130								
PCB-2	336	1680	517								
PCB-3	456	2280	764								
PCB-4	4060	20300									
PCB-10	170	850									
PCB-9	877	4385	2260								
PCB-7	471	2355	1220								
PCB-6	2820	14100	8020								
PCB-5	343	1715	801								
PCB-8	14200	71000	35800								
PCB-11	1830	9150	5970								
PCB-13/12	1060	5300	3020								
PCB-15	7220	36100	17400								

2004
TM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-19	2500	12500	10200								
PCB-30/18	28000	140000	83100								
PCB-17	13000	65000	38100								
PCB-27	2060	10300	6780								
PCB-24	551	2755	1380								
PCB-16	16000	80000	45100								
PCB-32	8170	40850	25500								
PCB-34	109	545	395								
PCB-23	48.6*	243	124								
PCB-26/29	5350	26750	16200								
PCB-25	2390	11950	7920								
PCB-31	25300	126500	70600								
PCB-28/20	26600	133000	73600								
PCB-21/33	16800	84000	42900								
PCB-22	9870	49350	27200								
PCB-39	147	735	436								
PCB-35	200	1000	654								
PCB-37	3140	15700	9570								
PCB-54	78.7	393.5									
PCB-50/53	3530	17650	14000								
PCB-45	4320	21600	14500								
PCB-51	1150	5750									
PCB-46	1680	8400	5730								
PCB-52	13500	67500	50000								
PCB-43	864	4320	2720								
PCB-69/49	7570	37850	29400								
PCB-48	4000	20000	12600								
PCB-44/47/65	12300	61500	47300								

3014
gm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-59/62/75	1230	6150	4440								
PCB-42	3400	17000	12600								
PCB-41	1890	9450	5400								
PCB-71/40	4970	24850	19600								
PCB-64	4200	21000	15400								
PCB-67	208	1040	753								
PCB-63	152*	760	642								
PCB-61/70/74/76	4120	20600	20100								
PCB-66	1610	8050									
PCB-56	360	1800									
PCB-60	189	945									
PCB-96	89.3*	446.5	405								
PCB-95	2390	11950									
PCB-102	141*	705									
PCB-91	350	1750									
PCB-84	492	2460									
PCB-92	184	920									
PCB-113/90/101	1170	5850									
PCB-99	330	1650									
PCB-108/119/86/97/125/87	513	2565									
PCB-110	828	4140									
PCB-82	60.8	304									
PCB-136	264	1320	1070								
PCB-151/135	576	2880									
PCB-144	60	300									
PCB-147/149	867	4335									
PCB-132	176	880									
PCB-153/168	318	1590									

4 of 4
GM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-141	90.1	450.5									
PCB-163/138/129	287	1435									
PCB-179	152	760	542								
PCB-176	33	165	99.6								
PCB-187	168	840	837								

*EMPC

13C-CE05-T042-XR04-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: TM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3 >5x

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-105	6.37	31.85									
PCB-118	16.2	81									
Total Mono-CBs	16.2*	81									
Total Di-CBs	66.4	332									
Total Tri-CBs	67.5*	337.5									
Total Tetra-CBs	86.2*	431									
Total Penta-CBs	119*	595									
Total Hexa-CBs	91.1*	455.5									
Total Hepta-CBs	82.6*	413									
Total Octa-CBs	19	95									
PCB-1	3.27*	16.35									
PCB-2	5.74	28.7									
PCB-3	7.16	35.8									
PCB-4	5.96	29.8									
PCB-9	2.79	13.95									
PCB-6	2.25	11.25									
PCB-8	7.31	36.55									
PCB-11	42	210									
PCB-15	6.08	30.4									
PCB-30/18	11	55									
PCB-17	5.94	29.7									
PCB-32	3.91	19.55									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-31	13.3	66.5									
PCB-28/20	17.1	85.5									
PCB-21/33	6.69	33.45									
PCB-22	4.06*	20.3									
PCB-37	5.43*	27.15									
PCB-52	17.6	88									
PCB-69/49	8.45	42.25									
PCB-48	2.37*	11.85									
PCB-44/47/65	15.3	76.5									
PCB-71/40	5.2	26									
PCB-64	4.17*	20.85									
PCB-61/70/74/76	18.3	91.5									
PCB-66	10.1	50.5									
PCB-56	4.71	23.55									
PCB-95	16.5	82.5									
PCB-84	5.82*	29.1									
PCB-113/90/101	20	100									
PCB-99	10.4	52									
PCB-108/119/86/97/125/87	15.5	77.5									
PCB-110	27.9	139.5									
PCB-136	2.09*	10.45									
PCB-151/135	8.11*	40.55									
PCB-147/149	21.5	107.5									
PCB-132	8.16	40.8									
PCB-153/168	20.3	101.5									
PCB-141	4.43*	22.15									
PCB-163/138/129	26.5*	132.5									
PCB-179	4.99	24.95									

SDB
JM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-187	13.4	67									
PCB-183	6.51*	32.55									
PCB-174	14.8	74									
PCB-177	7.51	37.55									
PCB-180/193	25.1	125.5									
PCB-170	10.3	51.5									
PCB-198/199	6.84	34.2									
PCB-196	5.82	29.1									
PCB-194	6.38	31.9									

*EMPC

13C-CE05-T042-XR02-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: CM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 4 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	4 (10x)								
PCB-105	224	1120									
PCB-118	528	2640									
Total Mono-CBs	562	2810									
Total Di-CBs	9270*	46350									
Total Tri-CBs	25500*	127500									
Total Tetra-CBs	14900*	74500									
Total Penta-CBs	5800*	29000									
Total Hexa-CBs	2050*	10250									
Total Hepta-CBs	199*	995									
PCB-1	190	950									
PCB-2	186	930	496								
PCB-3	185	925	765								
PCB-4	898	4490									
PCB-10	53.7	268.5									
PCB-9	148*	740									
PCB-7	90.6	453									
PCB-6	522	2610									
PCB-5	54.7	273.5									
PCB-8	2470	12350									
PCB-11	3670	18350	12500								
PCB-13/12	213	1065									
PCB-15	1140	5700									

2014
JM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	4 (10x)								
PCB-19	387	1935									
PCB-30/18	4070	20350									
PCB-17	1960	9800									
PCB-27	309	1545									
PCB-24	66.4	332									
PCB-16	2280	11400									
PCB-32	1240	6200									
PCB-34	15*	75									
PCB-26/29	867	4335									
PCB-25	413	2065									
PCB-31	4190	20950									
PCB-28/20	4510	22550									
PCB-21/33	2780	13900									
PCB-22	1670	8350									
PCB-35	58.3	291.5									
PCB-37	704	3520									
PCB-54	12.6	63									
PCB-50/53	533	2665									
PCB-45	687	3435									
PCB-51	187	935									
PCB-46	254	1270									
PCB-52	2780	13900									
PCB-43	138	690									
PCB-69/49	1470	7350									
PCB-48	691	3455									
PCB-44/47/65	2520	12600									
PCB-59/62/75	238	1190									
PCB-42	654	3270									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	4 (10x)								
PCB-41	374	1870									
PCB-71/40	953	4765									
PCB-64	854	4270									
PCB-67	41.8*	209									
PCB-63	41.7	208.5									
PCB-61/70/74/76	1510	7550									
PCB-66	625	3125									
PCB-56	218	1090									
PCB-60	113	565									
PCB-96	16.2*	81									
PCB-95	1110	5550									
PCB-102	53.5	267.5									
PCB-91	147	735									
PCB-84	343	1715									
PCB-92	161	805									
PCB-113/90/101	949	4745									
PCB-83	46.3	231.5									
PCB-99	372	1860									
PCB-108/119/86/97/125/87	605	3025									
PCB-116/85	118*	590									
PCB-110	1040	5200									
PCB-82	81.7	408.5									
PCB-136	121	605									
PCB-151/135	246	1230									
PCB-144	37*	185									
PCB-147/149	511	2555									
PCB-134	46.3	231.5									
PCB-132	197	985									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x	4 (10x)								
PCB-146	43.3*	216.5									
PCB-153/168	274	1370									
PCB-141	94.1	470.5									
PCB-163/138/129	402	2010									
PCB-158	38.4	192									
PCB-128/166	43.9*	219.5									
PCB-179	29.4*	147									
PCB-187	56.4	282									
PCB-183	26	130									
PCB-174	43*	215									
PCB-180/193	44.1*	220.5									

*EMPC

13C-CE05-T042-XR03-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: gm
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 5 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	5 (10x)								
PCB-105	54.1	270.5									
PCB-118	150	750									
Total Mono-CBs	739	3695	3440								
Total Di-CBs	16100	80500									
Total Tri-CBs	73200	366000									
Total Tetra-CBs	29600	148000									
Total Penta-CBs	3240*	16200									
Total Hexa-CBs	1330*	6650									
Total Hepta-CBs	142*	710									
PCB-1	339	1695									
PCB-2	173	865	512								
PCB-3	227	1135	755								
PCB-4	2030	10150									
PCB-10	95.4	477									
PCB-9	446	2230	1990								
PCB-7	241	1205	1090								
PCB-6	1360	6800									
PCB-5	152	760	722								
PCB-8	6770	33850	31100								
PCB-11	1190	5950	5200								
PCB-13/12	504	2520									
PCB-15	3270	16350	15200								

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	5 (10x)								
PCB-19	1140	5700									
PCB-30/18	13300	66500									
PCB-17	6070	30350									
PCB-27	958	4790									
PCB-24	222	1110	1070								
PCB-16	7510	37550									
PCB-32	3970	19850									
PCB-34	51.2	256									
PCB-26/29	2430	12150									
PCB-25	1060	5300									
PCB-31	11100	55500	54700								
PCB-28/20	11800	59000	57900								
PCB-21/33	7640	38200	33700								
PCB-22	4420	22100	20800								
PCB-39	65.7	328.5									
PCB-37	1450	7250									
PCB-54	35	175									
PCB-50/53	1440	7200									
PCB-45	1780	8900									
PCB-51	492	2460									
PCB-46	666	3330									
PCB-52	5570	27850									
PCB-43	340	1700									
PCB-69/49	3150	15750									
PCB-48	1660	8300									
PCB-44/47/65	5020	25100									
PCB-59/62/75	537	2685									
PCB-42	1440	7200									

30b4
Orm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	5 (10x)								
PCB-41	760	3800									
PCB-71/40	2110	10550									
PCB-64	1770	8850									
PCB-67	85.3	426.5									
PCB-63	73.7	368.5									
PCB-61/70/74/76	1720	8600									
PCB-66	678	3390									
PCB-56	153	765									
PCB-60	90.8	454									
PCB-96	43	215									
PCB-95	1000	5000									
PCB-100/93	28.5*	142.5									
PCB-102	75.8	379									
PCB-91	160	800									
PCB-84	235	1175									
PCB-92	92.2	461									
PCB-113/90/101	527	2635									
PCB-99	174	870									
PCB-108/119/86/97/125/87	252	1260									
PCB-116/85	51	255									
PCB-110	359	1795									
PCB-82	38.9	194.5									
PCB-136	122	610									
PCB-151/135	280	1400									
PCB-144	26.9	134.5									
PCB-147/149	429	2145									
PCB-132	72.4	362									
PCB-146	28.7	143.5									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x	5 (10x)								
PCB-153/168	160	800									
PCB-141	36.5*	182.5									
PCB-163/138/129	152*	760									
PCB-158	19.1	95.5									
PCB-179	62.4*	312									
PCB-176	16.5	82.5	77.3								
PCB-187	36.1*	180.5									
PCB-180/193	27.2*	136									

*EMPC

13C-CE05-T042-XR04-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: gm
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 6 >5x

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-105	4.1	20.5									
PCB-118	8.18	40.9									
Total Mono-CBs	14.6	73									
Total Di-CBs	66.8	334									
Total Tri-CBs	56.1*	280.5									
Total Tetra-CBs	71*	355									
Total Penta-CBs	74*	370									
Total Hexa-CBs	49.5	247.5									
Total Hepta-CBs	30.4*	152									
Total Octa-CBs	7.78	38.9									
PCB-1	4.49	22.45									
PCB-2	4.27	21.35									
PCB-3	5.8	29									
PCB-4	4.7	23.5									
PCB-8	5.92	29.6									
PCB-11	51.4	257									
PCB-15	4.81	24.05									
PCB-30/18	7.42	37.1									
PCB-17	4.73	23.65									
PCB-16	3.65	18.25									
PCB-32	3.47	17.35									
PCB-26/29	2.03	10.15									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-31	9.78	48.9									
PCB-28/20	13.5	67.5									
PCB-21/33	4.98	24.9									
PCB-22	3.3*	16.5									
PCB-37	3.22*	16.1									
PCB-50/53	1.36*	6.8									
PCB-52	12.8	64									
PCB-69/49	5.9	29.5									
PCB-48	1.45*	7.25									
PCB-44/47/65	13.6	68									
PCB-71/40	3.82	19.1									
PCB-64	3.6	18									
PCB-61/70/74/76	15.7	78.5									
PCB-66	8.81	44.05									
PCB-56	4.03*	20.15									
PCB-95	10.5	52.5									
PCB-91	1.96*	9.8									
PCB-84	3.96	19.8									
PCB-92	2.12	10.6									
PCB-113/90/101	12.1	60.5									
PCB-99	6.45	32.25									
PCB-108/119/86/97/125/87	7.89	39.45									
PCB-116/85	2.83	14.15									
PCB-110	14	70									
PCB-151/135	4.1	20.5									
PCB-147/149	10.6	53									
PCB-132	3.55	17.75									
PCB-146	1.51	7.55									

30113

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-153/168	9.85	49.25									
PCB-141	3.45	17.25									
PCB-163/138/129	14.3	71.5									
PCB-128/166	2.16	10.8									
PCB-179	1.81*	9.05									
PCB-187	5.5	27.5									
PCB-183	2.08*	10.4									
PCB-174	5.25	26.25									
PCB-177	2.97	14.85									
PCB-180/193	9.45	47.25									
PCB-170	3.37	16.85									
PCB-198/199	3.82	19.1									
PCB-194	3.96	19.8									

*EMPC

13C-CE05-T042-XR02-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: TM
2nd Reviewer: 9

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		MB1_11113	13C PCB-15	115 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		2	13C PCB-155	149 (25-124)	Jdets/P (see attached, +Total Hexa-CBs)
		3	13C PCB-15	112 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		4	13C PCB-15	110 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		5	13C PCB-4	108 (14-107)	Jdets/P (PCB-4, PCB-10)
			13C PCB-15	129 (19-107)	Jdets/P (see attached, +Total Di-CBs)
			13C PCB-155	166 (25-124)	Jdets/P (see attached, +Total Hexa-CBs)
			13C PCB-189	119 (47-116)	Jdets/P (PCB-189, +Total Hepta-CBs)

Table 3. Quantitation References for Analytes

2 of 2 pm

AP Quantitation References

ES PCB-1
PCB-1

ES PCB-3
PCB-2
PCB-3

ES PCB-4
PCB-4
PCB-10

ES PCB-15
PCB-9
PCB-7
PCB-6
PCB-5
PCB-8
PCB-14
PCB-11
PCB-13/12
PCB-15

ES PCB-19
PCB-19
PCB-30/18
PCB-17
PCB-27
PCB-24
PCB-16
PCB-32

ES PCB-37
PCB-34
PCB-23
PCB-26/29
PCB-25
PCB-31
PCB-28/20
PCB-21/33
PCB-22
PCB-36
PCB-39
PCB-38
PCB-35
PCB-37

ES PCB-54
PCB-54

ES PCB-77
PCB-77

ES PCB-81
PCB-52
PCB-73
PCB-43
PCB-69/49
PCB-48
PCB-44/47/65
PCB-59/62/75
PCB-42
PCB-41
PCB-71/40
PCB-64
PCB-72
PCB-68
PCB-57
PCB-58
PCB-67
PCB-63
PCB-61/70/74/76
PCB-66
PCB-55
PCB-56
PCB-60
PCB-80
PCB-79
PCB-78
PCB-50/53*
PCB-45*
PCB-51*
PCB-46*
PCB-81

ES PCB-104
PCB-104
PCB-96

ES PCB-105
PCB-105
PCB-127

ES PCB-114
PCB-122
PCB-114

ES PCB-118
PCB-118

ES PCB-123
PCB-103
PCB-94
PCB-95
PCB-100/93
PCB-102
PCB-98
PCB-88
PCB-91
PCB-84
PCB-89
PCB-121
PCB-92
PCB-113/90/101
PCB-83
PCB-99
PCB-112
PCB-108/119/86/97/125/87
PCB-117
PCB-116/85
PCB-110
PCB-115
PCB-82
PCB-111
PCB-120
PCB-107/124
PCB-109
PCB-123
PCB-106

ES PCB-126
PCB-126

ES PCB-155
PCB-155
PCB-152
PCB-150
PCB-136
PCB-145

ES PCB-153
PCB-148
PCB-151/135
PCB-154
PCB-144
PCB-147/149
PCB-134
PCB-143
PCB-139/140
PCB-131
PCB-142
PCB-132
PCB-133
PCB-165
PCB-146
PCB-161
PCB-153/168
PCB-141
PCB-130
PCB-137
PCB-164
PCB-163/138/129
PCB-160
PCB-158

ES PCB-156/157
PCB-156/157

ES PCB-167
PCB-128/166
PCB-159
PCB-162
PCB-167

ES PCB-169
PCB-169

ES PCB-188
PCB-188
PCB-179
PCB-184
PCB-176
PCB-186
PCB-178

ES PCB-180
PCB-175
PCB-187
PCB-182
PCB-183
PCB-185
PCB-174
PCB-177
PCB-181
PCB-171/173
PCB-172
PCB-192
PCB-180/193
PCB-191

ES PCB-170
PCB-170
PCB-190

ES PCB-189
PCB-189

ES PCB-202
PCB-202
PCB-201
PCB-204
PCB-197
PCB-200
PCB-198/199
PCB-196
PCB-203

ES PCB-205
PCB-195
PCB-194
PCB-205

ES PCB-206
PCB-206

ES PCB-208
PCB-208
PCB-207

ES PCB-209
PCB-209

Note: Quantitation Reference for those congeners without a Labeled Standard is based on the nearest ES @ the same level of chlorination within the same function.
Quantitation of those congeners within a function where there is no ES is based on the nearest ES in the other functions of that homologue .
** Based on analytical observations PCB's 50/53, 45,51& 46 were moved to ES 81 when the additional ES's were added.*

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Page: 1 of 1
Reviewer: CM
2nd Reviewer: K

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	~~all~~ 1,2,4,5	TEXT (all compounds + Total Mono- through Nona-CBs)

Notes:

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: YM
2nd Reviewer: d

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

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	Compound	Finding	Associated Samples	Qualifications
			results reported as EMPC	All	EMPC-J/A (k)
			Congeners flagged "E" exceed upper calibration range	1, 4	Jdets/A (+Total Di-CBs,Tri-CBs,Tetra-CBs) (q)
				2, 5	Jdets/A (+Total Tri-CBs,Tetra-CBs)
				3	Jdets/A (+Total Tri-CBs,Tetra-CBs,Penta-CBs)
				6	Jdets/A (+Total Di-CBs,Tri-CBs,Tetra-CBs,Penta-CBs, Hexa-CBs)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30206A31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9m
2nd Reviewer: 9

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

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

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) 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	MM6 ICAL	12/14/12	PCB 77 (^{13}C-PCB 77)	1.25	1.25	1.24	1.24	5.4	5.3
			PCB 105 (^{13}C-PCB 105)	1.06	1.06	1.05	1.04	2.1	2.1
			PCB 167 (^{13}C-PCB 167)	1.18	1.18	1.20	1.20	1.6	1.6
			PCB 189 (^{13}C-PCB 189)	1.12	1.11	1.11	1.11	2.1	1.9
2			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 30206A31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

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

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

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	130729V04	7-29-13	PCB 77 (^{13}C-PCB 77)	1.25	1.07	1.07	-14.3	14.5
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.99	-5.8	6.1
			PCB 167 (^{13}C-PCB 167)	1.18	0.99	0.99	-16.0	16.2
			PCB 189 (^{13}C-PCB 189)	1.12	1.04	1.04	-6.4	6.85
2			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					
3			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					
4			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					

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 #: 30206A31

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 5, PCB-156/157:

Conc. = $\frac{(1.29e5)(4000)(1)}{(3.09e6)(1.00)(1)(\quad)}$

= 167pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5674 SITE: CWCM High Vol. #2, LPR
LAB: SGS-Analytical Perspectives

CHECKLIST

I.0 **Data Completeness and Deliverables**

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 **Reporting Requirements and Deliverables**

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] ___ ___

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] ___ ___

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] ___ ___

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] ___ ___

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [✓] ___ ___

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10.000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in **Table 8** (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [ ] ___ [✓]

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [ ] ___ ✓

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] [✓] ___

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [ ] ___ [✓]

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [✓] [Ø] ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)CI}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [___] ___ ___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [✓] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ✓ [ ] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [ ] ___ ✓

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [✓] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ ✓

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [ ] ✓ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ___ ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ___

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? ☑ ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? ☐ ___ ___

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set.

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS standard analyzed at the required frequency? ☑ ___ ___

13.4 Did the ~~OPR~~ BCS standard passed the concentration criteria limits in ~~outline below?~~ QAPP ☑ ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [___] ✓ ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [___] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [___] ✓ ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [___] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ___

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ___ ___

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ ___

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206B21_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 26, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS-Analytical Perspectives
Sample Delivery Group (SDG):	A5678

Sample Identification

13C-CE05-T042-XR03-101
13C-CE05-T042-XR04-101
13C-CE05-T042-XR02-101
13C-CE05-T042-XR03-103
13C-CE05-T042-XR04-103
13C-CE05-T042-XR02-103
13C-CE05-T175-AM01
13C-CE05-T175-AM02
13C-CE05-T175-AP01

Introduction

This data review covers 6 polyurethane foam (PUF) samples and 3 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, December 2010) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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 PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compound	Flag	A or P
7/16/13 (130716P2-01)	1,2,3,4,6,7,8-HpCDF	57.3 ng/mL (45-55)	13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR02-101 MB1_11113	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
7/16/13 (130716P2-13)	1,2,3,4,6,7,8-HpCDF	56.5 ng/mL (45-55)	All samples from SDG A5678	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P
7/17/13	1,2,3,4,6,7,8-HpCDF	59.6 ng/mL (45-55)	13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103 13C-CE05-T042-XR02-103 13C-CE05-T175-AM01 13C-CE05-T175-AM02 13C-CE05-T175-AP01	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

V. Blanks

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

Samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, 13C-CE05-T042-XR02-103, and samples N10-CE05-TNNE-XR02, N10-CE05-TNNE-XR03, and N10-CE05-TNNE-XR04 (all three from SDG A5668) were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	OCDD Total TCDD Total HpCDD	9.1 pg 1.17 pg 1.81 pg	No associated samples in this SDG
13C-CE05-T042-XR04-101	6/26/13	OCDD	3.14 pg	No associated samples in this SDG
13C-CE05-T042-XR02-101	6/26/13	OCDD	3.59 pg	No associated samples in this SDG
13C-CE05-T042-XR03-103	6/26/13	OCDD Total TCDD	3.32 pg 0.916 pg	No associated samples in this SDG
13C-CE05-T042-XR02-103	6/26/13	OCDD	5.77 pg	No associated samples in this SDG
N10-CE05-TNNE-XR03	6/25/13	OCDD Total HpCDD	6.8 pg 1.29 pg	13C-CE05-T175-AM01

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR04	6/25/13	1,2,3,4,6,7,8-HpCDD OCDD Total HpCDD	1.46 pg 4.72 pg 1.46 pg	13C-CE05-T175-AM02

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

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within QC limits.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103 13C-CE05-T175-AM01 13C-CE05-T175-AM02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

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

Sample	Compound	Flag	A or P
All samples in SDG A5678	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5678

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5678	13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR02-101 13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103 13C-CE05-T042-XR02-103 13C-CE05-T175-AM01 13C-CE05-T175-AM02 13C-CE05-T175-AP01	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects) J (all detects)	P	Continuing calibration (concentration) (c)
A5678	13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR02-101 13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103 13C-CE05-T042-XR02-103 13C-CE05-T175-AM01 13C-CE05-T175-AM02 13C-CE05-T175-AP01	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (k)

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5678

No Sample Data Qualified in this SDG

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5678

No Sample Data Qualified in this SDG

LDC #: 30206B21
SDG #: A5678
Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 8-20-13
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤20/35
IV.	Routine calibration/~~ICV~~	SW	QC limits
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	~~A~~ SW	10/28/14
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	EB=1-6 (5=ND)*

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: 6 PUFs / 3 filters

1	13C-CE05-T042-XR03-101 ✓	11		21		31	
2	13C-CE05-T042-XR04-101 ✓	12		22		32	
3	13C-CE05-T042-XR02-101 ✓	13		23		33	
4	13C-CE05-T042-XR03-103 ✓	14		24		34	
5	13C-CE05-T042-XR04-103 ✓	15		25		35	
6	13C-CE05-T042-XR02-103 ✓	16		26		36	
7	13C-CE05-T175-AM01 ✓	17		27		37	
8	13C-CE05-T175-AM02 ✓	18		28		38	
9	13C-CE05-T175-AP01 ✓	19		29		39	
10		20		30	MBL-11113	40	

Notes: * N10-CE05-TNNE-XR02 (A5668=ND), N10-CE05-TNNE-XR03 (A5668), N10-CE05-TNNE-XR04 (A5668)

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria?

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	07/16/13	130716P2-01	O	57.3 (45-55)		MB1_11113, 1-3	Jdets/P (O, Y) (c)
	07/16/13	130716P2-13	O	56.5 (45-55)		All	Jdets/P (O, Y) (c)
	07/17/13	130716P3-11	O	59.6 (45-55)		4-9	Jdets/P (O, Y) (c)

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-101	5X								
G	9.1*	45.5								
R	1.17*	5.9								
U	1.81*	9.1								

* EMPC

13C-CE05-T042-XR03-101 (A5678)

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:\Field Blanks\30206B21_13C-CE05-T042-XR03-101.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR04-101	5X								
G	3.14*	15.7								

* EMPC

13C-CE05-T042-XR04-101 (A5678)

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:\Field Blanks\30206B21_13C-CE05-T042-XR04-101.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-101	5X								
G	3.59*	18.0								

* EMPC

13C-CE05-T042-XR02-101 (A5678)

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:\Field Blanks\30206B21_13C-CE05-T042-XR02-101.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-103	5X								
G	3.32*	16.6								
R	0.916	4.6								

* EMPC

13C-CE05-T042-XR03-103 (A5678)

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:\Field Blanks\30206B21_13C-CE05-T042-XR03-103.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-103	5X								
G	5.77	28.9								

* EMPC

13C-CE05-T042-XR02-103 (A5678)

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:\Field Blanks\30206B21_13C-CE05-T042-XR02-103.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 7 >5x

Compound	Blank ID	Sample Identification								
	N10-CE05-TNNE-XR03	5X								
G	6.8	34.0								
U	1.29	6.5								

* EMPC

N10-CE05-TNNE-XR03 (A5668)

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:\Field Blanks\30206B21_N10-CE05-TNNE-XR03.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 8 >5x

Compound	Blank ID	Sample Identification								
	N10-CE05-TNNE-XR04	5X								
F	1.46	7.3								
G	4.72	23.6								
U	1.46	7.3								

* EMPC

N10-CE05-TNNE-XR04 (A5668)

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:\Field Blanks\30206B21_N10-CE05-TNNE-XR04.wpd4

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: GR
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	1,2,4,5 ~~all~~ 7,8	TEXT

Notes: See Attached

LDC #: 30206B21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: CM
2nd Reviewer: CM

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

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	Compound	Finding	Associated Samples	Qualifications
			EMPC results	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 31206B21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: 9m
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	MM1 ICAL	02/13/13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.97	0.97	0.98	0.98	4.5	4.5
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.06	1.06	1.07	1.07	4.1	4.2
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.04	1.04	1.03	1.03	5.3	5.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.02	1.02	1.02	1.02	4.8	4.75
			OCDF (^{13}C-OCDF)	1.00	1.00	1.01	1.01	5.6	5.6
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 30206B21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130716P2-01	7-16-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.8	11.8	18	18
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.5	10.5	5	5
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	54.3	54.1	9	9
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52	52	4	4
			OCDF (^{13}C-OCDF)	100	116	116	16	16
2	130716P2-13	7-16-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.6	11.6	16	16
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.3	10.3	3	3
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	56.7	56.5	13	13
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52.7	52.9	5	5
			OCDF (^{13}C-OCDF)	100	115	115	15	15
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				

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 #: 30206B21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 3, G:

Conc. = $\frac{(6.86e4)(4000)(1)}{(6.51e7)(1.17)(1)(\ )}$

= 3.59 pg

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5678 LAB: SGS Analytical Perspectives
SITE: CWCM High Vol #2, LPR

I.0 Data Completeness and Deliverables

		YES	NO	N/A
1.1	Does the Traffic Report or Field Chain of Custody list all samples?	[✓]		
1.2	Is the Case Narrative present?	[✓]		
1.3	Are the Case Number and SDG numbers contained in the case narrative?	[✓]		
1.4	Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data?		[✓]	

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

	YES	NO	N/A
a. Sample Data Summary (Form I CDD-1)	[✓]		
b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2)	[✓]		
c. Second Column Confirmation Summary (Form I, CDD-3)			[✓]
d. Total Homologue Concentration Summary (Form II CDD)	[✓]		
e. CDD/CDF Spiked Sample Summary (Form III CDD-1)	[✓]		
f. CDD/CDF Duplicate Sample Summary (Form III CDD-2)			[✓]
g. CDD/CDF Method Blank Summary (Form IV-CDD)	[✓]		

	YES	NO	N/A
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	[✓]	___	___
I. Chromatographic Resolution Summary (Form V CDD-2)	[✓]	___	___
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	[✓]	___	___
k. Initial Calibration (Form VI, CDD-1, CDD-2)	[✓]	___	___
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	[✓]	___	___

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

	YES	NO	N/A
a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number	[✓]	___	___
b. Percent peak resolution valley	[✓]	___	___
c. Window Defining Mixture raw data	[✓]	___	___
d. SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	[✓]	___	___
e. Integrated area and peak height must be listed for all peaks 2.5 times above background	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

	YES	NO	N/A
a. Chain of Custody Records	[✓]	___	___
b. Sample Shipment Records	[✓]	___	___
c. Sample log-in sheets	[✓]	___	___
d. GC/MS Standard and Sample Run Log in chronological order	[✓]	___	___
e. Sample Extraction Log	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the

YES NO N/A

effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [/] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, 30 days from VTSR to extraction? [/] ___ ___

b. For soil/sediment samples, 30 days from VTSR to extraction? [___] ___ /

c. For fish and tissue samples, one (1) year from VTSR to extraction? [___] ___ /

d. For all samples 45 days from time of extraction to time of analysis? [/] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects
as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning of every 12 hour period. Was this performed accordingly? [/] ___ ___

YES NO N/A

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] ___ ___

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] ___ ___

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining **Solution** and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9-HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated

and the percent coefficient of variation must be 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve

YES NO N/A

must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [___] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be

YES NO N/A

quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [___] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [___] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in Table 8 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:
For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$(A_{l1} + A_{l2}) \times Q_n$

For labeled analytes, Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2,3,7,8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [✓] ___ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4- TCDD and $^{13}C_{12}$1,2,3,7,8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) [✓] ___ ___

YES NO N/A

6.2 Isomer Specificity Test Standard

6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613**B**, Section **15**.4.2.2) [✓] ___ ___

6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. [___] ___ ✓

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.I Were the following MS/DS conditions used?

7.1.1 SIM data were acquired for each of the ions listed in Table 8 (see analytical method)

		YES	NO	N/A
	including diphenylether interfering ions.	[✓]	___	___
7.2	Were the following identification criteria met?			
7.2.1	For the 2,3,7,8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract, must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]	___	___
7.2.2	For non-2,3,7,8 substituted compounds (tetra through octa) found present, the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B, Section 16.4)	[✓]	___	___
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte, the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B, Section 16.1)	[✓]	___	___
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.5	The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[___]	[✓]	___
7.2.7	The relative retention time of the unlabeled 2,3,7,8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]	___	___
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup, and internal standard must be met (Table 9 - Method 1613B).	[✓]	___	___
7.2.9	The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]	___	___

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive, high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]	___	___

ACTION:
1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.
2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

YES NO N/A

A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance
ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6. and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_I}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_I}{V \times (A_{I1} + A_{I2}) \times RR}$$

YES NO N/A

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_l = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range **listed on Table 6 of the Analytical method?** [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [✓] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

	YES	NO	N/A
7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method?	[___]	___	___/

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present? [___/] ___ ___

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria? [___/] ___ ___

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$EMPC\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$EMPC\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [___] ___ ✓

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the

YES NO N/A

concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [___] ___ ___

11.3 If not, were samples reanalyzed? [___] ___ ✓

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non- detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

YES NO N/A

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [___] ___ ✓

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [___] ___ ✓

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [___] ___ ✓

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [___] ___ ✓

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

YES NO N/A

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section **9**.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table **6** of the method? [___] ___ ✓

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12

YES NO N/A

hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~Table 6 of the method~~ QAPP? [✓] ___ ___

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [___] ___ [✓]

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 μg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 μg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 μg/L or any other analyte at levels > 1 µg/L? [___] [✓] ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines

YES NO N/A

outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [___] ___ ___

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [___] ___ ___

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [___] ___ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [___] ___ ___

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

		YES	NO	N/A
20.1	Was a matrix spike analyzed at the frequency of one per SDG samples per matrix?	[___]	/	___
20.2	Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent?	[___]	___	/

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3	Was a matrix spike duplicate analyzed as per section 11.1 and 11.2?	[___]	___	/

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1	For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency?	[___]	/	___
21.2	Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes?	[___]	___	/

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills",

YES NO N/A

Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision **B**- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October **1994**

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin", 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF", National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016, Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206B31_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 26, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5678

Sample Identification

13C-CE05-T042-XR03-101
13C-CE05-T042-XR04-101
13C-CE05-T042-XR02-101
13C-CE05-T042-XR03-103
13C-CE05-T042-XR04-103
13C-CE05-T042-XR02-103
13C-CE05-T175-AM01
13C-CE05-T175-AM02
13C-CE05-T175-AP01

Introduction

This data review covers 6 polyurethane foam (PUF) samples and 3 filter samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 Toxic/LOC and labeled compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing 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 PCBs 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
MB_11113	7/8/13	PCB-77	4.33 pg	All samples in SDG A5678
		PCB-105	9.41 pg	
		PCB-118	28.3 pg	
		Total Mono-CBs	77.5 pg	
		Total Di-CBs	1180 pg	
		Total Tri-CBs	3360 pg	
		Total Tetra-CBs	2370 pg	
		Total Penta-CBs	687 pg	
		Total Hexa-CBs	159 pg	
		Total Hepta-CBs	23.8 pg	
		PCB-1	24.9 pg	
		PCB-2	23.3 pg	
		PCB-3	29.3 pg	
		PCB-4	92.9 pg	
		PCB-10	6.09 pg	
		PCB-9	17.5 pg	
		PCB-7	12.6 pg	
		PCB-6	55.6 pg	
		PCB-5	6.04 pg	
		PCB-8	290 pg	
		PCB-11	517 pg	
		PCB-13/12	28.5 pg	
		PCB-15	158 pg	
		PCB-19	39 pg	
		PCB-30/18	487 pg	
		PCB-17	241 pg	
		PCB-27	37.6 pg	
		PCB-24	9.36 pg	
		PCB-16	288 pg	
		PCB-32	167 pg	
		PCB-34	2.21 pg	
		PCB-26/29	118 pg	
		PCB-25	52.8 pg	
		PCB-31	574 pg	
		PCB-28/20	605 pg	
		PCB-21/33	380 pg	
		PCB-22	229 pg	
		PCB-39	3.57 pg	
		PCB-35	10.8 pg	
		PCB-37	113 pg	
		PCB-54	1.58 pg	
		PCB-50/53	72.1 pg	
		PCB-45	89.8 pg	
		PCB-51	27 pg	
		PCB-46	36.7 pg	
		PCB-52	446 pg	
		PCB-43	20.2 pg	
		PCB-69/49	226 pg	
		PCB-48	107 pg	
		PCB-44/47/65	383 pg	
		PCB-59/62/75	35 pg	
		PCB-42	104 pg	
		PCB-41	55.7 pg	
		PCB-71/40	151 pg	
		PCB-64	133 pg	
		PCB-68	3.52 pg	
		PCB-67	7.64 pg	
		PCB-63	6.93 pg	
		PCB-61/70/74/76	262 pg	
		PCB-66	116 pg	
		PCB-56	50.2 pg	
		PCB-60	28.5 pg	
		PCB-96	3.03 pg	
		PCB-95	166 pg	
		PCB-102	6.8 pg	
		PCB-91	22.3 pg	
		PCB-84	50.2 pg	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB_11113 (continued)	7/8/13	PCB-92	23.7 pg	All samples in SDG A5678
		PCB-113/90/101	122 pg	
		PCB-83	6.98 pg	
		PCB-99	49 pg	
		PCB-108/119/86/97/125/87	71.2 pg	
		PCB-117	2.59 pg	
		PCB-116/85	13.2 pg	
		PCB-110	101 pg	
		PCB-82	9.54 pg	
		PCB-109	1.82 pg	
		PCB-136	16.3 pg	
		PCB-151/135	27.8 pg	
		PCB-144	3.75 pg	
		PCB-147/149	47.3 pg	
		PCB-134	3.44 pg	
		PCB-132	15.7 pg	
		PCB-146	2.45 pg	
		PCB-153/168	15.9 pg	
		PCB-141	5.55 pg	
		PCB-163/138/129	18.9 pg	
		PCB-158	2.44 pg	
		PCB-179	5.06 pg	
		PCB-176	0.991 pg	
		PCB-187	7.07 pg	
		PCB-174	4.47 pg	
		PCB-180/193	6.22 pg	

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 with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-XR03-101	PCB-77	7.84 pg	7.84U pg
	PCB-105	22.2 pg	22.2U pg
	PCB-118	52.8 pg	52.8U pg
	Total Mono-CBs	340 pg	340U pg
	Total Di-CBs	3540 pg	3540U pg
	Total Tri-CBs	1020 pg	1020U pg
	Total Tetra-CBs	995 pg	995U pg
	Total Penta-CBs	489 pg	489U pg
	Total Hexa-CBs	177 pg	177U pg
	Total Hepta-CBs	54.8 pg	54.8U pg
	PCB-1	77.8 pg	77.8U pg
	PCB-3	113 pg	113U pg
	PCB-4	76 pg	76U pg
	PCB-10	9.47 pg	9.47U pg
	PCB-9	10.8 pg	10.8U pg
	PCB-7	5.94 pg	5.94U pg
	PCB-6	28.8 pg	28.8U pg
	PCB-8	96.5 pg	96.5U pg
	PCB-13/12	28.5 pg	28.5U pg
	PCB-15	72.8 pg	72.8U pg
	PCB-19	17 pg	17U pg
	PCB-30/18	127 pg	127U pg
	PCB-17	72.5 pg	72.5U pg
	PCB-27	14.2 pg	14.2U pg
	PCB-24	2.95 pg	2.95U pg
	PCB-16	63.5 pg	63.5U pg
	PCB-32	51.9 pg	51.9U pg
	PCB-26/29	36.3 pg	36.3U pg
	PCB-25	25 pg	25U pg
	PCB-31	172 pg	172U pg
	PCB-28/20	233 pg	233U pg
	PCB-21/33	80.3 pg	80.3U pg
	PCB-22	59.3 pg	59.3U pg
	PCB-35	12.8 pg	12.8U pg
	PCB-37	48.5 pg	48.5U pg
	PCB-54	2.57 pg	2.57U pg
	PCB-50/53	22.2 pg	22.2U pg
	PCB-45	13.9 pg	13.9U pg
	PCB-51	33.9 pg	33.9U pg
	PCB-46	7.53 pg	7.53U pg
	PCB-52	141 pg	141U pg
	PCB-69/49	87.4 pg	87.4U pg
	PCB-48	25.6 pg	25.6U pg
	PCB-44/47/65	167 pg	167U pg
	PCB-59/62/75	13.5 pg	13.5U pg
	PCB-42	33 pg	33U pg
	PCB-41	10.1 pg	10.1U pg
	PCB-71/40	46.9 pg	46.9U pg
	PCB-64	44.4 pg	44.4U pg
	PCB-68	6.93 pg	6.93U pg
	PCB-67	3.49 pg	3.49U pg
	PCB-63	4.34 pg	4.34U pg
	PCB-61/70/74/76	169 pg	169U pg
	PCB-66	98.9 pg	98.9U pg
	PCB-56	38.9 pg	38.9U pg
	PCB-60	16.8 pg	16.8U pg
	PCB-95	58.8 pg	58.8U pg
	PCB-102	4.42 pg	4.42U pg
	PCB-91	11.3 pg	11.3U pg
	PCB-84	24.4 pg	24.4U pg
	PCB-92	14.1 pg	14.1U pg
	PCB-113/90/101	77.8 pg	77.8U pg
	PCB-99	44.7 pg	44.7U pg
	PCB-108/119/86/97/125/87	50.8 pg	50.8U pg
	PCB-117	3.94 pg	3.94U pg
	PCB-116/85	9.82 pg	9.82U pg
	PCB-110	87.9 pg	87.9U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-XR03-101 (continued)	PCB-82	9.88 pg	9.88U pg
	PCB-109	5.05 pg	5.05U pg
	PCB-136	7.37 pg	7.37U pg
	PCB-151/135	15.3 pg	15.3U pg
	PCB-144	2.3 pg	2.3U pg
	PCB-147/149	35.8 pg	35.8U pg
	PCB-132	12 pg	12U pg
	PCB-146	4.24 pg	4.24U pg
	PCB-153/168	29.8 pg	29.8U pg
	PCB-141	5.86 pg	5.86U pg
	PCB-163/138/129	43.9 pg	43.9U pg
	PCB-158	3.99 pg	3.99U pg
	PCB-179	3.54 pg	3.54U pg
	PCB-187	8.78 pg	8.78U pg
	PCB-174	8.99 pg	8.99U pg
	PCB-180/193	14.6 pg	14.6U pg
13C-CE05-T042-XR04-101 (10X)	PCB-11	1830 pg	1830U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-XR02-101	PCB-105	6.37 pg	6.37U pg
	PCB-118	16.2 pg	16.2U pg
	Total Mono-CBs	16.2 pg	16.2U pg
	Total Di-CBs	66.4 pg	66.4U pg
	Total Tri-CBs	67.5 pg	67.5U pg
	Total Tetra-CBs	86.2 pg	86.2U pg
	Total Penta-CBs	119 pg	119U pg
	Total Hexa-CBs	91.1 pg	91.1U pg
	Total Hepta-CBs	82.6 pg	82.6U pg
	PCB-1	3.27 pg	3.27U pg
	PCB-2	5.74 pg	5.74U pg
	PCB-3	7.16 pg	7.16U pg
	PCB-4	5.96 pg	5.96U pg
	PCB-9	2.79 pg	2.79U pg
	PCB-6	2.25 pg	2.25U pg
	PCB-8	7.31 pg	7.31U pg
	PCB-11	42 pg	42U pg
	PCB-15	6.08 pg	6.08U pg
	PCB-30/18	11 pg	11U pg
	PCB-17	5.94 pg	5.94U pg
	PCB-32	3.91 pg	3.91U pg
	PCB-31	13.3 pg	13.3U pg
	PCB-28/20	17.1 pg	17.1U pg
	PCB-21/33	6.69 pg	6.69U pg
	PCB-22	4.06 pg	4.06U pg
	PCB-37	5.43 pg	5.43U pg
	PCB-52	17.6 pg	17.6U pg
	PCB-69/49	8.45 pg	8.45U pg
	PCB-48	2.37 pg	2.37U pg
	PCB-44/47/65	15.3 pg	15.3U pg
	PCB-71/40	5.2 pg	5.2U pg
	PCB-64	4.17 pg	4.17U pg
	PCB-61/70/74/76	18.3 pg	18.3U pg
	PCB-66	10.1 pg	10.1U pg
	PCB-56	4.71 pg	4.71U pg
	PCB-95	16.5 pg	16.5U pg
	PCB-84	5.82 pg	5.82U pg
	PCB-113/90/101	20 pg	20U pg
	PCB-99	10.4 pg	10.4U pg
	PCB-108/119/86/97/125/87	15.5 pg	15.5U pg
	PCB-110	27.9 pg	27.9U pg
	PCB-136	2.09 pg	2.09U pg
	PCB-151/135	8.11 pg	8.11U pg
	PCB-147/149	21.5 pg	21.5U pg
	PCB-132	8.16 pg	8.16U pg
	PCB-153/168	20.3 pg	20.3U pg
	PCB-141	4.43 pg	4.43U pg
	PCB-163/138/129	26.5 pg	26.5U pg
	PCB-179	4.99 pg	4.99U pg
	PCB-187	13.4 pg	13.4U pg
	PCB-174	14.8 pg	14.8U pg
	PCB-180/193	25.1 pg	25.1U pg
13C-CE05-T042-XR03-103 (10X)	PCB-56	218 pg	218U pg
	PCB-60	113 pg	113U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-XR04-103 (10X)	Total Penta-CBs	3240 pg	3240U pg
	PCB-11	1190 pg	1190U pg
	PCB-56	153 pg	153U pg
	PCB-60	90.8 pg	90.8U pg
	PCB-84	235 pg	235U pg
	PCB-92	92.2 pg	92.2U pg
	PCB-113/90/101	527 pg	527U pg
	PCB-99	174 pg	174U pg
	PCB-108/119/86/97/125/87	252 pg	252U pg
	PCB-116/85	51 pg	51U pg
	PCB-110	359 pg	359U pg
	PCB-82	38.9 pg	38.9U pg
	PCB-132	72.4 pg	72.4U pg
	PCB-180/193	27.2 pg	27.2U pg

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T042-XR02-103	PCB-105	4.1 pg	4.1U pg
	PCB-118	8.18 pg	8.18U pg
	Total Mono-CBs	14.6 pg	14.6U pg
	Total Di-CBs	66.8 pg	66.8U pg
	Total Tri-CBs	56.1 pg	56.1U pg
	Total Tetra-CBs	71 pg	71U pg
	Total Penta-CBs	74 pg	74U pg
	Total Hexa-CBs	49.5 pg	49.5U pg
	Total Hepta-CBs	30.4 pg	30.4U pg
	PCB-1	4.49 pg	4.49U pg
	PCB-2	4.27 pg	4.27U pg
	PCB-3	5.8 pg	5.8U pg
	PCB-4	4.7 pg	4.7U pg
	PCB-8	5.92 pg	5.92U pg
	PCB-11	51.4 pg	51.4U pg
	PCB-15	4.81 pg	4.81U pg
	PCB-30/18	7.42 pg	7.42U pg
	PCB-17	4.73 pg	4.73U pg
	PCB-16	3.65 pg	3.65U pg
	PCB-32	3.47 pg	3.47U pg
	PCB-26/29	2.03 pg	2.03U pg
	PCB-31	9.78 pg	9.78U pg
	PCB-28/20	13.5 pg	13.5U pg
	PCB-21/33	4.98 pg	4.98U pg
	PCB-22	3.3 pg	3.3U pg
	PCB-37	3.22 pg	3.22U pg
	PCB-50/53	1.36 pg	1.36U pg
	PCB-52	12.8 pg	12.8U pg
	PCB-69/49	5.9 pg	5.9U pg
	PCB-48	1.45 pg	1.45U pg
	PCB-44/47/65	13.6 pg	13.6U pg
	PCB-71/40	3.82 pg	3.82U pg
	PCB-64	3.6 pg	3.6U pg
	PCB-61/70/74/76	15.7 pg	15.7U pg
	PCB-66	8.81 pg	8.81U pg
	PCB-56	4.03 pg	4.03U pg
	PCB-95	10.5 pg	10.5U pg
	PCB-91	1.96 pg	1.96U pg
	PCB-84	3.96 pg	3.96U pg
	PCB-92	2.12 pg	2.12U pg
	PCB-113/90/101	12.1 pg	12.1U pg
	PCB-99	6.45 pg	6.45U pg
	PCB-108/119/86/97/125/87	7.89 pg	7.89U pg
	PCB-116/85	2.83 pg	2.83U pg
	PCB-110	14 pg	14U pg
	PCB-151/135	4.1 pg	4.1U pg
	PCB-147/149	10.6 pg	10.6U pg
	PCB-132	3.55 pg	3.55U pg
	PCB-146	1.51 pg	1.51U pg
	PCB-153/168	9.85 pg	9.85U pg
	PCB-141	3.45 pg	3.45U pg
	PCB-163/138/129	14.3 pg	14.3U pg
	PCB-179	1.81 pg	1.81U pg
	PCB-187	5.5 pg	5.5U pg
	PCB-174	5.25 pg	5.25U pg
	PCB-180/193	9.45 pg	9.45U pg
13C-CE05-T175-AM02	PCB-11	2430 pg	2430U pg

Samples N10-CE05-TNNE-XR03, N10-CE05-TNNE-XR04, and N10-CE05-TNNE-XR02 (all three from SDG A5668), and 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101, 13C-CE05-T042-XR03-103, 13C-CE05-T042-XR04-103, and 13C-CE05-T042-XR02-103 were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	PCB-77	7.84 pg	No associated samples in this SDG
		PCB-105	22.2 pg	
		PCB-118	52.8 pg	
		PCB-156/157	5.67 pg	
		Total Mono-CBs	340 pg	
		Total Di-CBs	3540 pg	
		Total Tri-CBs	1020 pg	
		Total Tetra-CBs	995 pg	
		Total Penta-CBs	489 pg	
		Total Hexa-CBs	177 pg	
		Total Hepta-CBs	54.8 pg	
		Total Octa-CBs	10.3 pg	
		PCB-1	77.8 pg	
		PCB-2	149 pg	
		PCB-3	113 pg	
		PCB-4	76 pg	
		PCB-10	9.47 pg	
		PCB-9	10.8 pg	
		PCB-7	5.94 pg	
		PCB-6	28.8 pg	
		PCB-8	96.5 pg	
		PCB-11	3210 pg	
		PCB-13/12	28.5 pg	
		PCB-15	72.8 pg	
		PCB-19	17 pg	
		PCB-30/18	127 pg	
		PCB-17	72.5 pg	
		PCB-27	14.2 pg	
		PCB-24	2.95 pg	
		PCB-16	63.5 pg	
		PCB-32	51.9 pg	
		PCB-26/29	36.3 pg	
		PCB-25	25 pg	
		PCB-31	172 pg	
		PCB-28/20	233 pg	
		PCB-21/33	80.3 pg	
		PCB-22	59.3 pg	
		PCB-35	12.8 pg	
		PCB-37	48.5 pg	
		PCB-54	2.57 pg	
		PCB-50/53	22.2 pg	
		PCB-45	13.9 pg	
		PCB-51	33.9 pg	
		PCB-46	7.53 pg	
		PCB-52	141 pg	
		PCB-69/49	87.4 pg	
		PCB-48	25.6 pg	
		PCB-44/47/65	167 pg	
		PCB-59/62/75	13.5 pg	
		PCB-42	33 pg	
		PCB-41	10.1 pg	
		PCB-71/40	46.9 pg	
		PCB-64	44.4 pg	
		PCB-68	6.93 pg	
		PCB-67	3.49 pg	
		PCB-63	4.34 pg	
		PCB-61/70/74/76	169 pg	
		PCB-66	98.9 pg	
		PCB-56	38.9 pg	
		PCB-60	16.8 pg	
		PCB-103	2.63 pg	
		PCB-95	58.8 pg	
		PCB-100/93	5.51 pg	
		PCB-102	4.42 pg	
		PCB-91	11.3 pg	
		PCB-84	24.4 pg	
		PCB-92	14.1 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101 (continued)	6/26/13	PCB-113/90/101	77.8 pg	No associated samples in this SDG
		PCB-99	44.7 pg	
		PCB-108/119/86/97/125/87	50.8 pg	
		PCB-117	3.94 pg	
		PCB-116/85	9.82 pg	
		PCB-110	87.9 pg	
		PCB-82	9.88 pg	
		PCB-107/124	3.36 pg	
		PCB-109	5.05 pg	
		PCB-136	7.37 pg	
		PCB-151/135	15.3 pg	
		PCB-144	2.3 pg	
		PCB-147/149	35.8 pg	
		PCB-132	12 pg	
		PCB-146	4.24 pg	
		PCB-153/168	29.8 pg	
		PCB-141	5.86 pg	
		PCB-164	2.24 pg	
		PCB-163/138/129	43.9 pg	
		PCB-158	3.99 pg	
		PCB-128/166	8.56 pg	
		PCB-179	3.54 pg	
		PCB-187	8.78 pg	
		PCB-183	4.53 pg	
		PCB-174	8.99 pg	
		PCB-177	5.41 pg	
		PCB-171/173	3.25 pg	
		PCB-180/193	14.6 pg	
		PCB-170	5.64 pg	
		PCB-198/199	5.22 pg	
		PCB-194	5.12 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-101	6/26/13	PCB-105	70.9 pg	No associated samples in this SDG
		PCB-118	268 pg	
		Total Mono-CBs	1520 pg	
		Total Di-CBs	33000 pg	
		Total Tri-CBs	160000 pg	
		Total Tetra-CBs	71300 pg	
		Total Penta-CBs	6880 pg	
		Total Hexa-CBs	2640 pg	
		Total Hepta-CBs	353 pg	
		PCB-1	732 pg	
		PCB-2	336 pg	
		PCB-3	456 pg	
		PCB-4	4060 pg	
		PCB-10	170 pg	
		PCB-9	877 pg	
		PCB-7	471 pg	
		PCB-6	2820 pg	
		PCB-5	343 pg	
		PCB-8	14200 pg	
		PCB-11	1830 pg	
		PCB-13/12	1060 pg	
		PCB-15	7220 pg	
		PCB-19	2500 pg	
		PCB-30/18	28000 pg	
		PCB-17	13000 pg	
		PCB-27	2060 pg	
		PCB-24	551 pg	
		PCB-16	16000 pg	
		PCB-32	8170 pg	
		PCB-34	109 pg	
		PCB-23	48.6 pg	
		PCB-26/29	5350 pg	
		PCB-25	2390 pg	
		PCB-31	25300 pg	
		PCB-28/20	26600 pg	
		PCB-21/33	16800 pg	
		PCB-22	9870 pg	
		PCB-39	147 pg	
		PCB-35	200 pg	
		PCB-37	3140 pg	
		PCB-54	78.7 pg	
		PCB-50/53	3530 pg	
		PCB-45	4320 pg	
		PCB-51	1150 pg	
		PCB-46	1680 pg	
		PCB-52	13500 pg	
		PCB-43	864 pg	
		PCB-69/49	7570 pg	
		PCB-48	4000 pg	
		PCB-44/47/65	12300 pg	
		PCB-59/62/75	1230 pg	
		PCB-42	3400 pg	
		PCB-41	1890 pg	
		PCB-71/40	4970 pg	
		PCB-64	4200 pg	
		PCB-67	208 pg	
		PCB-63	152 pg	
		PCB-61/70/74/76	4120 pg	
		PCB-66	1610 pg	
		PCB-56	360 pg	
		PCB-60	189 pg	
		PCB-96	89.3 pg	
		PCB-95	2390 pg	
		PCB-102	141 pg	
		PCB-91	350 pg	
		PCB-84	492 pg	
		PCB-92	184 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-101 (continued)	6/26/13	PCB-113/90/101 PCB-99 PCB-108/119/86/97/125/87 PCB-110 PCB-82 PCB-136 PCB-151/135 PCB-144 PCB-147/149 PCB-132 PCB-153/168 PCB-141 PCB-163/138/129 PCB-179 PCB-176 PCB-187	1170 pg 330 pg 513 pg 828 pg 60.8 pg 264 pg 576 pg 60 pg 867 pg 176 pg 318 pg 90.1 pg 287 pg 152 pg 33 pg 168 pg	No associated samples in this SDG

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-101	6/26/13	PCB-105	6.37 pg	No associated samples in this SDG
		PCB-118	16.2 pg	
		Total Mono-CBs	16.2 pg	
		Total Di-CBs	66.4 pg	
		Total Tri-CBs	67.5 pg	
		Total Tetra-CBs	86.2 pg	
		Total Penta-CBs	119 pg	
		Total Hexa-CBs	91.1 pg	
		Total Hepta-CBs	82.6 pg	
		Total Octa-CBs	19 pg	
		PCB-1	3.27 pg	
		PCB-2	5.74 pg	
		PCB-3	7.16 pg	
		PCB-4	5.96 pg	
		PCB-9	2.79 pg	
		PCB-6	2.25 pg	
		PCB-8	7.31 pg	
		PCB-11	42 pg	
		PCB-15	6.08 pg	
		PCB-30/18	11 pg	
		PCB-17	5.94 pg	
		PCB-32	3.91 pg	
		PCB-31	13.3 pg	
		PCB-28/20	17.1 pg	
		PCB-21/33	6.69 pg	
		PCB-22	4.06 pg	
		PCB-37	5.43 pg	
		PCB-52	17.6 pg	
		PCB-69/49	8.45 pg	
		PCB-48	2.37 pg	
		PCB-44/47/65	15.3 pg	
		PCB-71/40	5.2 pg	
		PCB-64	4.17 pg	
		PCB-61/70/74/76	18.3 pg	
		PCB-66	10.1 pg	
		PCB-56	4.71 pg	
		PCB-95	16.5 pg	
		PCB-84	5.82 pg	
		PCB-113/90/101	20 pg	
		PCB-99	10.4 pg	
		PCB-108/119/86/97/125/87	15.5 pg	
		PCB-110	27.9 pg	
		PCB-136	2.09 pg	
		PCB-151/135	8.11 pg	
		PCB-147/149	21.5 pg	
		PCB-132	8.16 pg	
		PCB-153/168	20.3 pg	
		PCB-141	4.43 pg	
		PCB-163/138/129	26.5 pg	
		PCB-179	4.99 pg	
		PCB-187	13.4 pg	
		PCB-183	6.51 pg	
		PCB-174	14.8 pg	
		PCB-177	7.51 pg	
		PCB-180/193	25.1 pg	
		PCB-170	10.3 pg	
		PCB-198/199	6.84 pg	
		PCB-196	5.82 pg	
		PCB-194	6.38 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103	6/26/13	PCB-105	224 pg	No associated samples in this SDG
		PCB-118	528 pg	
		Total Mono-CBs	562 pg	
		Total Di-CBs	9270 pg	
		Total Tri-CBs	25500 pg	
		Total Tetra-CBs	14900 pg	
		Total Penta-CBs	5800 pg	
		Total Hexa-CBs	2050 pg	
		Total Hepta-CBs	199 pg	
		PCB-1	190 pg	
		PCB-2	186 pg	
		PCB-3	185 pg	
		PCB-4	898 pg	
		PCB-10	53.7 pg	
		PCB-9	148 pg	
		PCB-7	90.6 pg	
		PCB-6	522 pg	
		PCB-5	54.7 pg	
		PCB-8	2470 pg	
		PCB-11	3670 pg	
		PCB-13/12	213 pg	
		PCB-15	1140 pg	
		PCB-19	387 pg	
		PCB-30/18	4070 pg	
		PCB-17	1960 pg	
		PCB-27	309 pg	
		PCB-24	66.4 pg	
		PCB-16	2280 pg	
		PCB-32	1240 pg	
		PCB-34	15 pg	
		PCB-26/29	867 pg	
		PCB-25	413 pg	
		PCB-31	4190 pg	
		PCB-28/20	4510 pg	
		PCB-21/33	2780 pg	
		PCB-22	1670 pg	
		PCB-35	58.3 pg	
		PCB-37	704 pg	
		PCB-54	12.6 pg	
		PCB-50/53	533 pg	
		PCB-45	687 pg	
		PCB-51	187 pg	
		PCB-46	254 pg	
		PCB-52	2780 pg	
		PCB-43	138 pg	
		PCB-69/49	1470 pg	
		PCB-48	691 pg	
		PCB-44/47/65	2520 pg	
		PCB-59/62/75	238 pg	
		PCB-42	654 pg	
		PCB-41	374 pg	
		PCB-71/40	953 pg	
		PCB-64	854 pg	
		PCB-67	41.8 pg	
		PCB-63	41.7 pg	
		PCB-61/70/74/76	1510 pg	
		PCB-66	625 pg	
		PCB-56	218 pg	
		PCB-60	113 pg	
		PCB-96	16.2 pg	
		PCB-95	1110 pg	
		PCB-102	53.5 pg	
		PCB-91	147 pg	
		PCB-84	343 pg	
		PCB-92	161 pg	
		PCB-113/90/101	949 pg	
		PCB-83	46.3 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-103 (continued)	6/26/13	PCB-99 PCB-108/119/86/97/125/87 PCB-116/85 PCB-110 PCB-82 PCB-136 PCB-151/135 PCB-144 PCB-147/149 PCB-134 PCB-132 PCB-146 PCB-153/168 PCB-141 PCB-163/138/129 PCB-158 PCB-128/166 PCB-179 PCB-187 PCB-183 PCB-174 PCB-180/193	372 pg 605 pg 118 pg 1040 pg 81.7 pg 121 pg 246 pg 37 pg 511 pg 46.3 pg 197 pg 43.3 pg 274 pg 94.1 pg 402 pg 38.4 pg 43.9 pg 29.4 pg 56.4 pg 26 pg 43 pg 44.1 pg	No associated samples in this SDG

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-103	6/26/13	PCB-105	54.1 pg	No associated samples in this SDG
		PCB-118	150 pg	
		Total Mono-CBs	739 pg	
		Total Di-CBs	16100 pg	
		Total Tri-CBs	73200 pg	
		Total Tetra-CBs	29600 pg	
		Total Penta-CBs	3240 pg	
		Total Hexa-CBs	1330 pg	
		Total Hepta-CBs	142 pg	
		PCB-1	339 pg	
		PCB-2	173 pg	
		PCB-3	227 pg	
		PCB-4	2030 pg	
		PCB-10	95.4 pg	
		PCB-9	446 pg	
		PCB-7	241 pg	
		PCB-6	1360 pg	
		PCB-5	152 pg	
		PCB-8	6770 pg	
		PCB-11	1190 pg	
		PCB-13/12	504 pg	
		PCB-15	3270 pg	
		PCB-19	1140 pg	
		PCB-30/18	13300 pg	
		PCB-17	6070 pg	
		PCB-27	958 pg	
		PCB-24	222 pg	
		PCB-16	7510 pg	
		PCB-32	3970 pg	
		PCB-34	51.2 pg	
		PCB-26/29	2430 pg	
		PCB-25	1060 pg	
		PCB-31	11100 pg	
		PCB-28/20	11800 pg	
		PCB-21/33	7640 pg	
		PCB-22	4420 pg	
		PCB-39	65.7 pg	
		PCB-37	1450 pg	
		PCB-54	35 pg	
		PCB-50/53	1440 pg	
		PCB-45	1780 pg	
		PCB-51	492 pg	
		PCB-46	666 pg	
		PCB-52	5570 pg	
		PCB-43	340 pg	
		PCB-69/49	3150 pg	
		PCB-48	1660 pg	
		PCB-44/47/65	5020 pg	
		PCB-59/62/75	537 pg	
		PCB-42	1440 pg	
		PCB-41	760 pg	
		PCB-71/40	2110 pg	
		PCB-64	1770 pg	
		PCB-67	85.3 pg	
		PCB-63	73.7 pg	
		PCB-61/70/74/76	1720 pg	
		PCB-66	678 pg	
		PCB-56	153 pg	
		PCB-60	90.8 pg	
		PCB-96	43 pg	
		PCB-95	1000 pg	
		PCB-100/93	28.5 pg	
		PCB-102	75.8 pg	
		PCB-91	160 pg	
		PCB-84	235 pg	
		PCB-92	92.2 pg	
		PCB-113/90/101	527 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-103 (continued)	6/26/13	PCB-99 PCB-108/119/86/97/125/87 PCB-116/85 PCB-110 PCB-82 PCB-136 PCB-151/135 PCB-144 PCB-147/149 PCB-132 PCB-146 PCB-153/168 PCB-141 PCB-163/138/129 PCB-158 PCB-179 PCB-176 PCB-187 PCB-180/193	174 pg 252 pg 51 pg 359 pg 38.9 pg 122 pg 280 pg 26.9 pg 429 pg 72.4 pg 28.7 pg 160 pg 36.5 pg 152 pg 19.1 pg 62.4 pg 16.5 pg 36.1 pg 27.2 pg	No associated samples in this SDG

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-103	6/26/13	PCB-105	4.1 pg	No associated samples in this SDG
		PCB-118	8.18 pg	
		Total Mono-CBs	14.6 pg	
		Total Di-CBs	66.8 pg	
		Total Tri-CBs	56.1 pg	
		Total Tetra-CBs	71 pg	
		Total Penta-CBs	74 pg	
		Total Hexa-CBs	49.5 pg	
		Total Hepta-CBs	30.4 pg	
		Total Octa-CBs	7.78 pg	
		PCB-1	4.49 pg	
		PCB-2	4.27 pg	
		PCB-3	5.8 pg	
		PCB-4	4.7 pg	
		PCB-8	5.92 pg	
		PCB-11	51.4 pg	
		PCB-15	4.81 pg	
		PCB-30/18	7.42 pg	
		PCB-17	4.73 pg	
		PCB-16	3.65 pg	
		PCB-32	3.47 pg	
		PCB-26/29	2.03 pg	
		PCB-31	9.78 pg	
		PCB-28/20	13.5 pg	
		PCB-21/33	4.98 pg	
		PCB-22	3.3 pg	
		PCB-37	3.22 pg	
		PCB-50/53	1.36 pg	
		PCB-52	12.8 pg	
		PCB-69/49	5.9 pg	
		PCB-48	1.45 pg	
		PCB-44/47/65	13.6 pg	
		PCB-71/40	3.82 pg	
		PCB-64	3.6 pg	
		PCB-61/70/74/76	15.7 pg	
		PCB-66	8.81 pg	
		PCB-56	4.03 pg	
		PCB-95	10.5 pg	
		PCB-91	1.96 pg	
		PCB-84	3.96 pg	
		PCB-92	2.12 pg	
		PCB-113/90/101	12.1 pg	
		PCB-99	6.45 pg	
		PCB-108/119/86/97/125/87	7.89 pg	
		PCB-116/85	2.83 pg	
		PCB-110	14 pg	
		PCB-151/135	4.1 pg	
		PCB-147/149	10.6 pg	
		PCB-132	3.55 pg	
		PCB-146	1.51 pg	
		PCB-153/168	9.85 pg	
		PCB-141	3.45 pg	
		PCB-163/138/129	14.3 pg	
		PCB-128/166	2.16 pg	
		PCB-179	1.81 pg	
		PCB-187	5.5 pg	
		PCB-183	2.08 pg	
		PCB-174	5.25 pg	
		PCB-177	2.97 pg	
		PCB-180/193	9.45 pg	
		PCB-170	3.37 pg	
		PCB-198/199	3.82 pg	
		PCB-194	3.96 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR02	6/25/13	PCB-118 Total Di-CBs Total Tri-CBs Total Penta-CBs Total Hexa-CBs PCB-11 PCB-15 PCB-31 PCB-28/20 PCB-113/90/101 PCB-153/168 PCB-163/138/129	32.1 pg 188 pg 107 pg 70.2 pg 69 pg 106 pg 82.1 pg 41.6 pg 65.6 pg 38.1 pg 27.8 pg 41.2 pg	13C-CE05-T175-AP01

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR03	6/25/13	PCB-77	9.09 pg	13C-CE05-T175-AM01
		PCB-105	15.4 pg	
		PCB-118	33.7 pg	
		PCB-156/157	5.61 pg	
		Total Mono-CBs	391 pg	
		Total Di-CBs	3450 pg	
		Total Tri-CBs	693 pg	
		Total Tetra-CBs	581 pg	
		Total Penta-CBs	295 pg	
		Total Hexa-CBs	161 pg	
		Total Hepta-CBs	60 pg	
		PCB-1	87.4 pg	
		PCB-2	164 pg	
		PCB-3	140 pg	
		PCB-4	69.8 pg	
		PCB-10	8.27 pg	
		PCB-9	10.8 pg	
		PCB-7	6.62 pg	
		PCB-6	43.5 pg	
		PCB-8	118 pg	
		PCB-11	3070 pg	
		PCB-13/12	39.2 pg	
		PCB-15	86.5 pg	
		PCB-19	16.9 pg	
		PCB-30/18	102 pg	
		PCB-17	51.7 pg	
		PCB-27	9.52 pg	
		PCB-16	50.5 pg	
		PCB-32	33.9 pg	
		PCB-26/29	25.1 pg	
		PCB-25	14.7 pg	
		PCB-31	108 pg	
		PCB-28/20	132 pg	
		PCB-21/33	53.9 pg	
		PCB-22	38.4 pg	
		PCB-35	11.4 pg	
		PCB-37	44.8 pg	
		PCB-50/53	13 pg	
		PCB-45	11.3 pg	
		PCB-51	16 pg	
		PCB-46	4.47 pg	
		PCB-52	92 pg	
		PCB-69/49	47.5 pg	
		PCB-48	15.6 pg	
		PCB-44/47/65	110 pg	
		PCB-59/62/75	6.98 pg	
		PCB-42	19.5 pg	
		PCB-41	7.7 pg	
		PCB-71/40	28.2 pg	
		PCB-64	24.6 pg	
		PCB-68	4.71 pg	
		PCB-61/70/74/76	88.9 pg	
		PCB-66	49.8 pg	
		PCB-56	22.9 pg	
		PCB-60	9.47 pg	
		PCB-95	46.9 pg	
		PCB-91	7.74 pg	
		PCB-84	14.7 pg	
		PCB-92	9.04 pg	
		PCB-113/90/101	47.9 pg	
		PCB-99	21.3 pg	
		PCB-108/119/86/97/125/87	32.1 pg	
		PCB-116/85	7.69 pg	
		PCB-110	49 pg	
		PCB-82	5.97 pg	
		PCB-109	3.9 pg	
		PCB-136	5.81 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
N10-CE05-TNNE-XR03 (continued)	6/25/13	PCB-151/135	16.4 pg	13C-CE05-T175-AM01
		PCB-147/149	33.4 pg	
		PCB-132	13.9 pg	
		PCB-146	6.96 pg	
		PCB-153/168	26.2 pg	
		PCB-141	7.46 pg	
		PCB-130	5.42 pg	
		PCB-163/138/129	33.6 pg	
		PCB-128/166	6.14 pg	
		PCB-179	4.96 pg	
		PCB-187	12.7 pg	
		PCB-183	5.14 pg	
		PCB-174	9.48 pg	
		PCB-177	5.68 pg	
		PCB-180/193	14.1 pg	
		PCB-170	7.89 pg	
		PCB-209	4.94 pg	
N10-CE05-TNNE-XR04	6/25/13	PCB-105	15.8 pg	13C-CE05-T175-AM02
		PCB-118	30.5 pg	
		Total Mono-CBs	161 pg	
		Total Di-CBs	1110 pg	
		Total Tri-CBs	714 pg	
		Total Tetra-CBs	467 pg	
		Total Penta-CBs	258 pg	
		Total Hexa-CBs	90.2 pg	
		PCB-1	47.4 pg	
		PCB-2	59 pg	
		PCB-3	54.4 pg	
		PCB-4	53.4 pg	
		PCB-9	17.4 pg	
		PCB-6	32.6 pg	
		PCB-8	103 pg	
		PCB-11	810 pg	
		PCB-15	89.6 pg	
		PCB-30/18	97.4 pg	
		PCB-17	50.7 pg	
		PCB-16	51.7 pg	
		PCB-32	31.6 pg	
		PCB-26/29	29.9 pg	
		PCB-31	122 pg	
		PCB-28/20	152 pg	
		PCB-21/33	73.3 pg	
		PCB-22	46.8 pg	
		PCB-37	58.8 pg	
		PCB-52	90.2 pg	
		PCB-69/49	43.2 pg	
		PCB-44/47/65	87.6 pg	
		PCB-71/40	29.3 pg	
		PCB-64	25.4 pg	
		PCB-61/70/74/76	96.4 pg	
		PCB-66	52.4 pg	
		PCB-56	27.5 pg	
		PCB-60	15.1 pg	
		PCB-95	50.8 pg	
		PCB-113/90/101	56.1 pg	
		PCB-99	20.4 pg	
		PCB-108/119/86/97/125/87	35.8 pg	
		PCB-110	48.8 pg	
		PCB-147/149	33 pg	
		PCB-153/168	27.1 pg	
		PCB-163/138/129	30.1 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T175-AM01	PCB-2 PCB-3 PCB-11	225 pg 678 pg 6770 pg	225U pg 678U pg 6770U pg
13C-CE05-T175-AM02	PCB-2 PCB-11	169 pg 2430 pg	169U pg 2430U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
MB_11113	^{13}C-PCB-15	115 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
13C-CE05-T042-XR03-101	^{13}C-PCB-15	112 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T175-AM01	^{13}C-PCB-15	108 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T175-AM02	^{13}C-PCB-15	110 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compounds met the identification criteria with the following exceptions:

Sample	Compound	Flag	A or P
13C-CE05-T042-XR03-101	PCB-9 PCB-7 PCB-6 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P
13C-CE05-T042-XR02-101	PCB-4 PCB-9 PCB-6 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Compound	Flag	A or P
13C-CE05-T042-XR02-103	PCB-4 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P

For the above listed samples, the laboratory indicated that the Dichlorobiphenyl congeners were quantitated using single ion mode. The area for the secondary ion (m/z 223.9974) was not integrated due to significant interference from PFK. Using professional judgment, associated detected results were qualified as estimated.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103	All TCL compounds
13C-CE05-T175-AM01 13C-CE05-T175-AM02	All TCL compounds except PCB-38 PCB-40 to PCB-42 PCB-44 PCB-46 to PCB-48 PCB-50 to PCB-53 PCB-59 PCB-60 PCB-62 PCB-64 PCB-65 PCB-68 PCB-69 PCB-71 PCB-75 Total Tetra-CBs

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5678	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A

Sample	Compound	Flag	A or P
13C-CE05-T175-AM01 13C-CE05-T175-AP01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	A

Sample	Compound	Finding	Criteria	Flag	A or P
13C-CE05-T175-AM01	Total Tri-CBs Total Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
13C-CE05-T175-AP01	Total Penta-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (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.

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A5678

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5678	13C-CE05-T042-XR03-101 13C-CE05-T175-AM01 13C-CE05-T175-AM02	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5678	13C-CE05-T042-XR03-101	PCB-9 PCB-7 PCB-6 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5678	13C-CE05-T042-XR02-101	PCB-4 PCB-9 PCB-6 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5678	13C-CE05-T042-XR02-103	PCB-4 PCB-8 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects)	P	Target compound identification (q)
A5678	13C-CE05-T042-XR03-101 13C-CE05-T042-XR04-101 13C-CE05-T042-XR02-101 13C-CE05-T042-XR03-103 13C-CE05-T042-XR04-103 13C-CE05-T042-XR02-103 13C-CE05-T175-AM01 13C-CE05-T175-AM02 13C-CE05-T175-AP01	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (EMPC) (k)
A5678	13C-CE05-T175-AM01 13C-CE05-T175-AP01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	A	Compound quantitation (exceeded range) (q)
A5678	13C-CE05-T175-AM01	Total Tri-CBs Total Tetra-CBs	J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)
A5678	13C-CE05-T175-AP01	Total Penta-CBs	J (all detects)	A	Compound quantitation (exceeded range) (q)

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5678

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T042-XR03-101	PCB-77	7.84U pg	A	bl
		PCB-105	22.2U pg		
		PCB-118	52.8U pg		
		Total Mono-CBs	340U pg		
		Total Di-CBs	3540U pg		
		Total Tri-CBs	1020U pg		
		Total Tetra-CBs	995U pg		
		Total Penta-CBs	489U pg		
		Total Hexa-CBs	177U pg		
		Total Hepta-CBs	54.8U pg		
		PCB-1	77.8U pg		
		PCB-3	113U pg		
		PCB-4	76U pg		
		PCB-10	9.47U pg		
		PCB-9	10.8U pg		
		PCB-7	5.94U pg		
		PCB-6	28.8U pg		
		PCB-8	96.5U pg		
		PCB-13/12	28.5U pg		
		PCB-15	72.8U pg		
		PCB-19	17U pg		
		PCB-30/18	127U pg		
		PCB-17	72.5U pg		
		PCB-27	14.2U pg		
		PCB-24	2.95U pg		
		PCB-16	63.5U pg		
		PCB-32	51.9U pg		
		PCB-26/29	36.3U pg		
		PCB-25	25U pg		
		PCB-31	172U pg		
		PCB-28/20	233U pg		
		PCB-21/33	80.3U pg		
		PCB-22	59.3U pg		
		PCB-35	12.8U pg		
		PCB-37	48.5U pg		
		PCB-54	2.57U pg		
		PCB-50/53	22.2U pg		
		PCB-45	13.9U pg		
		PCB-51	33.9U pg		
		PCB-46	7.53U pg		
		PCB-52	141U pg		
		PCB-69/49	87.4U pg		
		PCB-48	25.6U pg		
		PCB-44/47/65	167U pg		
		PCB-59/62/75	13.5U pg		
		PCB-42	33U pg		
		PCB-41	10.1U pg		
		PCB-71/40	46.9U pg		
		PCB-64	44.4U pg		
		PCB-68	6.93U pg		
		PCB-67	3.49U pg		
		PCB-63	4.34U pg		
		PCB-61/70/74/76	169U pg		
		PCB-66	98.9U pg		
		PCB-56	38.9U pg		
		PCB-60	16.8U pg		
		PCB-95	58.8U pg		
		PCB-102	4.42U pg		
		PCB-91	11.3U pg		
		PCB-84	24.4U pg		
		PCB-92	14.1U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T042-XR03-101 (continued)	PCB-113/90/101 PCB-99 PCB-108/119/86/97/125/87 PCB-117 PCB-116/85 PCB-110 PCB-82 PCB-109 PCB-136 PCB-151/135 PCB-144 PCB-147/149 PCB-132 PCB-146 PCB-153/168 PCB-141 PCB-163/138/129 PCB-158 PCB-179 PCB-187 PCB-174 PCB-180/193	77.8U pg 44.7U pg 50.8U pg 3.94U pg 9.82U pg 87.9U pg 9.88U pg 5.05U pg 7.37U pg 15.3U pg 2.3U pg 35.8U pg 12U pg 4.24U pg 29.8U pg 5.86U pg 43.9U pg 3.99U pg 3.54U pg 8.78U pg 8.99U pg 14.6U pg	A	bl
A5678	13C-CE05-T042-XR04-101 (10X)	PCB-11	1830U pg	A	bl

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T042-XR02-101	PCB-105	6.37U pg	A	bl
		PCB-118	16.2U pg		
		Total Mono-CBs	16.2U pg		
		Total Di-CBs	66.4U pg		
		Total Tri-CBs	67.5U pg		
		Total Tetra-CBs	86.2U pg		
		Total Penta-CBs	119U pg		
		Total Hexa-CBs	91.1U pg		
		Total Hepta-CBs	82.6U pg		
		PCB-1	3.27U pg		
		PCB-2	5.74U pg		
		PCB-3	7.16U pg		
		PCB-4	5.96U pg		
		PCB-9	2.79U pg		
		PCB-6	2.25U pg		
		PCB-8	7.31U pg		
		PCB-11	42U pg		
		PCB-15	6.08U pg		
		PCB-30/18	11U pg		
		PCB-17	5.94U pg		
		PCB-32	3.91U pg		
		PCB-31	13.3U pg		
		PCB-28/20	17.1U pg		
		PCB-21/33	6.69U pg		
		PCB-22	4.06U pg		
		PCB-37	5.43U pg		
		PCB-52	17.6U pg		
		PCB-69/49	8.45U pg		
		PCB-48	2.37U pg		
		PCB-44/47/65	15.3U pg		
		PCB-71/40	5.2U pg		
		PCB-64	4.17U pg		
		PCB-61/70/74/76	18.3U pg		
		PCB-66	10.1U pg		
		PCB-56	4.71U pg		
		PCB-95	16.5U pg		
		PCB-84	5.82U pg		
		PCB-113/90/101	20U pg		
		PCB-99	10.4U pg		
		PCB-108/119/86/97/125/87	15.5U pg		
		PCB-110	27.9U pg		
		PCB-136	2.09U pg		
		PCB-151/135	8.11U pg		
		PCB-147/149	21.5U pg		
		PCB-132	8.16U pg		
		PCB-153/168	20.3U pg		
		PCB-141	4.43U pg		
		PCB-163/138/129	26.5U pg		
		PCB-179	4.99U pg		
		PCB-187	13.4U pg		
		PCB-174	14.8U pg		
		PCB-180/193	25.1U pg		
A5678	13C-CE05-T042-XR03-103 (10X)	PCB-56	218U pg	A	bl
		PCB-60	113U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T042-XR04-103 (10X)	Total Penta-CBs	3240U pg	A	bl
		PCB-11	1190U pg		
		PCB-56	153U pg		
		PCB-60	90.8U pg		
		PCB-84	235U pg		
		PCB-92	92.2U pg		
		PCB-113/90/101	527U pg		
		PCB-99	174U pg		
		PCB-108/119/86/97/125/87	252U pg		
		PCB-116/85	51U pg		
		PCB-110	359U pg		
		PCB-82	38.9U pg		
		PCB-132	72.4U pg		
		PCB-180/193	27.2U pg		

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T042-XR02-103	PCB-105	4.1U pg	A	bl
		PCB-118	8.18U pg		
		Total Mono-CBs	14.6U pg		
		Total Di-CBs	66.8U pg		
		Total Tri-CBs	56.1U pg		
		Total Tetra-CBs	71U pg		
		Total Penta-CBs	74U pg		
		Total Hexa-CBs	49.5U pg		
		Total Hepta-CBs	30.4U pg		
		PCB-1	4.49U pg		
		PCB-2	4.27U pg		
		PCB-3	5.8U pg		
		PCB-4	4.7U pg		
		PCB-8	5.92U pg		
		PCB-11	51.4U pg		
		PCB-15	4.81U pg		
		PCB-30/18	7.42U pg		
		PCB-17	4.73U pg		
		PCB-16	3.65U pg		
		PCB-32	3.47U pg		
		PCB-26/29	2.03U pg		
		PCB-31	9.78U pg		
		PCB-28/20	13.5U pg		
		PCB-21/33	4.98U pg		
		PCB-22	3.3U pg		
		PCB-37	3.22U pg		
		PCB-50/53	1.36U pg		
		PCB-52	12.8U pg		
		PCB-69/49	5.9U pg		
		PCB-48	1.45U pg		
		PCB-44/47/65	13.6U pg		
		PCB-71/40	3.82U pg		
		PCB-64	3.6U pg		
		PCB-61/70/74/76	15.7U pg		
		PCB-66	8.81U pg		
		PCB-56	4.03U pg		
		PCB-95	10.5U pg		
		PCB-91	1.96U pg		
		PCB-84	3.96U pg		
		PCB-92	2.12U pg		
		PCB-113/90/101	12.1U pg		
		PCB-99	6.45U pg		
		PCB-108/119/86/97/125/87	7.89U pg		
		PCB-116/85	2.83U pg		
		PCB-110	14U pg		
		PCB-151/135	4.1U pg		
		PCB-147/149	10.6U pg		
		PCB-132	3.55U pg		
		PCB-146	1.51U pg		
		PCB-153/168	9.85U pg		
		PCB-141	3.45U pg		
		PCB-163/138/129	14.3U pg		
		PCB-179	1.81U pg		
		PCB-187	5.5U pg		
		PCB-174	5.25U pg		
		PCB-180/193	9.45U pg		
A5678	13C-CE05-T175-AM02	PCB-11	2430U pg	A	bl

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5678

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5678	13C-CE05-T175-AM01	PCB-2 PCB-3 PCB-11	225U pg 678U pg 6770U pg	A	be
A5678	13C-CE05-T175-AM02	PCB-2 PCB-11	169U pg 2430U pg	A	be

LDC #: 30206B31

SDG #: A5678

Laboratory: SGS-Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 8-20-13

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

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

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

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 6/26/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Routine calibration/~~ICV~~	A	≤ 30/50
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	SW	
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	FB=1-6*

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

Validated Samples: 6 PUF's/3 Filters

1	13C-CE05-T042-XR03-101	11		21		31	
2	13C-CE05-T042-XR04-101	12		22		32	
3	13C-CE05-T042-XR02-101	13		23		33	
4	13C-CE05-T042-XR03-103	14		24		34	
5	13C-CE05-T042-XR04-103	15		25		35	
6	13C-CE05-T042-XR02-103	16		26		36	
7	13C-CE05-T175-AM01	17		27		37	
8	13C-CE05-T175-AM02	18		28		38	
9	13C-CE05-T175-AP01	19		29		39	
10		20		30	MB1-11113	40	

* N10-CE05-TNNE-XR03 (A5668)
N10-CE05-TNNE-XR04 (A5668)
N10-CE05-TNNE-XR02 (A5668)

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer:

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

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?
Blank extraction date: 07/08/13 **Blank analysis date:** 07/29/13 **Associated samples:** All Qual U (bl)
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1_11113	5x	1	2 (10x)	3	4 (10x)	5 (10x)	6	8		
PCB-77	4.33	21.7	7.84								
PCB-105	9.41	47.1	22.2		6.37			4.1			
PCB-118	28.3	141.5	52.8		16.2			8.18			
Total Mono-CBs	77.5	388	340		16.2*			14.6			
Total Di-CBs	1180*	5900	3540		66.4			66.8			
Total Tri-CBs	3360	16800	1020		67.5*			56.1*			
Total Tetra-CBs	2370	11850	995*		86.2*			71*			
Total Penta-CBs	687*	3435	489*		119*		3240*	74*			
Total Hexa-CBs	159*	795	177*		91.1*			49.5			
Total Hepta-CBs	23.8*	119	54.8*		82.6*			30.4*			
PCB-1	24.9	125	77.8		3.27*			4.49			
PCB-2	23.3	117			5.74			4.27			
PCB-3	29.3	147	113		7.16			5.8			
PCB-4	92.9	465	76		5.96			4.7			
PCB-10	6.09	30	9.47								
PCB-9	17.5*	88	10.8		2.79						
PCB-7	12.6	63	5.94								
PCB-6	55.6	278	28.8		2.25						
PCB-5	6.04	30									
PCB-8	290	1450	96.5		7.31			5.92			

2004
TM

Compound	Blank ID		Sample Identification								
	MB1_11113	5x	1	2 (10x)	3	4 (10x)	5 (10x)	6	8		
PCB-11	517	2585		1830	42		1190	51.4	2430		
PCB-13/12	28.5	143	28.5								
PCB-15	158	790	72.8		6.08			4.81			
PCB-19	39	195	17								
PCB-30/18	487	2435	127		11			7.42			
PCB-17	241	1205	72.5		5.94			4.73			
PCB-27	37.6	188	14.2								
PCB-24	9.36	47	2.95								
PCB-16	288	1440	63.5					3.65			
PCB-32	167	835	51.9		3.91			3.47			
PCB-34	2.21	11									
PCB-26/29	118	590	36.3					2.03			
PCB-25	52.8	264	25								
PCB-31	574	2870	172		13.3			9.78			
PCB-28/20	605	3025	233		17.1			13.5			
PCB-21/33	380	1900	80.3		6.69			4.98			
PCB-22	229	1145	59.3		4.06*			3.3*			
PCB-39	3.57	18									
PCB-35	10.8	54.0	12.8								
PCB-37	113	565	48.5		5.43*			3.22*			
PCB-54	1.58	7.9	2.57*								
PCB-50/53	72.1	361	22.2					1.36*			
PCB-45	89.8	449	13.9								
PCB-51	27	135	33.9								
PCB-46	36.7	184	7.53								
PCB-52	446	2230	141		17.6			12.8			
PCB-43	20.2	101									

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Compound	Blank ID		Sample Identification								
	MB1_11113	5x	1	2 (10x)	3	4 (10x)	5 (10x)	6	8		
PCB-69/49	226	1130	87.4		8.45			5.9			
PCB-48	107	535	25.6		2.37*			1.45*			
PCB-44/47/65	383	1915	167		15.3			13.6			
PCB-59/62/75	35	175	13.5								
PCB-42	104	520	33								
PCB-41	55.7	279	10.1								
PCB-71/40	151	755	46.9		5.2			3.82			
PCB-64	133	665	44.4		4.17*			3.6			
PCB-68	3.52	18	6.93								
PCB-67	7.64	38.2	3.49*								
PCB-63	6.93	34.7	4.34								
PCB-61/70/74/76	262	1310	169		18.3			15.7			
PCB-66	116	580	98.9		10.1			8.81			
PCB-56	50.2	251	38.9		4.71	218	153	4.03*			
PCB-60	28.5	143	16.8			113	90.8				
PCB-96	3.03	15.2									
PCB-95	166	830	58.8		16.5			10.5			
PCB-102	6.8	34.0	4.42*								
PCB-91	22.3	112	11.3					1.96*			
PCB-84	50.2	251	24.4		5.82*		235	3.96			
PCB-92	23.7	119	14.1				92.2	2.12			
PCB-113/90/101	122	610	77.8		20		527	12.1			
PCB-83	6.98	34.9									
PCB-99	49	245	44.7		10.4		174	6.45			
PCB-108/119/86/97/125/87	71.2	356	50.8		15.5		252	7.89			
PCB-117	2.59	13.0	3.94								

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Compound	Blank ID		Sample Identification								
	MB1_11113	5x	1	2 (10x)	3	4 (10x)	5 (10x)	6	8		
PCB-116/85	13.2	66.0	9.82*				51	2.83			
PCB-110	101	505	87.9		27.9		359	14			
PCB-82	9.54*	47.7	9.88				38.9				
PCB-109	1.82	9	5.05								
PCB-136	16.3	82	7.37		2.09*						
PCB-151/135	27.8	139	15.3		8.11*			4.1			
PCB-144	3.75	18.8	2.3								
PCB-147/149	47.3	237	35.8		21.5			10.6			
PCB-134	3.44	17.2									
PCB-132	15.7	78.5	12		8.16		72.4	3.55			
PCB-146	2.45*	12	4.24					1.51			
PCB-153/168	15.9	80	29.8		20.3			9.85			
PCB-141	5.55	28	5.86*		4.43*			3.45			
PCB-163/138/129	18.9	95	43.9		26.5*			14.3			
PCB-158	2.44	12.2	3.99								
PCB-179	5.06*	25.3	3.54*		4.99			1.81*			
PCB-176	0.991	5.0									
PCB-187	7.07	35.4	8.78*		13.4			5.5			
PCB-174	4.47	22	8.99		14.8			5.25			
PCB-180/193	6.22	31	14.6		25.1		27.2*	9.45			

*EMPC

All contaminants within five times the method blank concentration were qualified as not detected.

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: 2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: None

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x									
PCB-77	7.84	39.2									
PCB-105	22.2	111									
PCB-118	52.8	264									
PCB-156/157	5.67*	28.35									
Total Mono-CBs	340	1700									
Total Di-CBs	3540	17700									
Total Tri-CBs	1020	5100									
Total Tetra-CBs	995*	4975									
Total Penta-CBs	489*	2445									
Total Hexa-CBs	177*	885									
Total Hepta-CBs	54.8*	274									
Total Octa-CBs	10.3*	51.5									
PCB-1	77.8	389									
PCB-2	149	745									
PCB-3	113	565									
PCB-4	76	380									
PCB-10	9.47	47.35									
PCB-9	10.8	54									
PCB-7	5.94	29.7									
PCB-6	28.8	144									
PCB-8	96.5	482.5									
PCB-11	3210	16050									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x									
PCB-13/12	28.5	142.5									
PCB-15	72.8	364									
PCB-19	17	85									
PCB-30/18	127	635									
PCB-17	72.5	362.5									
PCB-27	14.2	71									
PCB-24	2.95	14.75									
PCB-16	63.5	317.5									
PCB-32	51.9	259.5									
PCB-26/29	36.3	181.5									
PCB-25	25	125									
PCB-31	172	860									
PCB-28/20	233	1165									
PCB-21/33	80.3	401.5									
PCB-22	59.3	296.5									
PCB-35	12.8	64									
PCB-37	48.5	242.5									
PCB-54	2.57*	12.85									
PCB-50/53	22.2	111									
PCB-45	13.9	69.5									
PCB-51	33.9	169.5									
PCB-46	7.53	37.65									
PCB-52	141	705									
PCB-69/49	87.4	437									
PCB-48	25.6	128									
PCB-44/47/65	167	835									
PCB-59/62/75	13.5	67.5									
PCB-42	33	165									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x									
PCB-41	10.1	50.5									
PCB-71/40	46.9	234.5									
PCB-64	44.4	222									
PCB-68	6.93	34.65									
PCB-67	3.49*	17.45									
PCB-63	4.34	21.7									
PCB-61/70/74/76	169	845									
PCB-66	98.9	494.5									
PCB-56	38.9	194.5									
PCB-60	16.8	84									
PCB-103	2.63	13.15									
PCB-95	58.8	294									
PCB-100/93	5.51	27.55									
PCB-102	4.42*	22.1									
PCB-91	11.3	56.5									
PCB-84	24.4	122									
PCB-92	14.1	70.5									
PCB-113/90/101	77.8	389									
PCB-99	44.7	223.5									
PCB-108/119/86/97/125/87	50.8	254									
PCB-117	3.94	19.7									
PCB-116/85	9.82*	49.1									
PCB-110	87.9	439.5									
PCB-82	9.88	49.4									
PCB-107/124	3.36	16.8									
PCB-109	5.05	25.25									
PCB-136	7.37	36.85									
PCB-151/135	15.3	76.5									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x									
PCB-144	2.3	11.5									
PCB-147/149	35.8	179									
PCB-132	12	60									
PCB-146	4.24	21.2									
PCB-153/168	29.8	149									
PCB-141	5.86*	29.3									
PCB-164	2.24*	11.2									
PCB-163/138/129	43.9	219.5									
PCB-158	3.99	19.95									
PCB-128/166	8.56	42.8									
PCB-179	3.54*	17.7									
PCB-187	8.78*	43.9									
PCB-183	4.53*	22.65									
PCB-174	8.99	44.95									
PCB-177	5.41	27.05									
PCB-171/173	3.25	16.25									
PCB-180/193	14.6	73									
PCB-170	5.64*	28.2									
PCB-198/199	5.22	26.1									
PCB-194	5.12*	25.6									

*EMPC

13C-CE05-T042-XR03-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: TM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: —

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x									
PCB-105	70.9*	354.5									
PCB-118	268	1340									
Total Mono-CBs	1520	7600									
Total Di-CBs	33000	165000									
Total Tri-CBs	160000*	800000									
Total Tetra-CBs	71300*	356500									
Total Penta-CBs	6880*	34400									
Total Hexa-CBs	2640	13200									
Total Hepta-CBs	353	1765									
PCB-1	732	3660									
PCB-2	336	1680									
PCB-3	456	2280									
PCB-4	4060	20300									
PCB-10	170	850									
PCB-9	877	4385									
PCB-7	471	2355									
PCB-6	2820	14100									
PCB-5	343	1715									
PCB-8	14200	71000									
PCB-11	1830	9150									
PCB-13/12	1060	5300									
PCB-15	7220	36100									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x									
PCB-19	2500	12500									
PCB-30/18	28000	140000									
PCB-17	13000	65000									
PCB-27	2060	10300									
PCB-24	551	2755									
PCB-16	16000	80000									
PCB-32	8170	40850									
PCB-34	109	545									
PCB-23	48.6*	243									
PCB-26/29	5350	26750									
PCB-25	2390	11950									
PCB-31	25300	126500									
PCB-28/20	26600	133000									
PCB-21/33	16800	84000									
PCB-22	9870	49350									
PCB-39	147	735									
PCB-35	200	1000									
PCB-37	3140	15700									
PCB-54	78.7	393.5									
PCB-50/53	3530	17650									
PCB-45	4320	21600									
PCB-51	1150	5750									
PCB-46	1680	8400									
PCB-52	13500	67500									
PCB-43	864	4320									
PCB-69/49	7570	37850									
PCB-48	4000	20000									
PCB-44/47/65	12300	61500									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x									
PCB-59/62/75	1230	6150									
PCB-42	3400	17000									
PCB-41	1890	9450									
PCB-71/40	4970	24850									
PCB-64	4200	21000									
PCB-67	208	1040									
PCB-63	152*	760									
PCB-61/70/74/76	4120	20600									
PCB-66	1610	8050									
PCB-56	360	1800									
PCB-60	189	945									
PCB-96	89.3*	446.5									
PCB-95	2390	11950									
PCB-102	141*	705									
PCB-91	350	1750									
PCB-84	492	2460									
PCB-92	184	920									
PCB-113/90/101	1170	5850									
PCB-99	330	1650									
PCB-108/119/86/97/125/87	513	2565									
PCB-110	828	4140									
PCB-82	60.8	304									
PCB-136	264	1320									
PCB-151/135	576	2880									
PCB-144	60	300									
PCB-147/149	867	4335									
PCB-132	176	880									
PCB-153/168	318	1590									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x									
PCB-141	90.1	450.5									
PCB-163/138/129	287	1435									
PCB-179	152	760									
PCB-176	33	165									
PCB-187	168	840									

*EMPC

13C-CE05-T042-XR04-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: GM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: —

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-105	6.37	31.85									
PCB-118	16.2	81									
Total Mono-CBs	16.2*	81									
Total Di-CBs	66.4	332									
Total Tri-CBs	67.5*	337.5									
Total Tetra-CBs	86.2*	431									
Total Penta-CBs	119*	595									
Total Hexa-CBs	91.1*	455.5									
Total Hepta-CBs	82.6*	413									
Total Octa-CBs	19	95									
PCB-1	3.27*	16.35									
PCB-2	5.74	28.7									
PCB-3	7.16	35.8									
PCB-4	5.96	29.8									
PCB-9	2.79	13.95									
PCB-6	2.25	11.25									
PCB-8	7.31	36.55									
PCB-11	42	210									
PCB-15	6.08	30.4									
PCB-30/18	11	55									
PCB-17	5.94	29.7									
PCB-32	3.91	19.55									

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YM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-31	13.3	66.5									
PCB-28/20	17.1	85.5									
PCB-21/33	6.69	33.45									
PCB-22	4.06*	20.3									
PCB-37	5.43*	27.15									
PCB-52	17.6	88									
PCB-69/49	8.45	42.25									
PCB-48	2.37*	11.85									
PCB-44/47/65	15.3	76.5									
PCB-71/40	5.2	26									
PCB-64	4.17*	20.85									
PCB-61/70/74/76	18.3	91.5									
PCB-66	10.1	50.5									
PCB-56	4.71	23.55									
PCB-95	16.5	82.5									
PCB-84	5.82*	29.1									
PCB-113/90/101	20	100									
PCB-99	10.4	52									
PCB-108/119/86/97/125/87	15.5	77.5									
PCB-110	27.9	139.5									
PCB-136	2.09*	10.45									
PCB-151/135	8.11*	40.55									
PCB-147/149	21.5	107.5									
PCB-132	8.16	40.8									
PCB-153/168	20.3	101.5									
PCB-141	4.43*	22.15									
PCB-163/138/129	26.5*	132.5									
PCB-179	4.99	24.95									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-187	13.4	67									
PCB-183	6.51*	32.55									
PCB-174	14.8	74									
PCB-177	7.51	37.55									
PCB-180/193	25.1	125.5									
PCB-170	10.3	51.5									
PCB-198/199	6.84	34.2									
PCB-196	5.82	29.1									
PCB-194	6.38	31.9									

*EMPC

13C-CE05-T042-XR02-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: —

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x									
PCB-105	224	1120									
PCB-118	528	2640									
Total Mono-CBs	562	2810									
Total Di-CBs	9270*	46350									
Total Tri-CBs	25500*	127500									
Total Tetra-CBs	14900*	74500									
Total Penta-CBs	5800*	29000									
Total Hexa-CBs	2050*	10250									
Total Hepta-CBs	199*	995									
PCB-1	190	950									
PCB-2	186	930									
PCB-3	185	925									
PCB-4	898	4490									
PCB-10	53.7	268.5									
PCB-9	148*	740									
PCB-7	90.6	453									
PCB-6	522	2610									
PCB-5	54.7	273.5									
PCB-8	2470	12350									
PCB-11	3670	18350									
PCB-13/12	213	1065									
PCB-15	1140	5700									

2 of 4
JM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x									
PCB-19	387	1935									
PCB-30/18	4070	20350									
PCB-17	1960	9800									
PCB-27	309	1545									
PCB-24	66.4	332									
PCB-16	2280	11400									
PCB-32	1240	6200									
PCB-34	15*	75									
PCB-26/29	867	4335									
PCB-25	413	2065									
PCB-31	4190	20950									
PCB-28/20	4510	22550									
PCB-21/33	2780	13900									
PCB-22	1670	8350									
PCB-35	58.3	291.5									
PCB-37	704	3520									
PCB-54	12.6	63									
PCB-50/53	533	2665									
PCB-45	687	3435									
PCB-51	187	935									
PCB-46	254	1270									
PCB-52	2780	13900									
PCB-43	138	690									
PCB-69/49	1470	7350									
PCB-48	691	3455									
PCB-44/47/65	2520	12600									
PCB-59/62/75	238	1190									
PCB-42	654	3270									

30/4
gm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x									
PCB-41	374	1870									
PCB-71/40	953	4765									
PCB-64	854	4270									
PCB-67	41.8*	209									
PCB-63	41.7	208.5									
PCB-61/70/74/76	1510	7550									
PCB-66	625	3125									
PCB-56	218	1090									
PCB-60	113	565									
PCB-96	16.2*	81									
PCB-95	1110	5550									
PCB-102	53.5	267.5									
PCB-91	147	735									
PCB-84	343	1715									
PCB-92	161	805									
PCB-113/90/101	949	4745									
PCB-83	46.3	231.5									
PCB-99	372	1860									
PCB-108/119/86/97/125/87	605	3025									
PCB-116/85	118*	590									
PCB-110	1040	5200									
PCB-82	81.7	408.5									
PCB-136	121	605									
PCB-151/135	246	1230									
PCB-144	37*	185									
PCB-147/149	511	2555									
PCB-134	46.3	231.5									
PCB-132	197	985									

4 of 4
am

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-103	5x									
PCB-146	43.3*	216.5									
PCB-153/168	274	1370									
PCB-141	94.1	470.5									
PCB-163/138/129	402	2010									
PCB-158	38.4	192									
PCB-128/166	43.9*	219.5									
PCB-179	29.4*	147									
PCB-187	56.4	282									
PCB-183	26	130									
PCB-174	43*	215									
PCB-180/193	44.1*	220.5									

*EMPC

13C-CE05-T042-XR03-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: —

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x									
PCB-105	54.1	270.5									
PCB-118	150	750									
Total Mono-CBs	739	3695									
Total Di-CBs	16100	80500									
Total Tri-CBs	73200	366000									
Total Tetra-CBs	29600	148000									
Total Penta-CBs	3240*	16200									
Total Hexa-CBs	1330*	6650									
Total Hepta-CBs	142*	710									
PCB-1	339	1695									
PCB-2	173	865									
PCB-3	227	1135									
PCB-4	2030	10150									
PCB-10	95.4	477									
PCB-9	446	2230									
PCB-7	241	1205									
PCB-6	1360	6800									
PCB-5	152	760									
PCB-8	6770	33850									
PCB-11	1190	5950									
PCB-13/12	504	2520									
PCB-15	3270	16350									

2004
Jm

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x									
PCB-19	1140	5700									
PCB-30/18	13300	66500									
PCB-17	6070	30350									
PCB-27	958	4790									
PCB-24	222	1110									
PCB-16	7510	37550									
PCB-32	3970	19850									
PCB-34	51.2	256									
PCB-26/29	2430	12150									
PCB-25	1060	5300									
PCB-31	11100	55500									
PCB-28/20	11800	59000									
PCB-21/33	7640	38200									
PCB-22	4420	22100									
PCB-39	65.7	328.5									
PCB-37	1450	7250									
PCB-54	35	175									
PCB-50/53	1440	7200									
PCB-45	1780	8900									
PCB-51	492	2460									
PCB-46	666	3330									
PCB-52	5570	27850									
PCB-43	340	1700									
PCB-69/49	3150	15750									
PCB-48	1660	8300									
PCB-44/47/65	5020	25100									
PCB-59/62/75	537	2685									
PCB-42	1440	7200									

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Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x									
PCB-41	760	3800									
PCB-71/40	2110	10550									
PCB-64	1770	8850									
PCB-67	85.3	426.5									
PCB-63	73.7	368.5									
PCB-61/70/74/76	1720	8600									
PCB-66	678	3390									
PCB-56	153	765									
PCB-60	90.8	454									
PCB-96	43	215									
PCB-95	1000	5000									
PCB-100/93	28.5*	142.5									
PCB-102	75.8	379									
PCB-91	160	800									
PCB-84	235	1175									
PCB-92	92.2	461									
PCB-113/90/101	527	2635									
PCB-99	174	870									
PCB-108/119/86/97/125/87	252	1260									
PCB-116/85	51	255									
PCB-110	359	1795									
PCB-82	38.9	194.5									
PCB-136	122	610									
PCB-151/135	280	1400									
PCB-144	26.9	134.5									
PCB-147/149	429	2145									
PCB-132	72.4	362									
PCB-146	28.7	143.5									

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Am

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-103	5x									
PCB-153/168	160	800									
PCB-141	36.5*	182.5									
PCB-163/138/129	152*	760									
PCB-158	19.1	95.5									
PCB-179	62.4*	312									
PCB-176	16.5	82.5									
PCB-187	36.1*	180.5									
PCB-180/193	27.2*	136									

*EMPC

13C-CE05-T042-XR04-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: TM
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: —

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-105	4.1	20.5									
PCB-118	8.18	40.9									
Total Mono-CBs	14.6	73									
Total Di-CBs	66.8	334									
Total Tri-CBs	56.1*	280.5									
Total Tetra-CBs	71*	355									
Total Penta-CBs	74*	370									
Total Hexa-CBs	49.5	247.5									
Total Hepta-CBs	30.4*	152									
Total Octa-CBs	7.78	38.9									
PCB-1	4.49	22.45									
PCB-2	4.27	21.35									
PCB-3	5.8	29									
PCB-4	4.7	23.5									
PCB-8	5.92	29.6									
PCB-11	51.4	257									
PCB-15	4.81	24.05									
PCB-30/18	7.42	37.1									
PCB-17	4.73	23.65									
PCB-16	3.65	18.25									
PCB-32	3.47	17.35									
PCB-26/29	2.03	10.15									

2013
TM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-31	9.78	48.9									
PCB-28/20	13.5	67.5									
PCB-21/33	4.98	24.9									
PCB-22	3.3*	16.5									
PCB-37	3.22*	16.1									
PCB-50/53	1.36*	6.8									
PCB-52	12.8	64									
PCB-69/49	5.9	29.5									
PCB-48	1.45*	7.25									
PCB-44/47/65	13.6	68									
PCB-71/40	3.82	19.1									
PCB-64	3.6	18									
PCB-61/70/74/76	15.7	78.5									
PCB-66	8.81	44.05									
PCB-56	4.03*	20.15									
PCB-95	10.5	52.5									
PCB-91	1.96*	9.8									
PCB-84	3.96	19.8									
PCB-92	2.12	10.6									
PCB-113/90/101	12.1	60.5									
PCB-99	6.45	32.25									
PCB-108/119/86/97/125/87	7.89	39.45									
PCB-116/85	2.83	14.15									
PCB-110	14	70									
PCB-151/135	4.1	20.5									
PCB-147/149	10.6	53									
PCB-132	3.55	17.75									
PCB-146	1.51	7.55									

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TM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-103	5x									
PCB-153/168	9.85	49.25									
PCB-141	3.45	17.25									
PCB-163/138/129	14.3	71.5									
PCB-128/166	2.16	10.8									
PCB-179	1.81*	9.05									
PCB-187	5.5	27.5									
PCB-183	2.08*	10.4									
PCB-174	5.25	26.25									
PCB-177	2.97	14.85									
PCB-180/193	9.45	47.25									
PCB-170	3.37	16.85									
PCB-198/199	3.82	19.1									
PCB-194	3.96	19.8									

*EMPC

13C-CE05-T042-XR02-103 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 9 >5x

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR02	5x	9								
PCB-118	32.1	160.5									
Total Di-CBs	188	940									
Total Tri-CBs	107*	535									
Total Penta-CBs	70.2*	351									
Total Hexa-CBs	69*	345									
PCB-11	106	530									
PCB-15	82.1	410.5									
PCB-31	41.6*	208									
PCB-28/20	65.6	328									
PCB-113/90/101	38.1*	190.5									
PCB-153/168	27.8*	139									
PCB-163/138/129	41.2	206									

*EMPC

N10-CE05-TNNE-XR02 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: TM
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 7 Qual U (be)

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	7								
PCB-77	9.09	45.45									
PCB-105	15.4	77									
PCB-118	33.7	168.5									
PCB-156/157	5.61	28.05									
Total Mono-CBs	391	1955									
Total Di-CBs	3450	17250									
Total Tri-CBs	693	3465									
Total Tetra-CBs	581*	2905									
Total Penta-CBs	295*	1475									
Total Hexa-CBs	161*	805									
Total Hepta-CBs	60	300									
PCB-1	87.4	437									
PCB-2	164	820	225								
PCB-3	140	700	678								
PCB-4	69.8	349									
PCB-10	8.27	41.35									
PCB-9	10.8	54									
PCB-7	6.62	33.1									
PCB-6	43.5	217.5									
PCB-8	118	590									
PCB-11	3070	15350	6770								
PCB-13/12	39.2	196									

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	7								
PCB-15	86.5	432.5									
PCB-19	16.9	84.5									
PCB-30/18	102	510									
PCB-17	51.7	258.5									
PCB-27	9.52	47.6									
PCB-16	50.5	252.5									
PCB-32	33.9	169.5									
PCB-26/29	25.1	125.5									
PCB-25	14.7	73.5									
PCB-31	108	540									
PCB-28/20	132	660									
PCB-21/33	53.9	269.5									
PCB-22	38.4	192									
PCB-35	11.4	57									
PCB-37	44.8	224									
PCB-50/53	13	65									
PCB-45	11.3	56.5									
PCB-51	16	80									
PCB-46	4.47*	22.35									
PCB-52	92	460									
PCB-69/49	47.5	237.5									
PCB-48	15.6	78									
PCB-44/47/65	110	550									
PCB-59/62/75	6.98	34.9									
PCB-42	19.5	97.5									
PCB-41	7.7	38.5									
PCB-71/40	28.2	141									
PCB-64	24.6	123									

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9m

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	7								
PCB-68	4.71	23.55									
PCB-61/70/74/76	88.9	444.5									
PCB-66	49.8	249									
PCB-56	22.9	114.5									
PCB-60	9.47*	47.35									
PCB-95	46.9	234.5									
PCB-91	7.74	38.7									
PCB-84	14.7	73.5									
PCB-92	9.04	45.2									
PCB-113/90/101	47.9	239.5									
PCB-99	21.3	106.5									
PCB-108/119/86/97/125/87	32.1	160.5									
PCB-116/85	7.69	38.45									
PCB-110	49	245									
PCB-82	5.97*	29.85									
PCB-109	3.9	19.5									
PCB-136	5.81	29.05									
PCB-151/135	16.4	82									
PCB-147/149	33.4	167									
PCB-132	13.9	69.5									
PCB-146	6.96	34.8									
PCB-153/168	26.2	131									
PCB-141	7.46*	37.3									
PCB-130	5.42*	27.1									
PCB-163/138/129	33.6	168									
PCB-128/166	6.14*	30.7									
PCB-179	4.96	24.8									
PCB-187	12.7	63.5									

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR03	5x	7								
PCB-183	5.14	25.7									
PCB-174	9.48	47.4									
PCB-177	5.68	28.4									
PCB-180/193	14.1	70.5									
PCB-170	7.89	39.45									
PCB-209	4.94	24.7									

*EMPC

N10-CE05-TNNE-XR03 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: Yh
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/25/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 8 Qual U (be)

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR04	5x	8								
PCB-105	15.8	79									
PCB-118	30.5	152.5									
Total Mono-CBs	161*	805									
Total Di-CBs	1110	5550									
Total Tri-CBs	714	3570									
Total Tetra-CBs	467*	2335									
Total Penta-CBs	258*	1290									
Total Hexa-CBs	90.2*	451									
PCB-1	47.4*	237									
PCB-2	59	295	169								
PCB-3	54.4	272									
PCB-4	53.4	267									
PCB-9	17.4	87									
PCB-6	32.6	163									
PCB-8	103	515									
PCB-11	810	4050	2430								
PCB-15	89.6	448									
PCB-30/18	97.4	487									
PCB-17	50.7	253.5									
PCB-16	51.7	258.5									
PCB-32	31.6	158									
PCB-26/29	29.9	149.5									

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Th

Compound	Blank ID	Sample Identification									
	N10-CE05-TNNE-XR04	5x	8								
PCB-31	122	610									
PCB-28/20	152	760									
PCB-21/33	73.3	366.5									
PCB-22	46.8	234									
PCB-37	58.8	294									
PCB-52	90.2	451									
PCB-69/49	43.2	216									
PCB-44/47/65	87.6	438									
PCB-71/40	29.3*	146.5									
PCB-64	25.4	127									
PCB-61/70/74/76	96.4	482									
PCB-66	52.4	262									
PCB-56	27.5	137.5									
PCB-60	15.1*	75.5									
PCB-95	50.8	254									
PCB-113/90/101	56.1	280.5									
PCB-99	20.4*	102									
PCB-108/119/86/97/125/87	35.8*	179									
PCB-110	48.8	244									
PCB-147/149	33*	165									
PCB-153/168	27.1	135.5									
PCB-163/138/129	30.1	150.5									

*EMPC

N10-CE05-TNNE-XR04 (A5668)

All contaminants within five times the blank concentration were qualified as not detected, "U".

V:\Field Blanks\30206B31_N10-CE05-TNNE-XR04.wpd

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: TM
2nd Reviewer: Q

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
(Y) N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		MB1_11113	13C PCB-15	115 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		1	13C PCB-15	112 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		7	13C PCB-15	108 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		8	13C PCB-15	110 (19-107)	Jdets/P (see attached, +Total Di-CBs)

Table 3. Quantitation References for Analytes

2002

AP Quantitation References

ES PCB-1
PCB-1

ES PCB-3
PCB-2
PCB-3

ES PCB-4
PCB-4
PCB-10

ES PCB-15
PCB-9
PCB-7
PCB-6
PCB-5
PCB-8
PCB-14
PCB-11
PCB-13/12
PCB-15

ES PCB-19
PCB-19
PCB-30/18
PCB-17
PCB-27
PCB-24
PCB-16
PCB-32

ES PCB-37
PCB-34
PCB-23
PCB-26/29
PCB-25
PCB-31
PCB-28/20
PCB-21/33
PCB-22
PCB-36
PCB-39
PCB-38
PCB-35
PCB-37

ES PCB-54
PCB-54

ES PCB-77
PCB-77

ES PCB-81
PCB-52
PCB-73
PCB-43
PCB-69/49
PCB-48
PCB-44/47/65
PCB-59/62/75
PCB-42
PCB-41
PCB-71/40
PCB-64
PCB-72
PCB-68
PCB-57
PCB-58
PCB-67
PCB-63
PCB-61/70/74/76
PCB-66
PCB-55
PCB-56
PCB-60
PCB-80
PCB-79
PCB-78
PCB-50/53*
PCB-45*
PCB-51*
PCB-46*
PCB-81

ES PCB-104
PCB-104
PCB-96

ES PCB-105
PCB-105
PCB-127

ES PCB-114
PCB-122
PCB-114

ES PCB-118
PCB-118

ES PCB-123
PCB-103
PCB-94
PCB-95
PCB-100/93
PCB-102
PCB-98
PCB-88
PCB-91
PCB-84
PCB-89
PCB-121
PCB-92
PCB-113/90/101
PCB-83
PCB-99
PCB-112
PCB-108/119/86/97/125/87
PCB-117
PCB-116/85
PCB-110
PCB-115
PCB-82
PCB-111
PCB-120
PCB-107/124
PCB-109
PCB-123
PCB-106

ES PCB-126
PCB-126

ES PCB-155
PCB-155
PCB-152
PCB-150
PCB-136
PCB-145

ES PCB-153
PCB-148
PCB-151/135
PCB-154
PCB-144
PCB-147/149
PCB-134
PCB-143
PCB-139/140
PCB-131
PCB-142
PCB-132
PCB-133
PCB-165
PCB-146
PCB-161
PCB-153/168
PCB-141
PCB-130
PCB-137
PCB-164
PCB-163/138/129
PCB-160
PCB-158

ES PCB-156/157
PCB-156/157

ES PCB-167
PCB-128/166
PCB-159
PCB-162
PCB-167

ES PCB-169
PCB-169

ES PCB-188
PCB-188
PCB-179
PCB-184
PCB-176
PCB-186
PCB-178

ES PCB-180
PCB-175
PCB-187
PCB-182
PCB-183
PCB-185
PCB-174
PCB-177
PCB-181
PCB-171/173
PCB-172
PCB-192
PCB-180/193
PCB-191

ES PCB-170
PCB-170
PCB-190

ES PCB-189
PCB-189

ES PCB-202
PCB-202
PCB-201
PCB-204
PCB-197
PCB-200
PCB-198/199
PCB-196
PCB-203

ES PCB-205
PCB-195
PCB-194
PCB-205

ES PCB-206
PCB-206

ES PCB-208
PCB-208
PCB-207

ES PCB-209
PCB-209

Note: Quantitation Reference for those congeners without a Labeled Standard is based on the nearest ES @ the same level of chlorination within the same function.
Quantitation of those congeners within a function where there is no ES is based on the nearest ES in the other functions of that homologue .
** Based on analytical observations PCB's 50/53, 45,51& 46 were moved to ES 81 when the additional ES's were added.*

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

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

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		PCB-9, PCB-7, PCB-6	The laboratory indicated that congeners were	1	Jdets/P (+ Total Di-CBs) (q)
			quantitated using single ion mode (SI). The		
		PCB-4, PCB-9, PCB-6, PCB-8, PCB-15	area for the secondary ion trace was not	3	
			integrated due to significantly elevated noise		
		PCB-4, PCB-8, PCB-15	levels from background PFK.	6	
			Quantitation should be performed using the		
			area of the primary and secondary ions.		

Notes: _____

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	+ all except ~~8~~ 7, 8	TEXT (all compounds + Total Mono- through Nona-CBs)
				7, 8	TEXT (all compounds except PCB-38,-40, -41,-42,-44,-46,-47,-48,-50,-51,-52,-53,-59, -60,-62,-64,-65,-68,-69,-71,-75 and Total Tetra-CBs)
				+ 1, 2, 4, 5, 7, 8	

Notes:

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer:
2nd Reviewer:

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

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	Compound	Finding	Associated Samples	Qualifications
			results reported as EMPC	All	EMPC-J/A (k)
			Congeners flagged "E" exceed upper calibration range	7	Jdets/A (+Total Tri-CBs,Tetra-CBs) (q)
				9	Jdets/P (+Total Penta-CBs)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30206B31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) 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	MM6 ICAL	12/14/12	PCB 77 (^{13}C-PCB 77)	1.25	1.25	1.24	1.24	5.4	5.3
			PCB 105 (^{13}C-PCB 105)	1.06	1.06	1.05	1.04	2.1	2.1
			PCB 167 (^{13}C-PCB 167)	1.18	1.18	1.20	1.20	1.6	1.6
			PCB 189 (^{13}C-PCB 189)	1.12	1.11	1.11	1.11	2.1	1.9
2			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 30206B31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: SM
2nd Reviewer: ____

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

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	130727V01	7-27-13	PCB 77 (^{13}C-PCB 77)	1.25	1.04	1.04	-16.6	16.8
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.98	-6.6	6.6
			PCB 167 (^{13}C-PCB 167)	1.18	1.03	1.03	-13.0	13.1
			PCB 189 (^{13}C-PCB 189)	1.12	1.03	1.03	-7.9	8.3
2	130727V13	7-27-13	PCB 77 (^{13}C-PCB 77)	1.25	1.10	1.09	-12.2	12.0
			PCB 105 (^{13}C-PCB 105)	1.06	1.00	0.99	-5.7	5.7
			PCB 167 (^{13}C-PCB 167)	1.18	1.00	1.00	-15.5	15.4
			PCB 189 (^{13}C-PCB 189)	1.12	1.03	1.03	-7.5	7.9
3	130729N04	7-29-13	PCB 77 (^{13}C-PCB 77)	1.25	1.07	1.07	-14.3	14.5
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.99	-5.8	6.1
			PCB 167 (^{13}C-PCB 167)	1.18	0.99	0.99	-16.0	16.2
			PCB 189 (^{13}C-PCB 189)	1.12	1.04	1.04	-6.4	6.85
4			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					

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 #: 30206B31

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 5, PCB-3:

Conc. = $\frac{(9.42e5)(2000)(1)}{(6.44e6)(1.29)(1)(\quad)}$

= 227 pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5678 SITE: CWCM High Vol #2, LPR
LAB: SGS- Analytical Perspectives

CHECKLIST

I.0 **Data Completeness and Deliverables**

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 **Reporting Requirements and Deliverables**

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] ___ ___

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] ___ ___

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] ___ ___

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] ___ ___

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [✓] ___ ___

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in **Table 8** (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [ ] ___ [✓]

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [✓] ___ ___

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).
2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.
3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [✓] ___ ___

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [✓] ___ ___

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [/] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [ ] ___ ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [/] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [/] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)CI}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [ ] / ___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [/] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [/] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [ ] ___ [/]

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [/] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Method Blanks

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ ✓

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [✓] ___ ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ ✓

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] ✓ ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ ✓

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [ ] ___ ✓

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set .

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? ☑ ___ ___

13.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~outline below~~ QAPP? ☑ ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [/] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [/] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [/] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [ ] / ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [ ] ___ /

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [ ] / ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [ ] ___ /

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ /

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] / ___

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ /

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206C21_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 27, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Dioxins/Dibenzofurans
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5684

Sample Identification

13C-CE05-T102-BM01
13C-CE05-T102-BM02
13C-CE05-T102-BP01

Introduction

This data review covers 2 polyurethane foam (PUF) samples and one filter sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1613B for Polychlorinated Dioxins/Dibenzofurans.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-25 (Revision 3, December 2010) for Tetra- through Octachlorinated Dioxins and Furans by Isotope Dilution and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all homologues.

The chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers was resolved with a valley of less than or equal to 10%.

The chromatographic resolution between 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers was resolved with a valley of less than or equal to 40%.

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.

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

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compound and labeled compound.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration results were within the QC limits for unlabeled compounds and labeled compounds with the following exceptions:

Date	Compound	Concentration (Limits)	Associated Samples	Affected Compounds	Flag	A or P
7/16/13	1,2,3,4,6,7,8-HpCDF	57.3 (45-55)	MB1 11113	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects)	P
7/16/13	1,2,3,4,6,7,8-HpCDF	56.5 (45-55)	MB1 11113	1,2,3,4,6,7,8-HpCDF Total HpCDF	J (all detects)	P

The ion abundance ratios for all PCDDs and PCDFs were within method criteria.

V. Blanks

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

Samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, 13C-CE05-T042-XR02-101 (all from SDG A5678) were identified as equipment blanks. No polychlorinated dioxin/dibenzofuran contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	OCDD Total TCDD Total HpCDD	9.1 pg 1.17 pg 1.81 pg	13C-CE05-T102-BM01
13C-CE05-T042-XR04-101	6/26/13	OCDD	3.14 pg	13C-CE05-T102-BM02
13C-CE05-T042-XR02-101	6/26/13	OCDD	3.59 pg	13C-CE05-T102-BP01

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

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria.

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compound identifications were within validation criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T102-BM01 13C-CE05-T102-BM02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5684	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	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.

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Data Qualification Summary - SDG A5684

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5684	13C-CE05-T102-BM01 13C-CE05-T102-BM02 13C-CE05-T102-BP01	All compounds reported by the laboratory as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (EMPC) (k)

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG A5684

No Sample Data Qualified in this SDG

CWCM Lower Passaic River High Volume Event #2
Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG A5684

No Sample Data Qualified in this SDG

LDC #: 30206C21

SDG #: A5684

Laboratory: SGS/Analytical Perspectives

VALIDATION COMPLETENESS WORKSHEET

Full

Date: 8-27-13

Page: 1 of 1

Reviewer: TM

2nd Reviewer: C

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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: 6/27/13
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	≤ 20/35
IV.	Routine calibration/~~ICV~~	SW	QC limits
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	A	
X.	Target compound identifications	~~A~~ SW TM 10/28/14	
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	*

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: 2PUFs/1 filter (water)

1	13C-CE05-T102-BM01	11		21		31	
2	13C-CE05-T102-BM02	12		22		32	
3	13C-CE05-T102-BP01	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	MB1-11113	30		40	

Notes: * 13C-CE05-T042-XR03-101 (A5678), 13C-CE05-T042-XR04-101 (A5678), 13C-CE05-T042-XR02-101 (A5678)

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Routine Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a routine calibration performed at the beginning of each 12 hour period?
Y N N/A Were all concentrations within method QC limits for unlabeled and labeled compounds?
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria? (c)

#	Date	Standard ID	Compound	conc (ng/mL) Finding %D	Finding Ion Abundance Ratio	Associated Samples	Qualifications
	07/16/13	130716P2-01	O	57.3 (45-55)		MB1 11113	Jdets/P (O, Y)
	07/16/13	130716P2-13	O	56.5 (45-55)		MB1 11113	Jdets/P (O, Y)

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: GM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR03-101	5X								
G	9.1*	45.5								
R	1.17*	5.9								
U	1.81*	9.1								

* EMPC

13C-CE05-T042-XR03-101 (A5678)

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:\Field Blanks\30206C21_13C-CE05-T042-XR03-101.wpd4

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR04-101	5X								
G	3.14*	15.7								

* EMPC

13C-CE05-T042-XR04-101 (A5678)

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:\Field Blanks\30206C21_13C-CE05-T042-XR04-101.wpd4

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins (EPA Method 1613B)

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3 >5x

Compound	Blank ID	Sample Identification								
	13C-CE05-T042-XR02-101	5X								
G	3.59*	18.0								

* EMPC

13C-CE05-T042-XR02-101 (A5678)

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:\Field Blanks\30206C21_13C-CE05-T042-XR02-101.wpd4

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer:
2nd Reviewer:

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Compound ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	~~all~~ 1, 2	TEXT

Notes: See Attached

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: 7h
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (Method 1613B)

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	Compound	Finding	Associated Samples	Qualifications
			EMPC results	All	EMPC-J/A (k)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30206C21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

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

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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	MM1 ICAL	02/13/13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.97	0.97	0.98	0.98	4.5	4.5
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.06	1.06	1.07	1.07	4.1	4.2
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.04	1.04	1.03	1.03	5.3	5.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	1.02	1.02	1.02	1.02	4.8	4.75
			OCDF (^{13}C-OCDF)	1.00	1.00	1.01	1.01	5.6	5.6
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDF)						

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 #: 30206C21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: JM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)	Spiked Conc (ng/mL)	Reported Conc (ng/mL)	Recalculated Conc (ng/mL)	Reported %D	Recalculated %D
1	130716PZ-01	7-16-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.8	11.8	18	18
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.5	10.5	5	5
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	54.3	54.1	9	9
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52	52	4	4
			OCDF (^{13}C-OCDF)	100	116	116	16	16
2	130717P1-01	7-17-13	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10	11.3	11.3	13	13
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10	10.7	10.8	7	7
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50	55.6	55.4	11	11
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50	52.5	52.5	5	5
			OCDF (^{13}C-OCDF)	100	107	107	7	7
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	10				
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	10				
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	50				
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	50				
			OCDF (^{13}C-OCDF)	100				

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 #: 30206C21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 1613B)

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)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 1, J:

$$\text{Conc.} = \frac{(2.20e5)(2000)(1)}{(6.56e7)(1.07)(1)(\ )}$$

$$= 6.27 pg$$

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

YES NO N/A

PACKAGE COMPLETENESS AND DELIVERABLES

CASE NUMBER: A5684 LAB: SGS Analytical Perspectives
SITE: CWCM High Vol #2, LPR

I.0 Data Completeness and Deliverables

		YES	NO	N/A
1.1	Does the Traffic Report or Field Chain of Custody list all samples?	[✓]	___	___
1.2	Is the Case Narrative present?	[✓]	___	___
1.3	Are the Case Number and SDG numbers contained in the case narrative?	[✓]	___	___
1.4	Do the Traffic Reports, Field Chain of Custody or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data?	___	[✓]	___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: As per region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample Contains more than 90% water, then qualify positive hits "J", and non detects "UJ".

ACTION: If sample cooler temperature was greater than 10 C, then flag all positive hits "J" And non detects "UJ".

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, DFLM01.1 and should be specified in the Project Plan. Laboratories will not always use the exact CLP format for the forms. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

	YES	NO	N/A
a. Sample Data Summary (Form I CDD-1)	[✓]	___	___
b. CDD/CDF Toxicity Equivalency Factor (Form I, CDD-2)	[✓]	___	___
c. Second Column Confirmation Summary (Form I, CDD-3)	[___]	___	✓
d. Total Homologue Concentration Summary (Form II CDD)	[✓]	___	___
e. CDD/CDF Spiked Sample Summary (Form III CDD-1)	[✓]	___	___
f. CDD/CDF Duplicate Sample Summary (Form III CDD-2)	[___]	___	✓
g. CDD/CDF Method Blank Summary (Form IV-CDD)	[✓]	___	___

	YES	NO	N/A
h. CDD/CDF Window Defining Mix Summary (Form V-CDD-1)	[✓]	___	___
I. Chromatographic Resolution Summary (Form V CDD-2)	[✓]	___	___
j. CDD/CDF Analytical Sequence Summary (Form V CDD-3)	[✓]	___	___
k. Initial Calibration (Form VI, CDD-1, CDD-2)	[✓]	___	___
l. Continuing Calibration (Form VII, CDD-1, Form VII, CDD-2)	[✓]	___	___

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.3 GC/MS Displays
Are the following GC/MS displays present?

	YES	NO	N/A
a. Standard and sample SIM chromatograms. SIM and TIC chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number	[✓]	___	___
b. Percent peak resolution valley	[✓]	___	___
c. Window Defining Mixture raw data	[✓]	___	___
d. SIM mass chromatograms must display quantitation ion, confirmation ion, and polychlorinated diphenylether ion, where applicable.	[✓]	___	___
e. Integrated area and peak height must be listed for all peaks 2.5 times above background	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

	YES	NO	N/A
a. Chain of Custody Records	[✓]	___	___
b. Sample Shipment Records	[✓]	___	___
c. Sample log-in sheets	[✓]	___	___
d. GC/MS Standard and Sample Run Log in chronological order	[✓]	___	___
e. Sample Extraction Log	[✓]	___	___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the

YES NO N/A

effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment.

3.0 Holding Times

3.1 Have samples been analyzed within proper holding times?

a. For aqueous samples, ~~30 days~~ 1 yr from VTSR to extraction? [✓] ___ ___

b. For soil/sediment samples, 30 days from VTSR to extraction? [___] ___ ✓

c. For fish and tissue samples, one (1) year from VTSR to extraction? [___] ___ ✓

d. For all samples ~~45 days~~ 1 yr from time of extraction to time of analysis? [✓] ___ ___

ACTION: If holding times are exceeded, flag all positive hits as estimated ("J"), and non-detects
as estimated "UJ". Holding time criteria do not apply to PE samples.
If holding times are grossly exceeded (e.g. by greater than two times the specified Technical holding times), either on the first analysis or upon reanalysis, flag positive hits as estimated "J", and flag non-detects as unusable "R".

Note: The data reviewer must note whether or not technical and contractual holding times were met.

4.0 Instrument Performance

4.1 Mass Calibration - Mass calibration of the MS must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. Include in the narrative, minimum required resolving power of 10000 was obtained for perfluorokerosene (PFK) ion 380.9760. This is done by first measuring peak width at 5% of the maximum. This should not exceed 100 ppm, i.e., it should not exceed 0.038, for ion 380.9760. Resolving power, then is calculated using the formula,

Resolving Power = $m/\Delta m$ = 380.9760/0.038 = 10025.

NOTE: The mass calibration is generally not reported. Improper mass calibration may be detected by examining ion abundance ratios for initial and continuing calibration standards. If the mass calibration is not properly performed, the standards will not have ion abundance ratios within criteria.

4.2 Window Defining Solution/ Isomer Specificity Test Standards

The Window Defining Solution must contain the first and the last isomers of each homologue CDD/CDF, (the labeled and internal standards are optional). The solution also should contain a series of other TCDD analytes for the purpose of documenting the chromatographic resolution.

4.2.1 For analyses on a DB-5 (or equivalent) GC column, the chromatographic resolution is evaluated by the analysis of Isomer Specificity Test Standards at the beginning of every 12 hour period. Was this performed accordingly? [✓] ___ ___

YES NO N/A

ACTION: If the Isomer Specificity Test Standards was not analyzed at the required frequency, use professional judgement to determine the effect on the quality of the data. Document in Data Assessment under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Did the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4-TCDD exceed 25.0 minutes on the DB-5 column and 15.0 minutes on the DB-225 column? (Method 1613B, Section 10.2.4) [✓] ___ ___

4.2.4 Are the relative retention times of native and labeled CDD's and CDF's within the limits given in Table 2 of the method. (Method 1613B, Section 15.4.1.2) [✓] ___ ___

ACTION: If no for sections 4.2.2, 4.2.3 and 4.2.4, assess the effect on the validity of the data. Note in the Data Assessment.

4.2.5 For DB-5 or equivalent, (Method 1613B, Section 15.4.2.2) the peak separation between the unlabeled 2,3,7,8-TCDD and the peaks representing any other TCDD analyte shall be resolved with a valley of ≤ 25 percent.
Was this criteria met? [✓] ___ ___

% Valley = (x/y) x (100)

Y = The peak height of 2,3,7,8-TCDD analyte

X = The distance from the baseline to the bottom of the valley between the adjacent peaks.

ACTION: If the percent valley criteria are not met, qualify all positive data "J". Do not qualify non-detects.

4.2.6 Is the last eluting tetra chlorinated congener (1,2,8,9-TCDD) and the first eluting penta chlorinated congener (1,3,4,6,8-PeCDF) separated properly, since they elute within 15 seconds of each other? [✓] ___ ___

ACTION: If one of the congener is missing, report that in the Data Assessment.

5.0 Initial 5-Point Calibration

The initial calibration standard solutions (CS1-CS5) must be analyzed prior to any sample analysis. However, initial calibration should be analyzed when the CS3 Calibration Verification (VER) or Isomer Specificity Test Standard do not meet performance criteria. The initial calibration standards must be analyzed on the same instrument using the same GC/MS conditions that were used to analyze the Window Defining **Solution** and the Isomer Specificity Test Standards.

Was the initial calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard, or to combine calibration solutions.

1. Isotope Dilution: performed for the fifteen 2,3,7,8-substituted CDDs and CDFs unlabeled analytes with labeled analytes added to the samples prior to extraction and for 1,2,3,7,8,9-HXCDD and OCDF (see sections 5.2.8 and 5.2.9). The relative response (RR) is calculated and the percent coefficient of variation must be 20% over the 5 point range (1613B sec. 10.5.4) to use the average relative response for quantitation, otherwise a calibration curve

YES NO N/A

must be used..

2. Calibration by Internal Standard: performed for non-2,3,7,8 substituted compounds having no labeled analytes in this method and for measurement of labeled compounds for intra laboratory statistics.. The response factor (RF) is calculated and the percent coefficient of variation must be 35% over the 5 point range (1613B sec. 10.6.3) to use the average response factor for quantitation, otherwise a calibration curve must be used.

3. Combined Calibration: performed by using solutions containing unlabeled, labeled compounds and internal standards. The requirements of each of the above methods are used. This method allows the laboratory to produce a single set of curves for isotope dilution and internal standard method.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 8, including interfering ions? (see analytical method) [✓] ___ ___

5.2 Were the following GC criteria met?

5.2.1 The chromatographic resolution between the 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers must be resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column (1613B sec. 15.4.2.2). [✓] ___ ___

5.2.2 The chromatographic resolution between the 2,3,7,8-TCDF and the peaks representing any other unlabeled TCDF isomers must be resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis column. [___] ___ [✓]

5.2.3 For all calibration solutions, the relative retention time of peaks representing an unlabeled 2,3,7,8- substituted CDD or CDF must be within the limits given in table 2 of the Method. The retention times of the peaks representing non-2,3,7,8- substituted CDD or CDF's must fall within the retention time windows established by the Window Defining Solution. In addition, the absolute retention times of internal standards, $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD shall not change by more than 15 seconds between the CS3 analysis and the analysis of any other standard. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog must maximize simultaneously and within 2 seconds of the corresponding labeled analyte ions?(1613B sec. 16.1) [✓] ___ ___

5.2.5 The relative ion abundance criteria for CDDs/CDFs listed in Table 9 (see analytical method) must be met. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean response factors (RRF) from the 17 unlabeled standards must be ≤ 20%, and those for the 15 labeled reference compounds must be ≤ 35%. [✓] ___ ___

5.2.8 Labeled analyte 1,2,3,7,8,9-HxCDD is used as an internal standard in this method, and can not be used to quantitate corresponding unlabeled analyte. The unlabeled 1,2,3,7,8,9-HxCDD must be

YES NO N/A

quantitated using the average of the responses of the labeled analytes of 1,2,3,4,7,8-HxCDD and 1,2,3,6,7,8-HxCDD. The concentration of the unlabeled 1,2,3,7,8,9-HxCDD is corrected for the average recovery of the other HxCDD's. Was the unlabeled 1,2,3,7,8,9-HxCDD quantitated correctly? [___] ___ ___

5.2.9 The labeled analog of OCDF is not added to the sample because of a potential interference. Unlabeled OCDF is quantitated against the labeled OCDD. The concentration of the unlabeled OCDF is corrected for the recovery of the labeled OCDD. Was the unlabeled OCDF correctly quantitated against the labeled OCDD. [___] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 was not met, note in Data Assessment.

2. If the selected monitoring ions specified in Table 8 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 25% percent valley for TCDD requirement was not met, quality positive data "J". Do not qualify non-detects. The tetra and penta (dioxins and furans) are affected. Heptas, Hexas and Octas are not affected.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each unlabeled analyte exceeds 20%, or the %RSD for each labeled analyte exceeds 35%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If 1,2,3,7,8,9-HxCDD was not calculated using the correct HxCDD response (average) factor, either manually recalculate the values for all standards and samples or contact Project Officer to request resubmittals from the laboratory.

9. If OCDF was not calculated using the correct response factor (OCDD), either manually recalculate the values for all standards and data or contact Project Officer to request resubmittals from the laboratory.

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

To recalculate the response factor, use the equation:
For target compounds (unlabeled analytes with corresponding labeled analytes):

$$RR = \frac{(A_{n1} + A_{n2}) \times Q_l}{}$$

YES NO N/A

$(A_{l1} + A_{l2}) \times Q_n$

For labeled analytes, Internal standards and cleanup standard listed in Table 6 of method 1613:

$$RF = \frac{(A_{l1} + A_{l2}) \times Q_{is}}{(A_{is1} + A_{is2}) \times Q_l}$$

Note: There is only one m/z for $^{37}Cl_4$2,3,7,8-TCDD.

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analytes of interest. (Target analyte, unlabeled compounds)

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled analytes compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_n = quantity of the unlabeled PCDD/PCDF analyte injected [pg]

Q_l = quantity of the appropriate labeled analytes compound [pg]

Q_{is} = quantity of the appropriate internal standard injected [pg]

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification and Isomer Specificity Test Standard)

At the beginning of a 12 hour shift during which analyses are performed, GC/MS system performance and calibration are verified for all unlabeled and labeled compounds. For these tests the calibration verification (VER) standard and the isomer specificity test standards shall be used to verify all performance criteria.

Only if the laboratory meets all performance criteria may samples, blanks, and precision and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Was the relative ion abundance for CDDs/CDFs listed in Table 9 of the analytical method met? (Method 1613B, Section 15.3.2) [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) of ≥ 10? (Method 1613B, Section 15.3.3) [✓] ___ ___

6.1.3 For each compound, was the concentration within the limit in Table 6 of the method? (Method 1613B, Section 15.3.5) [___] ✓ ___

6.1.4 Were the absolute retention time of the internal standards $^{13}C_{12}$-1,2,3,4- TCDD and $^{13}C_{12}$1,2,3,7,8,9- HxCDD within ± 15 seconds of the retention times obtained during calibration? (Method 1613B, Section 15.4.1.1) [✓] ___ ___

6.1.5 Were the relative retention times of the unlabeled and labeled CDDs and CDFs within the limits given by Table 2 of the method? (Method 1613B, Section 15.4.2.2) [✓] ___ ___

YES NO N/A

6.2 Isomer Specificity Test Standard

6.2.1 Was the chromatographic resolution between 2,3,7,8-TCDD and the peaks representing any other unlabeled TCDD isomers resolved with a valley of ≤ 25 percent on the primary analysis (DB-5) column? (Method 1613**B**, Section **15**.4.2.2) [✓] ___ ___

6.2 Was the chromatographic resolution between 2,3,7,8- TCDF and the peaks representing any other unlabeled TCDF isomers resolved with a valley of ≤ 25 percent on the confirmation (DB-225 or SP2330) analysis. [___] ___ ✓

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. If an analyte concentration fell outside the acceptance criteria listed in Table 6 of the method.

   A. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte exceeds the range, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

   B. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is below the range, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J").

   C. If the acceptance criteria for each unlabeled analyte and/or for each labeled analyte is excessively below, ≤ 10% of the range, at the minimum, flag the associated sample positive results as well as non-detects for that specific analyte as estimated ("J"). However the validator may use professional judgement to accept or reject positive data and non-detects.

4. If the 25 percent valley for TCDD and TCDF requirement was not met, qualify positive data "J". Do not qualify non-detects. The tetras and pentas (dioxin and furans) are affected. Heptas, Hexas and Octas are not affected.

5. Non compliance of any other criteria specified above, in the method should be evaluated using professional judgement.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CDDs/CDFs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Data

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.I Were the following MS/DS conditions used?

7.1.1 SIM data were acquired for each of the ions listed in Table 8 (see analytical method)

		YES	NO	N/A
	including diphenylether interfering ions.	[✓]	___	___
7.2	Were the following identification criteria met?			
7.2.1	For the 2,3,7,8 substituted analytes found present and the corresponding labeled compound or internal standard in the sample extract, must show relative retention times at the peak height within the limits given in Table 2. (Method 1613B, Section 16.4)	[✓]	___	___
7.2.2	For non-2,3,7,8 substituted compounds (tetra through octa) found present, the retention time must be within the window established by the Window Defining Solution, for the corresponding homologue (Method 1613B, Section 16.4)	[✓]	___	___
7.2.3	All specified ions listed in Table 8 for each isomer found present and the associated labeled compounds must be present in the SICP. The two SIM ions for the analyte, the labeled compound, and the internal standard must maximize simultaneously.(± 2 sec.) (Method 1613B, Section 16.1)	[✓]	___	___
7.2.4	The integrated ion current for each characteristic ion of the analyte identified as positive, must be at least 2.5 times background noise and must not have saturated the detector. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.5	The integrated ion current for the labeled compounds, internal standards, and cleanup standard characteristic ions must be at least 10 times background noise. (Method 1613B, Section 16.2)	[✓]	___	___
7.2.6	The relative ion abundance criteria for all CDDs/CDFs found present must be within the limits of Table 9, or 10% of the ratio in the midpoint CS3 calibration or calibration verification (VER) whichever is most recent.	[___]	[✓]	___
7.2.7	The relative retention time of the unlabeled 2,3,7,8-substituted PCDD or PCDF must be within the limits given in Table 2 (Method 1613B, Section 16.4).	[✓]	___	___
7.2.8	The relative ion abundance criteria for the labeled compounds, cleanup, and internal standard must be met (Table 9 - Method 1613B).	[✓]	___	___
7.2.9	The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met?	[✓]	___	___

NOTE: The analytical method clearly states that samples containing analytes having concentrations higher than 10 times the upper MCLs should be analyzed using a less sensitive, high resolution GC/low resolution MS method.

7.2.10	The identification of a GC peak as a PCDF can only be made if no signal having a S/N ≥ 2.5 is detected at the same time in the corresponding polychlorinated diphenylether (PCDPE) channel. Was the above condition met?	[✓]	___	___

ACTION:
1. If the selected monitoring ions specified in Table 3 were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.
2. If the retention time of an analyte falls outside the retention time windows established by the associated Window Defining Mixture take the following action:

YES NO N/A

A. If the analyte has a corresponding labeled analyte and is within 2 seconds of the labeled analyte, no action taken on positive data or non-detects.

B. If the analyte has a corresponding labeled analyte and is outside 2 seconds of the labeled analyte, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

C. If the analyte does not have a corresponding labeled analyte and is outside 2 seconds of the matching unlabeled analyte from the associated calibration, use professional judgement to determine qualifications for positive data or non-detects. At a minimum, "J" or "JN" positive data.

D. If analyte meets identification criteria (7.2.2, 7.2.4, 7.2.5, 7.2.7) but does not meet ion abundance
ratio criteria (7.2.8) and is not a labeled analog, the sample must be reanalyzed on a confirmation column. If confirmation analysis was not perform, reject "R" the failing analyte.

3. If the criteria listed in section 7.2.4 and 7.2.5 are not met but all other criteria are met, qualify all positive data of the specific analyte with "J".

4. If the analytes reported positive do not meet criteria for section 7.2.6, reject "R" all positive data for these analytes. Change the positive values to EMPC (Estimated Maximum Possible Concentration). Flag "J"

5. If the labeled compounds, internal standards and cleanup standards do not meet ion abundance criteria section 7.2.6. and 7.2.7. (Table 8 - analytical method) but they meet all other criteria, flag all corresponding data with "J".

6. If the lab reported values exceeding the calibration range flag those values with "J".

7. If peak deflections >50% are visible qualify particular compound with "J".

8. If PCDF was detected but an interfering PCDPE was also detected (see Section 7.2.9) and concentration not corrected for the interference, cross out the PCDF data. The reported value of PCDF is changed to EMPC.

9. If the lab did not monitor for PCDPEs, qualify all positive furan data "JN".

7.2.10 Spot check calculations for positive data and verify that the same labeled compounds used to calculate RFs were used to calculate concentration and EMPC. Ensure that the proper CDDs/CDFs and labeled compounds were used.

To recalculate the concentration of individual CDD/CDF analytes in the sample use the following equation:

All Matrices other than water

$$Cn\ (pg/g) = \frac{(A_{n1} + A_{n2}) \times Q_I}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water

$$Cn\ (pg/L) = \frac{(A_{n1} + A_{n2}) \times Q_I}{V \times (A_{I1} + A_{I2}) \times RR}$$

YES NO N/A

Where:

$A_{n1} + A_{n2}$ = integrated areas of the two quantitation ions of analyte of interest. (Target analyte)

$A_{I1} + A_{I2}$ = integrated areas of the two quantitation ions of the appropriate labeled analyte compound.

W = Weight (g) of sample extracted

V = Volume (L) of sample extracted

Q_I = Quantity (pg) of the appropriate labeled compound added to the sample prior to extraction.

RR = Calculated relative response from initial calibration. (see section 5.2.10)

ACTION: If the spot check calculations yielded positive hit concentrations with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the form 1's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 4 different procedures to choose from. Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery requirements of the method can be met using the clean-up procedure.

A labeled clean-up standard $^{37}Cl_4$2,3,7,8-TCDD is added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standard within the recommended range **listed on Table 6 of the Analytical method?** [✓] ___ ___

ACTION: If no, and the recovery is less than 25%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ✓ [___] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in Data Assessment.

	YES	NO	N/A
7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method?	[___]	___	___✓

ACTION: If no, Use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in Data Assessment.

8.0 Estimated Detection Limits (EDL) *If required for the project*

8.1 Was an EDL calculated for each 2,3,7,8-substituted analyte that was not identified regardless of whether other non-2,3,7,8 substituted analytes were present? [✓] ___ ___

ACTION: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{W \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{V \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the 2,3,7,8-substituted isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis, RR, W and V are previously defined.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs or EMPCs with $\leq$ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 Estimated Maximum Possible Concentration (EMPC) *If required for the project*

9.1 Was an EMPC calculated for 2,3,7,8-substituted analytes that had S/N ratio for the quantitation and confirmation ions greater than 2.5, but did not meet all the identification criteria? [✓] ___ ___

9.2 Use the equation below to check EMPC calculations:

YES NO N/A

All Matrices other than water

$$\text{EMPC (pg/g)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{W \times (A_{I1} + A_{I2}) \times RR}$$

Water:

$$\text{EMPC (pg/L)} = \frac{(A_{n1} + A_{n2}) \times Q_I \times D}{V \times (A_{I1} + A_{I2}) \times RR}$$

Action: 1. If EDL or EMPC of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

2. If the spot check calculations yielded EDLs or EMPCs with ≤ 15% Difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

3. If EDLs or EMPCs for the most toxic analytes (TEF ≥ 0.05) are above reporting limits, contact the project office to recommend sample reanalysis.

10.0 Method Blanks

10.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

10.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [___] ___ ✓

10.3 Acceptable method blanks must not contain any signal of 2,3,7,8-TCDD, or 2,3,7,8-TCDF, equivalent to a minimum levels listed in Table 2 or above one third the regulatory compliance level.. Was this criteria met? (Method 1613B, Section 9.5.2) [✓] ___ ___

10.4 For other 2,3,7,8- substituted CDD/CDF isomers of each homologue, the allowable concentration in the method blank is less than minimum level listed in Table 2 (< 5 ng/Kg for soils and 50 pg/L for waters). Was this criteria met? [✓] ___ ___

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EDL, qualify "J" and all concentrations ≤ 5 times the EDL are qualified "R" due to possibility of contamination.

2. If the method blank is contaminated with 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD, 1,2,3,7,8-PeCDF or 2,3,4,7,8-PeCDF at a concentration higher than the minimum levels in Table 2, reject all contaminant compound positive data for the associated samples "R" and notify the Project Officer to initiate reanalysis.

3. A. If the method blank is contaminated with any of the analytes mentioned in Action # 2 at a concentration of less than the minimum levels in Table 2 specified in the method or of any other 2,3,7,8-substituted analytes at any concentration and the concentration in the sample is less than five times the

YES NO N/A

concentration in the blank, transfer the sample results to the EMPC/EDL column and cross-out the value in the concentration column in order to present the data as a non-detect.

B. If the concentration in the sample is higher than five times the contamination concentration in the blank, no action is needed.

11.0 Labeled Compound Recoveries

11.1 Were the samples spiked with all the labeled compounds as specified in the method? [✓] ___ ___

11.2 Have labeled compounds' recoveries been within the required limits? [✓] ___ ___

11.3 If not, were samples reanalyzed? [___] ___ ✓

ACTION: 1. If the labeled compound recovery was below 25 percent, reject "R" all associated non- detect data (EMPC/EDL) and flag with "J" the positive data for the associated compound.

2. If the labeled compound recovery is above the upper limit (150 percent) flag associated positive data with "J". No effect on non-detects.

3. If the labeled compound recovery is less than 10%, qualify positive hits and non-detects associated with the failed labeled compound "R" (Reject). When highly toxic analytes (TEF$\geq$ 0.05) are affected, notify Project Officer to initiate reanalysis.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF was defined, previously.

12.0 Internal Standard Area Response

There is no method criterion for the Internal Standard area response. However, because it is very critical in determining instrument sensitivity, the Internal Standard area response should be checked for every sample. The two standards $^{13}C_{12}$1,2,3,4-TCDD and $^{13}C_{12}$1,2,3,7,8,9-HxCDD are referred to as Internal Standards in this method. In other Dioxin methods, the two standards are called Recovery Standards.

12.1 Are the internal standard areas for every sample and blank within the upper and lower limits of each associated initial calibration CS3?

Area upper limit= +100% of internal standard area.
Area lower limit= -50% of internal standard area. [✓] ___ ___

YES NO N/A

12.2 Is the retention time of each internal standard within 15 seconds of the associated initial calibration CS3 standard? [✓] ___ ___

ACTION: 1. If the internal standard area is outside the upper or lower limits, flag all related positive and non-detect data (EMPC/EDL) with "J" regardless whether the lab's labeled compound recoveries met specifications or not.

2. If extremely low area counts (<25%) are reported, flag all associated non-detect data as unusable "R" and the positive data "J".

3. If the retention time of the internal standards differs by more than 15 seconds from the initial calibration CS3, use professional judgement to determine the effect on the results. A time shift of more than 15 seconds may cause certain analytes to elute outside the retention time window established by the GC window defining/column performance check solution. A constant shift could be also the result of a leak.

NOTE: Action 1 and 2 are recommendations only since this criterion is not a method requirement. These guidelines are based on other methods, previously validated data packages and Region II recommendations. If method blanks have low area responses as well as the samples, the validator should seriously consider qualifying the data for this criterion. Action 3 is a method requirement.

13.0 Second Column Confirmation

13.1 Any sample in which 2,3,7,8-TCDF is identified on a DB-5 column, must have a confirmation analysis (Method 1613B, section 16.5). Was a second column confirmation performed? [___] ___ ✓

13.2 Was the sample extract reanalyzed on a 30 m DB-225, fused silica capillary column, for 2,3,7,8-TCDF using the GC/MS conditions given in Section 10.1.1 of the analytical method? [___] ___ ✓

NOTE: The concentration of 2,3,7,8-TCDF obtained from the primary column (DB-5) should only be used for qualification, due to better QC data associated with the primary column. Also note that the confirmation and quantitation of 2,3,7,8-TCDF may be accomplished on a SP-2330 GC column.

ACTION: If confirmation is missing, use professional judgement, or contact the Project Officer for assistance.

13.3 Did the second column meet the calibration and linearity specification in Sections 5.0 and 6.0 above? [___] ___ ✓

ACTION: If no, refer to section 5.0 and 6.0 for appropriate action.

13.4 Was the % D of the quantitation results of the two columns less than 50? [___] ___ ✓

ACTION: Note in data assessment the differences, use professional judgement to decide which column data to report for TCDF. No other action is needed since this is not a method requirement but a technical recommendation.

14.0 Sample Reanalysis

14.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

YES NO N/A

14.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the CDD/CDF sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. Contaminated method blank at concentrations above the minimum levels (Table 2)

2. Labeled compound recoveries outside acceptable ranges listed on Table 6 of Analytical method.

3. Exceedance of calibration range by an analyte (dilution or re-extract using a smaller aliquot).

4. Recovery of labeled compounds outside acceptable limits listed on Table 6 of the Analytical method in a diluted sample (re-extracted using a smaller aliquot).

ACTION: For criteria 1, 2, or 3, notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

For criteria 4, If the calibration was verified and the re-extracted sample still does not meet labeled recovery requirements, then the method does not apply to the sample. The results are not reportable for regulatory purposes (Method 1613B, section 18.4.4). Notify the Project Officer of problem to initiate re-analysis of sample using a different method. Document in Data Assessment.

15.0 Precision and Recovery (PAR)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

15.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard as outlined in section **9**.2 required by the analytical method? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, discuss with the Project Officer the feasibility of continuing with validation. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

15.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined in Table **6** of the method? [___] ___ [✓]

ACTION: If no, refer to action from section 15.1.

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12

YES NO N/A

hour shift after the analysis of the CS3 calibration verification (VER), and before the analysis of any sample in each set .

15.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? [✓] ___ ___

15.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~Table 6 of the method~~ QAPP? [✓] ___ ___

ACTION: If no, refer to action from section 15.1. All samples that do not have a passing OPR standard are potentially affected for that analyte.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

16.0 Isomer Specificity and Toxicity Equivalency Factor (TEF)

NOTE: The TEF value concentrations can be found in the DFLM01.1 Statement of Work for Dioxin Analysis Form I PCDD-2.

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample only those 2,3,7,8 substituted isomers that were positively identified in the sample must be included in the calculations. The sum of the TEF adjusted concentration is used to determine when a second column confirmation is required to achieve analyte specificity.

16.1 Did the lab include EMPC or EDL values in the toxicity equivalency calculations? [✓] ___ ___

16.2 Were all samples, whose toxicity equivalency exceeded the required values were reanalyzed on a confirmation column to establish analyte specificity? [___] ___ ✓

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

2. If the toxicity equivalency exceeded the required limits (0.7 μg/Kg for soil/ sediment, 7 ng/L for aqueous and 7 μg/Kg for chemical waste samples), and the lab failed to reanalyze the samples on a specific secondary column, notify Project Officer. Reanalysis may be initiated.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration.

17.0 Rinsate Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

17.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

17.2 Do any rinsate blanks show the presence of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD at amounts > .5 μg/L or any other analyte at levels > 1 µg/L? [___] ✓ ___

ACTION: If any rinsate blank was found to be contaminated with any of the CDDs/CDFs notify the Project Officer to discuss what proper action must be taken.

If any qualification is needed due to rinsate blank contamination, follow the guidelines

YES NO N/A

outlined under Method Blanks, section 10, Actions 2 and 3.

18.0 Field Blanks

18.1 The field blanks are PEM samples (blind blanks) supplied to Laboratory at the frequency of one field blank per 20 samples or one per samples collected over a period of one week, which ever comes first. A typical "field blank" will consist of uncontaminated soil. The field blanks are used to monitor possible cross contamination of samples in the field and in the laboratory.

Were the following conditions met?

18.2 Acceptable field blanks must not contain any signal of 2,3,7,8-TCDD, 2,3,7,8-TCDF, 1,2,3,7,8-PeCDD and 1,2,3,7,8-PeCDF equivalent to a concentration of > 20 ng/Kg. [___] ___ ___

18.3 For other 2,3,7,8 substituted CDD/CDF analytes of each homologue the allowable concentration in the field blank is less than the upper MCLs listed in the method. [___] ___ ___

ACTION: When the field blank is found to be contaminated with target compounds, apply the same action as described for the Method Blank, section 10, Actions 2 and 3.

NOTE: Ask Project Officer to verify that the PEM blank (field blank) did not contain any CDD/CDF analytes and ask their assistance in the evaluation of the PEM field blank.

19.0 PEM Interference Fortified Blanks

NOTE: This type of blank may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If a PEM Interference Fortified blank(s) were not analyzed but MS/MSD data were submitted, skip this section and go onto to section 21.

19.1 One known blank usually an interference fortified soil/sediment sample is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first. The sample is spiked by the laboratory with the appropriate volume of the matrix spiking solution and then extracted and analyzed with other samples.

19.2 Was a fortified PEM blank analyzed at the frequency described above? [___] ___ ___

19.3 Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted compounds within the 50 to 150 percent control limits? [___] ___ ___

ACTION: 1. If the recovery of a 2,3,7,8-substituted analytes falls outside the 50-150 percent control limit, flag all positive and non-detect data of the same and related analytes in the same homolog series with "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

2. If no fortified PEM blank was analyzed, use professional judgement to assess data validity.

20.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

		YES	NO	N/A
20.1	Was a matrix spike analyzed at the frequency of one per SDG samples per matrix?	[___]	___	✓
20.2	Was the percent recovery of 2,3,7,8-TCDD and other 2,3,7,8-substituted CDDs/CDFs within 60 to 140 percent?	[___]	___	✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. The matrix spike data of the PE blank sample are more important and must be used primarily in data validation.

20.3	Was a matrix spike duplicate analyzed as per section 11.1 and 11.2?	[___]	___	✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

21.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

21.1	For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency?	[___]	___	✓
21.2	Did results of the duplicate samples agree within 25% relative difference for 2,3,7,8-substituted analytes and 50% for the rest of the analytes?	[___]	___	✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

22.0 REFERENCES

The following references are cited in Method 1613. They are important references for technical information and are submitted here as part of this method's documentation.

1. "Analytical Procedures and Quality Assurance Plan for the Determination of PCDD/PCDF in Fish", USEPA Environmental Research Laboratory, 6201 Congdon Boulevard, Duluth, NH 55804, April 1988.

2. Barnes, Donald G., Kutz, Frederick W., and Bottimore, David P., "Update of Toxicity Equivalency Factors (TEFs) for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-dioxins and dibenzofurans (CDDs/CDFs)", Risk Assessment Forum, USEPA, Washington, DC 20460, February 1989.

3. Lamparski, L.L., and Nestrick, T.J., "Determination of Tetra-, Hexa-, Hepta-, and Octachlorodibenzo-p-dioxin Isomers in Particulate Samples at Parts per Trillion Levels", Analytical Chemistry, 52: 2045-2054, 1980.

4. "Measurment of 2,3,7,8-Tetrachlorinated Dibenzo-p-dioxin (TCDD) and 2,3,7,8-Tetrachlorinated Dibenzofurans (TCDF) in Pulp, Sludges, Process Samples and Waste-waters from Pulp and Paper Mills",

YES NO N/A

Wright State University, Dayton, OH 45435, June 1988.

5. Method 1613-Revision **B**- Tetra through Octa- chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS, USEPA, Washington, DC, 20460, October **1994**

6. "Method 613--2,3,7,8-tetrachlorodibenzo-p-dioxin", 40 CFR 136 (49 FR 43234), October 26, 1984, Section 4.1.

7. "NCASI Procedures for the Preparation and Isomer Specific Analysis of Pulp and Paper Industry Samples for 2,3,7,8 TCDD and 2,3,7,8 TCDF", National Council of the Paper Industry for Air and Stream Improvement, 260 Madison Avenue, New York, NY 10016, Technical Bulletin No.551, Pre-release Copy, July 1988.

8. Provost, L.P., and Elder, R.S., "Interpretation of Percent Recovery Data", American Laboratory, 15: 56-83, 1983

9. Stanley, John S., and Sack, Thomas M., "Protocol for the Analysis of 2,3,7,8-Tetrachlorodibenzo-p-dioxin by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA EMSL, Las Vegas, Nevada 89114, EPA 600/4-86-004, January 1986.

10. Tondeur, Yves, "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioixin and Dibenzofurans hy High Resolution Gas Chromatography/High Resolution Mass Spectrometry", USEPA ENSL, Las Vegas, Nevada, June 1987.

11. Tondeur, Yves, "Proposed GC/MS Methodology for the Analysis of CDDs and CDFs in Special Analytical Services Samples", Triangle Laboratories, Inc., 801-10 Capitola Dr., Research Triangle Park, NC 27713, January 1988; updated by personal communication September 1988.

Addendum to US EPA Region II SOP No. HW-25 Revision 3 (September 2006) for Data Validation of EPA Method 1613B Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCDD/F isomers designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Data

7.2.11 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

11.0 Labeled Compound Recoveries

11.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

AECOM
250 Apollo Drive
Chelmsford MA 01824
ATTN: Ms. Lisa Krowitz

October 30, 2014

SUBJECT: Revised CWCM High Volume Event #2, LPR, Data Validation

Dear Ms. Krowitz,

Enclosed are the revised validation reports for the fractions listed below. Please replace the previously submitted report with the enclosed revised report.

LDC Project # 30206:

SDG #	Fraction
A5674 A5678 A5684	Dioxins/Dibenzofurans, Polychlorinated Biphenyls as Congeners

- Added associated addendum (May 2013) to the Introduction page, breakthrough exceedances in the Target Compound Identification section and dynamic spike and static spike %R statement in the Internal Standard section

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

Sincerely,

Stella S. Cuenco
Operations Manager/Senior Chemist

LDC Report# 30206C31_RV1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	CWCM Lower Passaic River High Volume Event #2
Collection Date:	June 27, 2013
LDC Report Date:	October 30, 2014
Matrix:	PUF/Filter
Parameters:	Polychlorinated Biphenyls as Congeners
Validation Level:	Full
Laboratory:	SGS Analytical Perspectives
Sample Delivery Group (SDG):	A5684

Sample Identification

13C-CE05-T102-BM01
13C-CE05-T102-BM02
13C-CE05-T102-BP01

Introduction

This data review covers 2 polyurethane foam (PUF) samples and one filter sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 1668B for Polychlorinated Biphenyls as Congeners.

This review follows the Quality Assurance Project Plan, Remedial Investigation Water Column Monitoring/High Volume Chemical Data Collection, Lower Passaic River Restoration Project (December 2012, Revision 2), and the USEPA Region II Validation SOP HW-46 (Revision 1, September 2008) for Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue and associated addendum (May 2013), modified as necessary to accommodate the QAPP criteria.

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.

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.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

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.

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.

Retention time windows were established for all congeners. The chromatographic resolution between the congeners PCB-23 and PCB-34 and congeners PCB-182 and PCB-187 was resolved with a valley of less than or equal to 40%.

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.

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 Toxic/LOC and labeled compounds were within validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing 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 PCBs 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
MB1-11113	7/8/13	PCB-77	4.33 pg	All samples in SDG A5684
		PCB-105	9.41 pg	
		PCB-118	28.3 pg	
		Total Mono-CBs	77.5 pg	
		Total Di-CBs	1180 pg	
		Total Tri-CBs	3360 pg	
		Total Tetra-CBs	2370 pg	
		Total Penta-CBs	687 pg	
		Total Hexa-CBs	159 pg	
		Total Hepta-CBs	23.8 pg	
		PCB-1	24.9 pg	
		PCB-2	23.3 pg	
		PCB-3	29.3 pg	
		PCB-4	92.9 pg	
		PCB-10	6.09 pg	
		PCB-9	17.5 pg	
		PCB-7	12.6 pg	
		PCB-6	55.6 pg	
		PCB-5	6.04 pg	
		PCB-8	290 pg	
		PCB-11	517 pg	
		PCB-13/12	28.5 pg	
		PCB-15	158 pg	
		PCB-19	39 pg	
		PCB-30/18	487 pg	
		PCB-17	241 pg	
		PCB-27	37.6 pg	
		PCB-24	9.36 pg	
		PCB-16	288 pg	
		PCB-32	167 pg	
		PCB-34	2.21 pg	
		PCB-26/29	118 pg	
		PCB-25	52.8 pg	
		PCB-31	574 pg	
		PCB-28/20	605 pg	
		PCB-21/33	380 pg	
		PCB-22	229 pg	
		PCB-39	3.57 pg	
		PCB-35	10.8 pg	
		PCB-37	113 pg	
		PCB-54	1.58 pg	
		PCB-50/53	72.1 pg	
		PCB-45	89.8 pg	
		PCB-51	27 pg	
		PCB-46	36.7 pg	
		PCB-52	446 pg	
		PCB-43	20.2 pg	
		PCB-69/49	226 pg	
		PCB-48	107 pg	
		PCB-44/47/65	383 pg	
		PCB-59/62/75	35 pg	
		PCB-42	104 pg	
		PCB-41	55.7 pg	
		PCB-71/40	151 pg	
		PCB-64	133 pg	
		PCB-68	3.52 pg	
		PCB-67	7.64 pg	
		PCB-63	6.93 pg	
		PCB-61/70/74/76	262 pg	
		PCB-66	116 pg	
		PCB-56	50.2 pg	
		PCB-60	28.5 pg	
		PCB-96	3.03 pg	
		PCB-95	166 pg	
		PCB-102	6.8 pg	
		PCB-91	22.3 pg	

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
MB1-11113 (continued)	7/8/13	PCB-84	50.2 pg	All samples in SDG A5684
		PCB-92	23.7 pg	
		PCB-113/90/101	122 pg	
		PCB-83	6.98 pg	
		PCB-99	49 pg	
		PCB-108/119/86/97/125/87	71.2 pg	
		PCB-117	2.59 pg	
		PCB-116/85	13.2 pg	
		PCB-110	101 pg	
		PCB-82	9.54 pg	
		PCB-109	1.82 pg	
		PCB-136	16.3 pg	
		PCB-151/135	27.8 pg	
		PCB-144	3.75 pg	
		PCB-147/149	47.3 pg	
		PCB-134	3.44 pg	
		PCB-132	15.7 pg	
		PCB-146	2.45 pg	
		PCB-153/168	15.9 pg	
		PCB-141	5.55 pg	
		PCB-163/138/129	18.9 pg	
		PCB-158	2.44 pg	
		PCB-179	5.06 pg	
		PCB-176	0.991 pg	
		PCB-187	7.07 pg	
		PCB-174	4.47 pg	
		PCB-180/193	6.22 pg	

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.

Samples 13C-CE05-T042-XR03-101, 13C-CE05-T042-XR04-101, and 13C-CE05-T042-XR02-101 (all 3 from SDG A5678) were identified as equipment blanks. No polychlorinated biphenyls as congeners contaminants were found with the following exceptions:

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101	6/26/13	PCB-77	7.84 pg	13C-CE05-T102-BM01
		PCB-105	22.2 pg	
		PCB-118	52.8 pg	
		PCB-156/157	5.67 pg	
		Total Mono-CBs	340 pg	
		Total Di-CBs	3540 pg	
		Total Tri-CBs	1020 pg	
		Total Tetra-CBs	995 pg	
		Total Penta-CBs	489 pg	
		Total Hexa-CBs	177 pg	
		Total Hepta-CBs	54.8 pg	
		Total Octa-CBs	10.3 pg	
		PCB-1	77.8 pg	
		PCB-2	149 pg	
		PCB-3	113 pg	
		PCB-4	76 pg	
		PCB-10	9.47 pg	
		PCB-9	10.8 pg	
		PCB-7	5.94 pg	
		PCB-6	28.8 pg	
		PCB-8	96.5 pg	
		PCB-11	3210 pg	
		PCB-13/12	28.5 pg	
		PCB-15	72.8 pg	
		PCB-19	17 pg	
		PCB-30/18	127 pg	
		PCB-17	72.5 pg	
		PCB-27	14.2 pg	
		PCB-24	2.95 pg	
		PCB-16	63.5 pg	
		PCB-32	51.9 pg	
		PCB-26/29	36.3 pg	
		PCB-25	25 pg	
		PCB-31	172 pg	
		PCB-28/20	233 pg	
		PCB-21/33	80.3 pg	
		PCB-22	59.3 pg	
		PCB-35	12.8 pg	
		PCB-37	48.5 pg	
		PCB-54	2.57 pg	
		PCB-50/53	22.2 pg	
		PCB-45	13.9 pg	
		PCB-51	33.9 pg	
		PCB-46	7.53 pg	
		PCB-52	141 pg	
		PCB-69/49	87.4 pg	
		PCB-48	25.6 pg	
		PCB-44/47/65	167 pg	
		PCB-59/62/75	13.5 pg	
		PCB-42	33 pg	
		PCB-41	10.1 pg	
		PCB-71/40	46.9 pg	
		PCB-64	44.4 pg	
		PCB-68	6.93 pg	
		PCB-67	3.49 pg	
		PCB-63	4.34 pg	
		PCB-61/70/74/76	169 pg	
		PCB-66	98.9 pg	
		PCB-56	38.9 pg	
		PCB-60	16.8 pg	
		PCB-103	2.63 pg	
		PCB-95	58.8 pg	
		PCB-100/93	5.51 pg	
		PCB-102	4.42 pg	
		PCB-91	11.3 pg	
		PCB-84	24.4 pg	
		PCB-92	14.1 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR03-101 (continued)	6/26/13	PCB-113/90/101	77.8 pg	13C-CE05-T102-BM01
		PCB-99	44.7 pg	
		PCB-108/119/86/97/125/87	50.8 pg	
		PCB-117	3.94 pg	
		PCB-116/85	9.82 pg	
		PCB-110	87.9 pg	
		PCB-82	9.88 pg	
		PCB-107/124	3.36 pg	
		PCB-109	5.05 pg	
		PCB-136	7.37 pg	
		PCB-151/135	15.3 pg	
		PCB-144	2.3 pg	
		PCB-147/149	35.8 pg	
		PCB-132	12 pg	
		PCB-146	4.24 pg	
		PCB-153/168	29.8 pg	
		PCB-141	5.86 pg	
		PCB-164	2.24 pg	
		PCB-163/138/129	43.9 pg	
		PCB-158	3.99 pg	
		PCB-128/166	8.56 pg	
		PCB-179	3.54 pg	
		PCB-187	8.78 pg	
		PCB-183	4.53 pg	
		PCB-174	8.99 pg	
		PCB-177	5.41 pg	
		PCB-171/173	3.25 pg	
		PCB-180/193	14.6 pg	
		PCB-170	5.64 pg	
		PCB-198/199	5.22 pg	
		PCB-194	5.12 pg	
13C-CE05-T042-XR04-101	6/26/13	PCB-105	70.9 pg	13C-CE05-T102-BM02
		PCB-118	268 pg	
		Total Mono-CBs	1520 pg	
		Total Di-CBs	33000 pg	
		Total Tri-CBs	160000 pg	
		Total Tetra-CBs	71300 pg	
		Total Penta-CBs	6880 pg	
		Total Hexa-CBs	2640 pg	
		Total Hepta-CBs	353 pg	
		PCB-1	732 pg	
		PCB-2	336 pg	
		PCB-3	456 pg	
		PCB-4	4060 pg	
		PCB-10	170 pg	
		PCB-9	877 pg	
		PCB-7	471 pg	
		PCB-6	2820 pg	
		PCB-5	343 pg	
		PCB-8	14200 pg	
		PCB-11	1830 pg	
		PCB-13/12	1060 pg	
		PCB-15	7220 pg	
		PCB-19	2500 pg	
		PCB-30/18	28000 pg	
		PCB-17	13000 pg	
		PCB-27	2060 pg	
		PCB-24	551 pg	
		PCB-16	16000 pg	
		PCB-32	8170 pg	
		PCB-34	109 pg	
		PCB-23	48.6 pg	
		PCB-26/29	5350 pg	
		PCB-25	2390 pg	
		PCB-31	25300 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR04-101 (continued)	6/26/13	PCB-28/20	26600 pg	13C-CE05-T102-BM02
		PCB-21/33	16800 pg	
		PCB-22	9870 pg	
		PCB-39	147 pg	
		PCB-35	200 pg	
		PCB-37	3140 pg	
		PCB-54	78.7 pg	
		PCB-50/53	3530 pg	
		PCB-45	4320 pg	
		PCB-51	1150 pg	
		PCB-46	1680 pg	
		PCB-52	13500 pg	
		PCB-43	864 pg	
		PCB-69/49	7570 pg	
		PCB-48	4000 pg	
		PCB-44/47/65	12300 pg	
		PCB-59/62/75	1230 pg	
		PCB-42	3400 pg	
		PCB-41	1890 pg	
		PCB-71/40	4970 pg	
		PCB-64	4200 pg	
		PCB-67	208 pg	
		PCB-63	152 pg	
		PCB-61/70/74/76	4120 pg	
		PCB-66	1610 pg	
		PCB-56	360 pg	
		PCB-60	189 pg	
		PCB-96	89.3 pg	
		PCB-95	2390 pg	
		PCB-102	141 pg	
		PCB-91	350 pg	
		PCB-84	492 pg	
		PCB-92	184 pg	
		PCB-113/90/101	1170 pg	
		PCB-99	330 pg	
		PCB-108/119/86/97/125/87	513 pg	
		PCB-110	828 pg	
		PCB-82	60.8 pg	
		PCB-136	264 pg	
		PCB-151/135	576 pg	
		PCB-144	60 pg	
		PCB-147/149	867 pg	
		PCB-132	176 pg	
		PCB-153/168	318 pg	
		PCB-141	90.1 pg	
		PCB-163/138/129	287 pg	
		PCB-179	152 pg	
		PCB-176	33 pg	
		PCB-187	168 pg	

Blank ID	Sampling Date	Compound	Concentration	Associated Samples
13C-CE05-T042-XR02-101	6/26/13	PCB-105	6.37 pg	13C-CE05-T102-BP01
		PCB-118	16.2 pg	
		Total Mono-CBs	16.2 pg	
		Total Di-CBs	66.4 pg	
		Total Tri-CBs	67.5 pg	
		Total Tetra-CBs	86.2 pg	
		Total Penta-CBs	119 pg	
		Total Hexa-CBs	91.1 pg	
		Total Hepta-CBs	82.6 pg	
		Total Octa-CBs	19 pg	
		PCB-1	3.27 pg	
		PCB-2	5.74 pg	
		PCB-3	7.16 pg	
		PCB-4	5.96 pg	
		PCB-9	2.79 pg	
		PCB-6	2.25 pg	
		PCB-8	7.31 pg	
		PCB-11	42 pg	
		PCB-15	6.08 pg	
		PCB-30/18	11 pg	
		PCB-17	5.94 pg	
		PCB-32	3.91 pg	
		PCB-31	13.3 pg	
		PCB-28/20	17.1 pg	
		PCB-21/33	6.69 pg	
		PCB-22	4.06 pg	
		PCB-37	5.43 pg	
		PCB-52	17.6 pg	
		PCB-69/49	8.45 pg	
		PCB-48	2.37 pg	
		PCB-44/47/65	15.3 pg	
		PCB-71/40	5.2 pg	
		PCB-64	4.17 pg	
		PCB-61/70/74/76	18.3 pg	
		PCB-66	10.1 pg	
		PCB-56	4.71 pg	
		PCB-95	16.5 pg	
		PCB-84	5.82 pg	
		PCB-113/90/101	20 pg	
		PCB-99	10.4 pg	
		PCB-108/119/86/97/125/87	15.5 pg	
		PCB-110	27.9 pg	
		PCB-136	2.09 pg	
		PCB-151/135	8.11 pg	
		PCB-147/149	21.5 pg	
		PCB-132	8.16 pg	
		PCB-153/168	20.3 pg	
		PCB-141	4.43 pg	
		PCB-163/138/129	26.5 pg	
		PCB-179	4.99 pg	
		PCB-187	13.4 pg	
		PCB-183	6.51 pg	
		PCB-174	14.8 pg	
		PCB-177	7.51 pg	
		PCB-180/193	25.1 pg	
		PCB-170	10.3 pg	
		PCB-198/199	6.84 pg	
		PCB-196	5.82 pg	
		PCB-194	6.38 pg	

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

Sample	Compound	Reported Concentration	Modified Final Concentration
13C-CE05-T102-BM01	PCB-2	514 pg	514U pg
13C-CE05-T102-BM02	Total Mono-CBs	7260 pg	7260U pg
	Total Di-CBs	74900 pg	74900U pg
	Total Tri-CBs	276000 pg	276000U pg
	Total Tetra-CBs	244000 pg	244000U pg
	PCB-2	427 pg	427U pg
	PCB-3	944 pg	944U pg
	PCB-9	1230 pg	1230U pg
	PCB-7	632 pg	632U pg
	PCB-6	5800 pg	5800U pg
	PCB-5	284 pg	284U pg
	PCB-8	17200 pg	17200U pg
	PCB-11	5950 pg	5950U pg
	PCB-13/12	1960 pg	1960U pg
	PCB-15	11200 pg	11200U pg
	PCB-19	10000 pg	10000U pg
	PCB-30/18	48900 pg	48900U pg
	PCB-17	24500 pg	24500U pg
	PCB-27	5090 pg	5090U pg
	PCB-24	762 pg	762U pg
	PCB-16	23000 pg	23000U pg
	PCB-32	17800 pg	17800U pg
	PCB-34	334 pg	334U pg
	PCB-26/29	9790 pg	9790U pg
	PCB-25	6260 pg	6260U pg
	PCB-31	40100 pg	40100U pg
	PCB-28/20	48000 pg	48000U pg
	PCB-21/33	17600 pg	17600U pg
	PCB-22	15200 pg	15200U pg
	PCB-39	365 pg	365U pg
	PCB-35	627 pg	627U pg
	PCB-37	7830 pg	7830U pg
	PCB-50/53	10000 pg	10000U pg
	PCB-45	7930 pg	7930U pg
	PCB-46	3570 pg	3570U pg
	PCB-52	40800 pg	40800U pg
	PCB-43	1830 pg	1830U pg
	PCB-69/49	22300 pg	22300U pg
	PCB-48	6820 pg	6820U pg
	PCB-44/47/65	39200 pg	39200U pg
	PCB-59/62/75	3220 pg	3220U pg
	PCB-42	9340 pg	9340U pg
	PCB-41	2380 pg	2380U pg
	PCB-71/40	16200 pg	16200U pg
	PCB-64	12500 pg	12500U pg
	PCB-67	762 pg	762U pg
	PCB-63	755 pg	755U pg

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. Batch Control Samples (BCS)

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

VIII. Regional Quality Assurance and Quality Control

Not applicable.

IX. Internal Standards

All internal standard recoveries (%R) were within validation criteria with the following exceptions:

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
MB_11113	^{13}C-PCB-15	115 (19-107)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 Total Di-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T102-BM01	^{13}C-PCB-15 ^{13}C-PCB-155 ^{13}C-PCB-189	113 (19-107) 136 (25-124) 117 (47-116)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 PCB-189 Total Di-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P
13C-CE05-T102-BM02	^{13}C-PCB-15 ^{13}C-PCB-189	108 (19-107) 119 (47-116)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-189 Total Di-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
13C-CE05-T102-BP01	^{13}C-PCB-15 ^{13}C-PCB-189	115 (19-107) 118 (47-116)	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-189 Total Di-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P

All dynamic spike and static spike recoveries (%R) were within validation criteria.

X. Target Compound Identifications

All target compounds met the identification criteria.

The concentrations of detected native compounds in the secondary polyurethane foam (PUF) samples were <20% of the primary PUF samples with the following exceptions:

Sample	Compound
13C-CE05-T102-BM01 13C-CE05-T102-BM02	All TCL compounds

No data were qualified due to this non-conformance.

XI. Compound Quantitation

All compound quantitations were within validation criteria with the following exceptions:

Sample	Compound	Flag	A or P
All samples in SDG A5684	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A
13C-CE05-T102-BM01 13C-CE05-T102-BM02 13C-CE05-T102-BP01	Results were flagged “E” by the laboratory to indicate that the results exceeded the calibration range.	J (all detects)	P

Sample	Compound	Finding	Criteria	Flag	A or P

Sample	Compound	Finding	Criteria	Flag	A or P
13C-CE05-T102-BM01 13C-CE05-T102-BP01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects)	A
13C-CE05-T102-BM02	Total Tri-CBs Total Tetra-CBs	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (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.

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Data Qualification Summary - SDG A5684

SDG	Sample	Compound	Flag	A or P	Reason (Code)
A5684	13C-CE05-T102-BM01	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-155 PCB-152 PCB-150 PCB-136 PCB-145 PCB-189 Total Di-CBs Total Hexa-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5684	13C-CE05-T102-BM02 13C-CE05-T102-BP01	PCB-9 PCB-7 PCB-6 PCB-5 PCB-8 PCB-14 PCB-11 PCB-13/12 PCB-15 PCB-189 Total Di-CBs Total Hepta-CBs	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	P	Internal standards (%R) (i)
A5684	13C-CE05-T102-BM01 13C-CE05-T102-BM02 13C-CE05-T102-BP01	All compounds reported as estimated maximum possible concentration (EMPC)	EMPC-J	A	Compound quantitation (EMPC) (k)
A5684	13C-CE05-T102-BM01 13C-CE05-T102-BM02 13C-CE05-T102-BP01	Results were flagged “E” by the laboratory to indicate sample exceeded calibration range.	J (all detects)	A	Compound quantitation (exceeded range) (q)
A5684	13C-CE05-T102-BM01 13C-CE05-T102-BP01	Total Di-CBs Total Tri-CBs Total Tetra-CBs Total Penta-CBs	J (all detects) J (all detects) J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)
A5684	13C-CE05-T102-BM02	Total Tri-CBs Total Tetra-CBs	J (all detects) J (all detects)	A	Compound quantitation (exceeded range) (q)

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Laboratory Blank Data Qualification Summary - SDG A5684

No Sample Data Qualified in this SDG

CWCM Lower Passaic River High Volume Event #2
Polychlorinated Biphenyls as Congeners - Field Blank Data Qualification Summary - SDG A5684

SDG	Sample	Compound	Modified Final Concentration	A or P	Code
A5684	13C-CE05-T102-BM01	PCB-2	514U pg	A	be
A5684	13C-CE05-T102-BM02	Total Mono-CBs	7260U pg	A	be
		Total Di-CBs	74900U pg		
		Total Tri-CBs	276000U pg		
		Total Tetra-CBs	244000U pg		
		PCB-2	427U pg		
		PCB-3	944U pg		
		PCB-9	1230U pg		
		PCB-7	632U pg		
		PCB-6	5800U pg		
		PCB-5	284U pg		
		PCB-8	17200U pg		
		PCB-11	5950U pg		
		PCB-13/12	1960U pg		
		PCB-15	11200U pg		
		PCB-19	10000U pg		
		PCB-30/18	48900U pg		
		PCB-17	24500U pg		
		PCB-27	5090U pg		
		PCB-24	762U pg		
		PCB-16	23000U pg		
		PCB-32	17800U pg		
		PCB-34	334U pg		
		PCB-26/29	9790U pg		
		PCB-25	6260U pg		
		PCB-31	40100U pg		
		PCB-28/20	48000U pg		
		PCB-21/33	17600U pg		
		PCB-22	15200U pg		
		PCB-39	365U pg		
		PCB-35	627U pg		
		PCB-37	7830U pg		
		PCB-50/53	10000U pg		
		PCB-45	7930U pg		
		PCB-46	3570U pg		
		PCB-52	40800U pg		
		PCB-43	1830U pg		
		PCB-69/49	22300U pg		
		PCB-48	6820U pg		
		PCB-44/47/65	39200U pg		
		PCB-59/62/75	3220U pg		
		PCB-42	9340U pg		
		PCB-41	2380U pg		
		PCB-71/40	16200U pg		
		PCB-64	12500U pg		
		PCB-67	762U pg		
		PCB-63	755U pg		

LDC #: 30206C31 **VALIDATION COMPLETENESS WORKSHEET** Date: 8-27-13
SDG #: A5684 Full Page: 1 of 1
Laboratory: SGS/Analytical Perspectives Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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: 6/27/13
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	≤20/35
IV.	Routine calibration/~~ICV~~	A	≤30/50
V.	Blanks	SW	
VI.	Matrix spike/Matrix spike duplicates	N	
VII.	Laboratory control samples	A	BCS3
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW	
X.	Target compound identifications	~~A~~ SW	TM 10/28/14
XI.	Compound quantitation/RL/~~LOQ/LODs~~	SW	
XII.	System performance	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	SW	*

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: 2PUFIS/1filter (water)

1	13C-CE05-T102-BM01	11		21		31	
2	13C-CE05-T102-BM02	12		22		32	
3	13C-CE05-T102-BP01	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	MBI-11113	30		40	

* 13C-CE05-T042-XR03-101 (A5678)
13C-CE05-T042-XR04-101 (A5678)
13C-CE05-T042-XR02-101 (A5678)

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer:
2nd Reviewer:

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

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?
Blank extraction date: 07/08/13 **Blank analysis date:** 07/29/13 **Associated samples:** All >5x
Conc. units: pg

Compound	Blank ID		Sample Identification								
	MB1_11113	5x									
PCB-77	4.33	21.7									
PCB-105	9.41	47.1									
PCB-118	28.3	141.5									
Total Mono-CBs	77.5	388									
Total Di-CBs	1180*	5900									
Total Tri-CBs	3360	16800									
Total Tetra-CBs	2370	11850									
Total Penta-CBs	687*	3435									
Total Hexa-CBs	159*	795									
Total Hepta-CBs	23.8*	119									
PCB-1	24.9	125									
PCB-2	23.3	117									
PCB-3	29.3	147									
PCB-4	92.9	465									
PCB-10	6.09	30									
PCB-9	17.5*	88									
PCB-7	12.6	63									
PCB-6	55.6	278									
PCB-5	6.04	30									
PCB-8	290	1450									

2024
JM

Compound	Blank ID		Sample Identification								
	MB1_11113	5x									
PCB-11	517	2585									
PCB-13/12	28.5	143									
PCB-15	158	790									
PCB-19	39	195									
PCB-30/18	487	2435									
PCB-17	241	1205									
PCB-27	37.6	188									
PCB-24	9.36	47									
PCB-16	288	1440									
PCB-32	167	835									
PCB-34	2.21	11									
PCB-26/29	118	590									
PCB-25	52.8	264									
PCB-31	574	2870									
PCB-28/20	605	3025									
PCB-21/33	380	1900									
PCB-22	229	1145									
PCB-39	3.57	18									
PCB-35	10.8	54.0									
PCB-37	113	565									
PCB-54	1.58	7.9									
PCB-50/53	72.1	361									
PCB-45	89.8	449									
PCB-51	27	135									
PCB-46	36.7	184									
PCB-52	446	2230									
PCB-43	20.2	101									

3 of 4

Compound	Blank ID		Sample Identification								
	MB1_11113	5x									
PCB-69/49	226	1130									
PCB-48	107	535									
PCB-44/47/65	383	1915									
PCB-59/62/75	35	175									
PCB-42	104	520									
PCB-41	55.7	279									
PCB-71/40	151	755									
PCB-64	133	665									
PCB-68	3.52	18									
PCB-67	7.64	38.2									
PCB-63	6.93	34.7									
PCB-61/70/74/76	262	1310									
PCB-66	116	580									
PCB-56	50.2	251									
PCB-60	28.5	143									
PCB-96	3.03	15.2									
PCB-95	166	830									
PCB-102	6.8	34.0									
PCB-91	22.3	112									
PCB-84	50.2	251									
PCB-92	23.7	119									
PCB-113/90/101	122	610									
PCB-83	6.98	34.9									
PCB-99	49	245									
PCB-108/119/86/97/125/87	71.2	356									
PCB-117	2.59	13.0									

4 of 4

Compound	Blank ID		Sample Identification								
	MB1_11113	5x									
PCB-116/85	13.2	66.0									
PCB-110	101	505									
PCB-82	9.54*	47.7									
PCB-109	1.82	9									
PCB-136	16.3	82									
PCB-151/135	27.8	139									
PCB-144	3.75	18.8									
PCB-147/149	47.3	237									
PCB-134	3.44	17.2									
PCB-132	15.7	78.5									
PCB-146	2.45*	12									
PCB-153/168	15.9	80									
PCB-141	5.55	28									
PCB-163/138/129	18.9	95									
PCB-158	2.44	12.2									
PCB-179	5.06*	25.3									
PCB-176	0.991	5.0									
PCB-187	7.07	35.4									
PCB-174	4.47	22									
PCB-180/193	6.22	31									

*EMPC

All contaminants within five times the method blank concentration were qualified as not detected.

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 1 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-77	7.84	39.2									
PCB-105	22.2	111									
PCB-118	52.8	264									
PCB-156/157	5.67*	28.35									
Total Mono-CBs	340	1700									
Total Di-CBs	3540	17700									
Total Tri-CBs	1020	5100									
Total Tetra-CBs	995*	4975									
Total Penta-CBs	489*	2445									
Total Hexa-CBs	177*	885									
Total Hepta-CBs	54.8*	274									
Total Octa-CBs	10.3*	51.5									
PCB-1	77.8	389									
PCB-2	149	745	514								
PCB-3	113	565									
PCB-4	76	380									
PCB-10	9.47	47.35									
PCB-9	10.8	54									
PCB-7	5.94	29.7									
PCB-6	28.8	144									
PCB-8	96.5	482.5									
PCB-11	3210	16050									

2004
YM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-13/12	28.5	142.5									
PCB-15	72.8	364									
PCB-19	17	85									
PCB-30/18	127	635									
PCB-17	72.5	362.5									
PCB-27	14.2	71									
PCB-24	2.95	14.75									
PCB-16	63.5	317.5									
PCB-32	51.9	259.5									
PCB-26/29	36.3	181.5									
PCB-25	25	125									
PCB-31	172	860									
PCB-28/20	233	1165									
PCB-21/33	80.3	401.5									
PCB-22	59.3	296.5									
PCB-35	12.8	64									
PCB-37	48.5	242.5									
PCB-54	2.57*	12.85									
PCB-50/53	22.2	111									
PCB-45	13.9	69.5									
PCB-51	33.9	169.5									
PCB-46	7.53	37.65									
PCB-52	141	705									
PCB-69/49	87.4	437									
PCB-48	25.6	128									
PCB-44/47/65	167	835									
PCB-59/62/75	13.5	67.5									
PCB-42	33	165									

3of4
JM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-41	10.1	50.5									
PCB-71/40	46.9	234.5									
PCB-64	44.4	222									
PCB-68	6.93	34.65									
PCB-67	3.49*	17.45									
PCB-63	4.34	21.7									
PCB-61/70/74/76	169	845									
PCB-66	98.9	494.5									
PCB-56	38.9	194.5									
PCB-60	16.8	84									
PCB-103	2.63	13.15									
PCB-95	58.8	294									
PCB-100/93	5.51	27.55									
PCB-102	4.42*	22.1									
PCB-91	11.3	56.5									
PCB-84	24.4	122									
PCB-92	14.1	70.5									
PCB-113/90/101	77.8	389									
PCB-99	44.7	223.5									
PCB-108/119/86/97/125/87	50.8	254									
PCB-117	3.94	19.7									
PCB-116/85	9.82*	49.1									
PCB-110	87.9	439.5									
PCB-82	9.88	49.4									
PCB-107/124	3.36	16.8									
PCB-109	5.05	25.25									
PCB-136	7.37	36.85									
PCB-151/135	15.3	76.5									

4 30 04 JM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR03-101	5x	1 (10x)								
PCB-144	2.3	11.5									
PCB-147/149	35.8	179									
PCB-132	12	60									
PCB-146	4.24	21.2									
PCB-153/168	29.8	149									
PCB-141	5.86*	29.3									
PCB-164	2.24*	11.2									
PCB-163/138/129	43.9	219.5									
PCB-158	3.99	19.95									
PCB-128/166	8.56	42.8									
PCB-179	3.54*	17.7									
PCB-187	8.78*	43.9									
PCB-183	4.53*	22.65									
PCB-174	8.99	44.95									
PCB-177	5.41	27.05									
PCB-171/173	3.25	16.25									
PCB-180/193	14.6	73									
PCB-170	5.64*	28.2									
PCB-198/199	5.22	26.1									
PCB-194	5.12*	25.6									

*EMPC

13C-CE05-T042-XR03-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: gm
2nd Reviewer: [illegible]

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 2 Qual U (be)

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-105	70.9*	354.5									
PCB-118	268	1340									
Total Mono-CBs	1520	7600	7260								
Total Di-CBs	33000	165000	74900								
Total Tri-CBs	160000*	800000	276000								
Total Tetra-CBs	71300*	356500	244000								
Total Penta-CBs	6880*	34400									
Total Hexa-CBs	2640	13200									
Total Hepta-CBs	353	1765									
PCB-1	732	3660									
PCB-2	336	1680	427								
PCB-3	456	2280	944								
PCB-4	4060	20300									
PCB-10	170	850									
PCB-9	877	4385	1230								
PCB-7	471	2355	632								
PCB-6	2820	14100	5800								
PCB-5	343	1715	284								
PCB-8	14200	71000	17200								
PCB-11	1830	9150	5950								
PCB-13/12	1060	5300	1960								
PCB-15	7220	36100	11200								

2014
TM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-19	2500	12500	10000								
PCB-30/18	28000	140000	48900								
PCB-17	13000	65000	24500								
PCB-27	2060	10300	5090								
PCB-24	551	2755	762								
PCB-16	16000	80000	23000								
PCB-32	8170	40850	17800								
PCB-34	109	545	334								
PCB-23	48.6*	243									
PCB-26/29	5350	26750	9790								
PCB-25	2390	11950	6260								
PCB-31	25300	126500	40100								
PCB-28/20	26600	133000	48000								
PCB-21/33	16800	84000	17600								
PCB-22	9870	49350	15200								
PCB-39	147	735	365								
PCB-35	200	1000	627								
PCB-37	3140	15700	7830								
PCB-54	78.7	393.5									
PCB-50/53	3530	17650	10000								
PCB-45	4320	21600	7930								
PCB-51	1150	5750									
PCB-46	1680	8400	3570								
PCB-52	13500	67500	40800								
PCB-43	864	4320	1830								
PCB-69/49	7570	37850	22300								
PCB-48	4000	20000	6820								
PCB-44/47/65	12300	61500	39200								

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-59/62/75	1230	6150	3220								
PCB-42	3400	17000	9340								
PCB-41	1890	9450	2380								
PCB-71/40	4970	24850	16200								
PCB-64	4200	21000	12500								
PCB-67	208	1040	762								
PCB-63	152*	760	755								
PCB-61/70/74/76	4120	20600									
PCB-66	1610	8050									
PCB-56	360	1800									
PCB-60	189	945									
PCB-96	89.3*	446.5									
PCB-95	2390	11950									
PCB-102	141*	705									
PCB-91	350	1750									
PCB-84	492	2460									
PCB-92	184	920									
PCB-113/90/101	1170	5850									
PCB-99	330	1650									
PCB-108/119/86/97/125/87	513	2565									
PCB-110	828	4140									
PCB-82	60.8	304									
PCB-136	264	1320									
PCB-151/135	576	2880									
PCB-144	60	300									
PCB-147/149	867	4335									
PCB-132	176	880									
PCB-153/168	318	1590									

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR04-101	5x	2 (10x)								
PCB-141	90.1	450.5									
PCB-163/138/129	287	1435									
PCB-179	152	760									
PCB-176	33	165									
PCB-187	168	840									

*EMPC

13C-CE05-T042-XR04-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer:
2nd Reviewer:

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

Blank units: pg **Associated sample units:** pg
Sampling date: 06/26/13
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: 3 >5x

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-105	6.37	31.85									
PCB-118	16.2	81									
Total Mono-CBs	16.2*	81									
Total Di-CBs	66.4	332									
Total Tri-CBs	67.5*	337.5									
Total Tetra-CBs	86.2*	431									
Total Penta-CBs	119*	595									
Total Hexa-CBs	91.1*	455.5									
Total Hepta-CBs	82.6*	413									
Total Octa-CBs	19	95									
PCB-1	3.27*	16.35									
PCB-2	5.74	28.7									
PCB-3	7.16	35.8									
PCB-4	5.96	29.8									
PCB-9	2.79	13.95									
PCB-6	2.25	11.25									
PCB-8	7.31	36.55									
PCB-11	42	210									
PCB-15	6.08	30.4									
PCB-30/18	11	55									
PCB-17	5.94	29.7									
PCB-32	3.91	19.55									

2063
QM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-31	13.3	66.5									
PCB-28/20	17.1	85.5									
PCB-21/33	6.69	33.45									
PCB-22	4.06*	20.3									
PCB-37	5.43*	27.15									
PCB-52	17.6	88									
PCB-69/49	8.45	42.25									
PCB-48	2.37*	11.85									
PCB-44/47/65	15.3	76.5									
PCB-71/40	5.2	26									
PCB-64	4.17*	20.85									
PCB-61/70/74/76	18.3	91.5									
PCB-66	10.1	50.5									
PCB-56	4.71	23.55									
PCB-95	16.5	82.5									
PCB-84	5.82*	29.1									
PCB-113/90/101	20	100									
PCB-99	10.4	52									
PCB-108/119/86/97/125/87	15.5	77.5									
PCB-110	27.9	139.5									
PCB-136	2.09*	10.45									
PCB-151/135	8.11*	40.55									
PCB-147/149	21.5	107.5									
PCB-132	8.16	40.8									
PCB-153/168	20.3	101.5									
PCB-141	4.43*	22.15									
PCB-163/138/129	26.5*	132.5									
PCB-179	4.99	24.95									

3 of 3
TM

Compound	Blank ID	Sample Identification									
	13C-CE05-T042-XR02-101	5x									
PCB-187	13.4	67									
PCB-183	6.51*	32.55									
PCB-174	14.8	74									
PCB-177	7.51	37.55									
PCB-180/193	25.1	125.5									
PCB-170	10.3	51.5									
PCB-198/199	6.84	34.2									
PCB-196	5.82	29.1									
PCB-194	6.38	31.9									

*EMPC

13C-CE05-T042-XR02-101 (A5678)

All contaminants within five times the blank concentration were qualified as not detected, "U".

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: TM
2nd Reviewer:

METHOD: HRGC/HRMS PCB Congeners (EPA Method 1668B)
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 within the QC criteria?
Y N N/A Was the S/N ratio all internal standard peaks ≥ 10? (i)

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		MB1_11113	13C PCB-15	115 (19-107)	Jdets/P (see attached, +Total Di-CBs)
		1	13C PCB-15	113 (19-107)	Jdets/P (see attached, +Total Di-CBs)
			13C PCB-155	136 (25-124)	Jdets/P (see attached, +Total Hexa-CBs)
			13C PCB-189	117 (47-116)	Jdets/P (PCB-189, +Total Hepta-CBs)
		2	13C PCB-15	108 (19-107)	Jdets/P (see attached, +Total Di-CBs)
			13C PCB-189	119 (47-116)	Jdets/P (PCB-189, +Total Hepta-CBs)
		3	13C PCB-15	115 (19-107)	Jdets/P (see attached, +Total Di-CBs)
			13C PCB-189	118 (47-116)	Jdets/P (PCB-189, +Total Hepta-CBs)

30206C31

Table 3. Quantitation References for Analytes

2002 TM

AP Quantitation References

ES PCB-1
PCB-1

ES PCB-3
PCB-2
PCB-3

ES PCB-4
PCB-4
PCB-10

ES PCB-15
PCB-9
PCB-7
PCB-6
PCB-5
PCB-8
PCB-14
PCB-11
PCB-13/12
PCB-15

ES PCB-19
PCB-19
PCB-30/18
PCB-17
PCB-27
PCB-24
PCB-16
PCB-32

ES PCB-37
PCB-34
PCB-23
PCB-26/29
PCB-25
PCB-31
PCB-28/20
PCB-21/33
PCB-22
PCB-36
PCB-39
PCB-38
PCB-35
PCB-37

ES PCB-54
PCB-54

ES PCB-77
PCB-77

ES PCB-81
PCB-52
PCB-73
PCB-43
PCB-69/49
PCB-48
PCB-44/47/65
PCB-59/62/75
PCB-42
PCB-41
PCB-71/40
PCB-64
PCB-72
PCB-68
PCB-57
PCB-58
PCB-67
PCB-63
PCB-61/70/74/76
PCB-66
PCB-55
PCB-56
PCB-60
PCB-80
PCB-79
PCB-78
PCB-50/53*
PCB-45*
PCB-51*
PCB-46*
PCB-81

ES PCB-104
PCB-104
PCB-96

ES PCB-105
PCB-105
PCB-127

ES PCB-114
PCB-122
PCB-114

ES PCB-118
PCB-118

ES PCB-123
PCB-103
PCB-94
PCB-95
PCB-100/93
PCB-102
PCB-98
PCB-88
PCB-91
PCB-84
PCB-89
PCB-121
PCB-92
PCB-113/90/101
PCB-83
PCB-99
PCB-112
PCB-108/119/86/97/125/87
PCB-117
PCB-116/85
PCB-110
PCB-115
PCB-82
PCB-111
PCB-120
PCB-107/124
PCB-109
PCB-123
PCB-106

ES PCB-126
PCB-126

ES PCB-155
PCB-155
PCB-152
PCB-150
PCB-136
PCB-145

ES PCB-153
PCB-148
PCB-151/135
PCB-154
PCB-144
PCB-147/149
PCB-134
PCB-143
PCB-139/140
PCB-131
PCB-142
PCB-132
PCB-133
PCB-165
PCB-146
PCB-161
PCB-153/168
PCB-141
PCB-130
PCB-137
PCB-164
PCB-163/138/129
PCB-160
PCB-158

ES PCB-156/157
PCB-156/157

ES PCB-167
PCB-128/166
PCB-159
PCB-162
PCB-167

ES PCB-169
PCB-169

ES PCB-188
PCB-188
PCB-179
PCB-184
PCB-176
PCB-186
PCB-178

ES PCB-180
PCB-175
PCB-187
PCB-182
PCB-183
PCB-185
PCB-174
PCB-177
PCB-181
PCB-171/173
PCB-172
PCB-192
PCB-180/193
PCB-191

ES PCB-170
PCB-170
PCB-190

ES PCB-189
PCB-189

ES PCB-202
PCB-202
PCB-201
PCB-204
PCB-197
PCB-200
PCB-198/199
PCB-196
PCB-203

ES PCB-205
PCB-195
PCB-194
PCB-205

ES PCB-206
PCB-206

ES PCB-208
PCB-208
PCB-207

ES PCB-209
PCB-209

Note: Quantitation Reference for those congeners without a Labeled Standard is based on the nearest ES @ the same level of chlorination within the same function. Quantitation of those congeners within a function where there is no ES is based on the nearest ES in the other functions of that homologue .

** Based on analytical observations PCB's 50/53, 45,51& 46 were moved to ES 81 when the additional ES's were added.*

LDC #: 32060C31

VALIDATION FINDINGS WORKSHEET
Target Compound Identification

Reviewer: [illegible]
2nd Reviewer: [illegible]

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

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

Y N N/A Was the Ion Abundance Ratio for the two quantitation ions within criteria?
Y N N/A Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?
Y N N/A Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
			concentration of detected native compounds in secondary PUF >20% of primary PUF	~~all~~ 1, 2	TEXT (all compounds + Total Mono- through Nona-CBs)

Notes: _____

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: Jm
2nd Reviewer: CP

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

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	Compound	Finding	Associated Samples	Qualifications
			results reported as EMPC	All	EMPC-J/A (k)
			Congeners flagged "E" exceed upper calibration range	1, 3	Jdets/A (+Total Di-CBs,Tri-CBs,Tetra-CBs,Penta-CBs) (q)
				2	Jdets/A (+Total Tri-CBs,Tetra-CBs)

Comments: See sample calculation verification worksheet for recalculations

LDC #: 30206C31

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer:
2nd Reviewer:

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

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 = $(A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of compound, A_{is} = Area of associated internal standard
average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, C_{is} = Concentration of internal standard
%RSD = 100 * (S/X) — 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	MM6 ICAL	12/14/12	PCB 77 (^{13}C-PCB 77)	1.25	1.25	1.24	1.24	5.4	5.3 .
			PCB 105 (^{13}C-PCB 105)	1.06	1.06	1.05	1.04	2.1	2.1
			PCB 167 (^{13}C-PCB 167)	1.18	1.18	1.20	1.20	1.6	1.6
			PCB 189 (^{13}C-PCB 189)	1.12	1.11	1.11	1.11	2.1	1.9
2			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						
3			PCB 77 (^{13}C-PCB 77)						
			PCB 105 (^{13}C-PCB 105)						
			PCB 167 (^{13}C-PCB 167)						
			PCB 189 (^{13}C-PCB 189)						

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 #: 30206C31

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9m
2nd Reviewer: 9

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

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	130727V01	7-27-13	PCB 77 (^{13}C-PCB 77)	1.25	1.04	1.04	-16.6	16.8
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.98	-6.6	6.6
			PCB 167 (^{13}C-PCB 167)	1.18	1.03	1.03	-13.0	13.1
			PCB 189 (^{13}C-PCB 189)	1.12	1.03	1.03	-7.9	8.3
2			PCB 77 (^{13}C-PCB 77)	1.25	1.07	1.07	-14.3	14.5
			PCB 105 (^{13}C-PCB 105)	1.06	0.99	0.99	-5.8	6.1
			PCB 167 (^{13}C-PCB 167)	1.18	0.99	0.99	-16.0	16.2
			PCB 189 (^{13}C-PCB 189)	1.12	1.04	1.04	-6.4	6.85
3			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					
4			PCB 77 (^{13}C-PCB 77)					
			PCB 105 (^{13}C-PCB 105)					
			PCB 167 (^{13}C-PCB 167)					
			PCB 189 (^{13}C-PCB 189)					

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 #: 30206C31

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

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

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

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

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
RRF	=	Relative Response Factor (average) from the initial calibration
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. 1, PCB-189:

Conc. = $\frac{(7.58e4)(2000)(1)}{(3.59e6)(1.03)(1)(\quad)}$

= 41.0 pg

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

PACKAGE COMPLETENESS AND DELIVERABLES

CASE/SDGNUMBER: A5684 SITE: CWCM High Vol #2, LPR
LAB: SGS Analytical Perspectives

CHECKLIST

I.0 Data Completeness and Deliverables

1.1 Does the Traffic Report or Field Chain of Custody list all samples? [✓] ___ ___

1.2 Is the Case Narrative, extraction logs, % solid worksheet, analysis logs present? [✓] ___ ___

1.3 Are the Case Number and SDG numbers contained in the case narrative? [✓] ___ ___

1.4 Do the Traffic Reports or Lab Case Narrative indicate problems with sample receipt, sample condition, analytical problems, or other comments affecting the quality of the data? ___ [✓] ___

ACTION: Use professional judgement to evaluate the effect of the noted problems on the quality of the data.

ACTION: **As per Field Chain of Custody/Region II requirements, if any sample analyzed as a soil, contains 50% to 90% water, all data shall be flagged as estimated "J". If a soil sample contains more than 90% water, then qualify positive hits "J", and non detects "R".**

NOTE: Samplers are required to maintain all types of environmental samples in the dark at < 4 ° C from the time of collection until receipt at the laboratory.

2.0 Reporting Requirements and Deliverables

2.1 All deliverables must be clearly labeled with the Case number and the associated sample/traffic number. Missing or illegible or incorrectly labeled items must be identified. The Project Officer must immediately be contacted and requested to ask laboratory to submit the missing or incorrect items.

2.2 The following forms were taken from the CLP SOW, CBC01.0 and should be specified in the Project Plan. A comparison of CLP forms must be made against the Laboratory's version. Some information may not be found on the exact form as the CLP version but may be located on another form. As long as the information is present and accessible, it is not a problem. Are these forms (CLP or lab's version) present?

a. Toxic CB Congener Sample Data Summary (Form I CB-1) [✓] ___ ___

b. Toxic CB Congener Toxicity Equivalency (Form I CB-2) [✓] ___ ___

c. CB Congener Sample Data Summary (Form I CB-3) [✓] ___ ___

Note: Form I is used for tabulating and reporting sample analysis, including dilutions, reanalysis, blank, LCS/Ongoing Precision and Recovery (OPR) and requested matrix spike and matrix spike duplicated for target compounds.

d. CB Congener Total Homologue Concentration Summary (Form II CB) [✓] ___ ___

Note: Form II is used to report the concentration of the mono- through nano-chloro

biphenyl homologue for each sample.

e. CB Congener Method Blank Summary (Form IV CB-1) [✓] ___ ___

Note: Form IV summarizes the samples associated with each method blank analysis.

f. CB Congener Descriptor Switching Resolution Summary (Form V CB-1) [✓] ___ ___

Note: Form V CB-1 is used to report the descriptor switching windows for each level of chlorination for each 12-hour time period and to summarize the date and time of analysis, including dilutions, reanalysis, standards, blanks, and requested MS/MSD associated with each analysis of the instrument performance check solution.

g. CB Congener Ion Abundance Ratio Summary (Form V CB-2) [✓] ___ ___
h. CB Congener (Labeled) Ion Abundance Ion Ratio Summary (Form V CB-3) [✓] ___ ___

Note: Form V CB-2 & CB-3 are used to report the ion abundance ratios and signal-to-noise (S/N) ratios for the congeners contained in the LOC/WDM for each 12-hour time period.

i. Toxic CB Congener Initial Calibration Response Factor Summary (Form VI CB-1, CB-2) [✓] ___ ___

j. Individual Congener Initial Calibration Response Factor Summary (Form VI CB-3) [✓] ___ ___

Note: Form VI is used to report the relative response factors (RRF), average RRF, % RSD and RRT for the five or six-point initial calibration at the specific concentration levels.

k. Toxic CB Congener Continuing Calibration Summary (Form VII CB-1) [✓] ___ ___

l. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-2) [✓] ___ ___

m. Individual Congener Continuing Calibration Summary (Form VII CB-3) [✓] ___ ___

n. Toxic CB Congener Continuing Calibration Time Summary (Form VII CB-4) [✓] ___ ___

o. Toxic CB Congener (Labeled) Continuing Calibration Summary (Form VII CB-5) [✓] ___ ___

p. Individual Congener Continuing Calibration Summary (Form VII CB-6) [✓] ___ ___

Note: Form VII is used to report the calibration verification of the HRGC/HRMS system by the analysis of specific calibration verification standard(s). The form is required for each 12-hour time period.

k. CB Congener Analytical Sequence (Form VIII CB) [✓] ___ ___
Note: Form VIII is used to report the analytical sequence for CB congener analyses.

ACTION: If forms are missing, contact the Project Officer to confirm which forms if any were specified in the Project Plan. If the forms are required, inform the Project Officer or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

Note: The above forms might be different or the laboratory might combine several forms into a single one. For example, the Target Analyte, Concentration and Q (qualifier) columns in the "CB Congener Sample Data Summary" form might include columns for IUPAC NO., Co-elution, Reporting Limits, Ion Abundance Ratio and Relative Retention Time (RRT).

2.3 GC/MS Displays
Are the following GC/MS displays present?

a. Standard and sample SICP/SIM chromatograms must list date and time of analysis; the file name; sample number; and instrument I.D. number [✓] ___ ___

b. Percent peak resolution valley [✓] ___ ___

c. Window Defining Mixture raw data [✓] ___ ___

d. SICP/SIM mass chromatograms must display ions used for quantitation, ion abundance ratio, absolute retention time/scan number, signal noise ratio [✓] ___ ___

e. Integrated area of the two ions must be listed for all peaks with signal noise ratio of 2.5 or greater (>10 for calibration and internal standards). [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/ resubmittal or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.4 Are the following Chain of Custody Records and in-house Laboratory Control Documents present?

a. Chain of Custody Records/Traffic Report [✓] ___ ___

b. Sample Shipment Records [✓] ___ ___

c. Sample log-in sheets [✓] ___ ___

d. GC/MS Standard and Sample Run Log in chronological order [✓] ___ ___

e. Sample Extraction Log [✓] ___ ___

ACTION: If deliverables are missing, contact the Project Officer to request explanation/resubmittals or obtain written permission to contact the lab for explanation/resubmittal. If the lab cannot provide missing deliverables, assess the effect on the validity of the data. Note in the Data Assessment.

2.5 Was the sample data package paginated and one sided? [✓] ___ ___

ACTION: If no, document difficulties of reviewing data caused by lack of pagination in Data Assessment Report.

3.0 Holding Times

3.1 There are no demonstrated maximum holding times associated with CBs in aqueous, solid, semi-solid, tissues and other matrices. Aqueous samples must be preserved (pH 2-3) and stored up to one year in the dark at 0-4° C. Solid, semi-solids, multi-phase, and tissue samples must be stored in the dark at <-10° C.

4.0 Instrument Performance

4.1 Mass Spectrometer (MS) Resolution

Perfluorokerosene (PFK) tuning must be performed prior to analyzing calibration solutions, blanks, samples, and QC samples. A static resolving power of at least 10,000 (10% valley definition) must be demonstrated at appropriate masses before any analysis is performed. Static resolving power checks must be performed at the beginning and at the end of each 12 hour period of operation. A minimum required resolving power of 10000

should be obtained for PFK ion at mass 330.9792 or any significant PFK fragment in the range of 300-350.

A manual estimate of the resolving power can be done using the resolution check printout/calibration reports that contain the peak profiles of masses 300 to 350. At mass 330.9792, the first horizontal guideline above the baseline is the 5% line (some MS data system might not show this line). The ppm measurement of the window is usually given at 200 ppm, thus every vertical guideline represents 50 ppm. If the PFK peak is within 100 ppm at 5% height, resolution is equal or greater than 10,000.

NOTE: Because of the extensive mass range covered in each function (native, group and labeled congeners) it may not be possible to maintain 10,000 resolution throughout the mass range during the function. Therefore, resolution must be ≥ 8,000 throughout the mass range and must be ≥ 10,000 in the center of the mass range for each function.

4.1.1 Estimating resolving power (RP) from the resolution check printout containing the peak profiles of masses 300-350

A. Search the data package for the mass 330.9792 PFK peak ion (usually present before the calibration raw data).
A. Locate the 5% line which is the first horizontal gridline above the baseline.
C. At the top left hand corner of the profile, the ppm measurement of the window can be found (usually 200 ppm). Each vertical gridline represents 50 ppm.
D. If the PFK peak is within 100 ppm at 5% height, the resolution is greater than 10,000.

4.2 Gas Chromatographic (GC) Column Resolution

For the SPB-octyl column, the retention times (RT) for decachlororbiphenyl (PCB 209) in the Labeled/LOC/Window Defining Standard must be greater than 55 minutes and uniquely resolve congeners 34 from 23 and 187 from 182. Congeners 156 and 157 must co-elute within 2 seconds at the peak maximum.

4.2.1 The uniquely resolved congeners must resolve with a valley height less than 40% of the shortest of the two peaks.

Was this criterion met? [✓] ___ ___

Note: The criteria for chromatographic resolution must be met for all standards. The data validator should use professional judgment to determine severity of the problem and its effect on the final results.

ACTION: If the percent valley criteria are not met for the uniquely resolved congeners, qualify positive reported values "J" (estimate) or reject "R" all data collected during the 12-hour time window. Document in Data Assessment Report under contract non-compliance.

4.2.2 Were all peaks labeled and identified on the Selected Ion Current Profiles (SICPs)? [✓] ___ ___

4.2.3 Is the absolute retention time of CB congener 209 greater than 55.0 minutes with the SPB-octyl capillary GC column? [✓] ___ ___

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance..

4.2.4 The relative retention times (RRT) of the native CBs and labeled congeners in the calibration verification standard (VER CS-3) must be within their respective RRT limits listed in Table 2/Method 1668A/CB01.0.

Was this criterion met? [ ] ___ ✓

ACTION: If no, use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

4.3 Window Defining Mixture

4.3.1 The Window Defining Mixture (WDM) standard contains 27 labeled congeners (Table 3/Method 1668A) and is analyzed to establish the beginning retention time (RT) and ending RTs of each level of chlorination (LOC, homologue group).

Note: The WDM are also used to set the descriptor switching time such that congeners that elute from the HRGC during a given RT window will also be those congeners for which the ions are monitored.

Did the laboratory label the WDM congeners in each sample Quant report? [✓] ___ ___

ACTION: If no, contract project officer or the laboratory for missing data.

4.3.2 Frequency of Window Defining Mixture - must be analyzed as follows:

1. After HRMS PFK tune and before any initial calibration.

2. Once at the beginning of each 12-hour period during which standards or samples are analyzed.

3. Whenever adjustments or instrument maintenance activities are performed.

Note: The standard CS1 can be used before any initial calibration and CS3 can be used before any continuing calibration.

ACTION: Were the above criteria met? [✓] ___ ___

4.3.3 The CB congeners must be within QC limits for their respective ion abundance ratio and must have signal-to-noise (S/N) ratios $\geq$ 10.

Was this criteria met? [✓] ___ ___

If no, did the lab perform reanalysis? Use professional judgment to assess the effect on the validity of the data. Make a note in the Data Assessment Report under contract non-compliance.

5.0 Initial Calibration

The Isotope dilution technique is used in the calibration of Toxics/LOC CB Congeners using labeled reference compounds. An Internal Standard calibration is applied to the determination of the native CB Congeners for which a labeled is not available, to the determination of the labeled Toxics/LOC/Window Defining Congeners and Labeled Internal Standards except CB 178.

Was the above calibration performed at the frequency specified above? [✓] ___ ___

5.1 The method allows the Laboratory to perform quantitative analysis by isotope dilution and internal standard.

1. Isotope Dilution: performed for the twenty seven (27) CB Congeners. The relative response (RR) (labeled to native) vs concentration is calculated and the response of each Toxics/LOC CB relative to its labeled analog is determined using the area response of both primary and secondary exact m/z ratios. For labeled compounds, a calibration is performed using the data from five (or six) points in the calibration for the native Toxics/LOC CB Congeners.

2. Calibration by Internal Standard: for the native congeners (other than the native Toxics/LOC

CB Congeners), calibration is performed at a single point using the diluted combined 209-Congener Standard solution.

5.1.1 The following MS/DS conditions must be used:

5.1.1.1 Mass calibration as per Section 4.1? [✓] ___ ___

5.1.1.2 Were SIM data acquired for each of the ions listed in Table 7/Method 1668A including interfering ions? [✓] ___ ___

5.2 Were the following criteria met?

5.2.1 The SPB-Octyl column must resolve CB-34 from CB-23, CB-187 from CB-182, and CB-156 and CB-157 must coelute within 2 seconds at the peak maximum. Resolution must have a valley height less than 40 percent of the shorter of the two peaks. [✓] ___ ___

5.2.2 For analysis on a DB-1 (or equivalent) column the chromatographic resolution is evaluated by the analysis of the CS3 continuing calibration standard during both the initial and continuing calibrations. Resolution must have a valley less than 25% for CB-156 and CB-157. [ ] ___ [✓]

5.2.3 The relative ion abundance criteria listed in Table 8 (see analytical method) must be met for all PCB congeners peaks, including the labeled internal standards, clean-up standards, and recovery standards in all solutions. The lower and upper limits of the ion abundance ratios represent a ±15 percent window around the theoretical abundance ratio for each pair of selected ions. [✓] ___ ___

5.2.4 Are the two SIM ions for each homolog within 2 seconds of the corresponding labeled analyte ions? [✓] ___ ___

5.2.5 The relative ion abundance criteria listed in **Table 8** (see analytical method) must be met for each PCB congener peak. [✓] ___ ___

5.2.6 For all calibration solutions the signal to noise ratio (S/N) for the GC signal present in every SICP, including the ones for the labeled standards must be ≥ 10. [✓] ___ ___

5.2.7 The percent relative standard deviations (% RSD) for the mean relative response factors (RRF) must be ≤ 20%. [✓] ___ ___

5.2.8 The relative response factor (RRF) for each congener standard must be greater than 0.05. [ ] ___ [✓]

5.2.9 For all calibration solutions, the retention times (RT) of the congeners must fall with the appropriate RT window established by the window defining mix analysis. In addition, the absolute RT of the of the recovery standards, internal standards and clean-up standards will not change by more than ± 15 seconds between the initial CS3 and the analysis of any other standard. [✓] ___ ___

ACTION:

1. If mass calibration criteria as specified in Section 4.1 were not met, make a note in Data Assessment.

2. If the selected monitoring ions specified in **Table 7/Method 1668A** were not used for data acquisition, the lab must be contacted by the Project Officer for an explanation. If an incorrect ion was used, reject "R" all the associated data.

3. If the 40% percent valley resolution for CBs listed in section 5.2.1 above were not met, quality

positive data "J". Do not qualify non-detects.

4. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

5. If the ion abundance ratio for an internal or labeled standard falls outside the QC limits flag the associated positive hits with "J". No effect on the non-detects.

6. If the signal to noise ratio (S/N) is below control limits, use professional judgement to determine quality of the data.

7. If the %RSD for each analyte exceeds 20%, flag the associated sample positive results for that specific analyte as estimated ("J"). No effect on the non-detect data.

8. If the DB-1 column was used, did the resolution have a valley of less than 25% for CB-156 and CB-157? If not met, qualify the analytes as estimate ("J"). Do not qualify non-detects.

9. If the RRF < 0.05, flag associate sample positive results for that specific congener as estimate "J".

10. Non compliance of any other criteria specified above should be evaluated using professional judgement.

5.2.10 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify that the appropriate labeled standard was used for each analyte.

ACTION: If calculations were not performed correctly, notify the Project Officer to initiate resubmittals from the laboratory.

6.0 System and Laboratory Performance (Calibration Verification)

At the beginning of a 12-hour shift during which analyses are performed, the HR/MS system performance tune is verified prior to analyzing the calibration verification standard CS3. If required, the diluted combined 209-congener standard solutions must also be analyzed at the beginning of the 12-hour period, but after the CS3. The CS3 standard must analyzed at the end of the 12-hour. This closing CS3 standard may also be used as the beginning of the next 12-hour period.

Only if the laboratory meets all performance criteria may samples, blanks, and recovery standards be analyzed.

6.1 Calibration Verification

6.1.1 Were the relative ion abundance ratio for each congener in the CS3 standard within their respective criteria? [✓] ___ ___

6.1.2 Were the peaks representing each unlabeled and labeled compound in the verification standard present with signal to noise ratio (S/N) greater or equal to 10? [✓] ___ ___

6.1.3 For each congener, were the per cent recovery within the limit (Table 6/method 1668A)? (Native Toxics/LOC: 70-130%; Labeled Toxics/LOC/Window-Defining: 50-150% and 60-130% for the cleanup standards) [✓] ___ ___

6.1.4 Were the relative retention time (RRT) of the congeners within the limits defined in Table 2/Method 1668A? Note: RRT should be listed in each sample quant report. [___] ___ ✓

ACTION: If no to section 6.1.1 - 6.1.4, qualify affected congener with "J" qualifier.

6.2 Instrument Sensitivity Test

6.2.1 Project technical specifications may require the laboratory to perform a GC/MS sensitivity test using the CS-0.2 standard. The following guidance is offered:

6.2.2 The test must be demonstrated every 12 hours by analysis of a CS-0.2 standard which must pass the following criteria

6.2.2.1 The absolute RT for the ending recovery standards $^{13}C_{12}$-CL_4-CB-52, $^{13}C_{12}$-CL_5-CB-101, $^{13}C_{12}$-Cl-CB-138, and $^{13}C_{12}$-CL_7-CB-178 must be within 10 seconds of the initial CS3.

6.2.2.2 The signal/noise ratio for the CS-0.2 standard must be at least 10:1 (or 3:1 for di- and nona-PCBs for unlabeled compounds and labeled internal and recovery standards.

6.2.2.3 Ion abundance ratio must be met.

ACTION:

1. If the ion abundance ratio for an analyte is outside the limits, flag the results for that analyte "R" (reject).

2. If the signal noise ratio (S/N) is below control limits, use professional judgement to determine the quality of the data.

3. The RT of the recovery standards from CS3 to the CS-0.2 will indicate the stability of the column during the 12 hours. If these criteria were not met, the estimate all reported values (J) and (UJ) non-detects associated with RT shifts greater than ± 10 seconds.

6.3 Spot check response factor calculations and ion ratios. Ensure that the correct quantitation ions for the unlabeled CBs and labeled standards were used. In addition, verify the appropriate labeled standard was used for each analyte.

7.0 Sample Analysis and Identification

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congeners concentration column.

7.1 A CB congener or labeled compound is identified in environment samples, blanks, or QC samples when all of the following qualitative criteria are met.

7.1.1 The signals for the two exact m/z ratios in **Table 7/Method 1668A** must be present and must maximize within the same two scans (area count for the m/z should be present in the Quant report) [✓] ___ ___

7.1.2 The signal-to-noise (S/N) ratio for each ion peak at each exact m/z must be ≥2.5 for each congener detected in a sample extract and ≥10 for all congener in the calibration standards (Note: The SN ratio should be available in each sample Quant report) [✓] ___ ___

7.1.3 The relative ion abundance criteria for all CB Congener detected as well as labeled compounds, cleanup and internal standards must be within the limits of Table 8 or within ±15% of the ratio in the midpoint calibration (CS-3) standard or calibration verification (VER), whichever is most recent. [ ] ___ ___

7.1.4 The relative retention time (RRT) for each detected peak must be within the RRT QC limits specified in Table 2 of the method (Note: The RRT values should be present in each sample Quant report). [ ] ___ ___

Note: For native congeners determined by Internal Standard Quantitation, a given congener may fall within more than one RT and mis-identified unless the RRT window are made very narrow, as in Table 2. Therefore, consistency of the RT and RRT with other congeners and the labeled compounds may be required for rigorous congener identification. The RT and RRT values should be available in each sample Quant report.

ACTION: If the identification criteria (section 7.1.1 - 7.1.4) were not met, check sample Quant report to verify the congener is listed as "non-detect".

7.2 Quantitative Determination

7.2.1 Isotope Dilution Quantitation

7.2.1.1 Were the Labeled Toxics/Level of Chlorination (LOC)/Window-Defining Congeners (WDC) and Cleanup standards added to every sample? [✓] ___ ___

ACTION: If no, contact project officer to contact the laboratory. Note problem in data assessment.

Note: Corrections for recovery of CB can be made because the native compound and its Labeled analog exhibit similar effects upon extraction, concentration and Gas Chromatography. Relative response (RR) are used in conjunction with the calibration data to determine the concentrations in the final extract providing the labeled compounds spiking levels are constant.

7.2.1.2 The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners for each sample is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30 -135% for Cleanup Standards. Was this criteria met? [X] [✓] ___

ACTION: If no, qualify affected native congener with "J". Make a note in the data assessment.

7.2.1.3 The integrated ion current for the labeled compounds, internal standards, and cleanup standards have a signal noise ratio at least 10 times background noise. [✓] ___ ___
ACTION: If not, verify that the sample in question was reanalyzed. If s/n ratio is less than 10, qualify affected native congener with "J".

7.2.1.4 Did the laboratory provide a "sample calculation" for one of the reported value? [✓] ___ ___

ACTION: Check one value and if not in agreement with the reported value, have Project Officer contact laboratory for a sample calculation.

$$C_{ex}\ (ng/ml) = \frac{(A1_n + A2_n)Cl}{(A1_l + A2_l)RR} \qquad RR = \frac{(A1_n + A2_n)C_l}{(A1_l + A2_l)C_n}$$

C_{ex} = Concentration of congener in the extract.
$A1_n$ and $A2_n$ = The areas of the primary and secondary m/z's for the congener.
C_l = Concentration of the labeled compound in the calibration standard.
C_n =Concentration of the native compound in the calibration standard.
RR = Relative Response

7.2.2 Internal Standard Quantitation and Labeled Compound Recovery

7.2.2.1 The concentration in the extract of the native compounds other than those in the Native Toxics/Labeled /LOC standard, in the Labeled cleanup standard and in the Labeled injection internal standard (except the Labeled CB 178) using the response factors determined from the calibration data and the following equations:

$$C_{ex}\ (ng/ml) = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})RF} \qquad RF = \frac{(A1_s + A2_s)C_{is}}{(A1_{is} + A2_{is})C_s}$$

C_{ex} = Concentration of labeled compound in the extract.
$A1_s$ and $A2_s$ = Areas of the primary and secondary m/z's for the congener.
$A1_{is}$ and $A2_{is}$ = Areas of the primary and secondary m/z's for the internal standard
C_{is} = Concentration of the internal standard.
C_s = Concentration of the compound in the calibration standard.
RF = Response Factor

Note: The internal standard and associated CB congeners can be found in Table 2 of the method.

7.2.2.2 The percent recovery of the Labeled Toxics/LOC/Window-defining CBs and the Labeled cleanup standard CBs are computed using the concentration in the extract determined above and the following equation:

$$\text{Recovery (\%)} = \frac{\text{Concentration found (ng/ml)}}{\text{Concentration spiked (ng/ml)}} \times 100$$

7.2.2.3 The concentration of the native CB in the solid phase is computed using the following equation:

$$\text{Concentration in the solid (ng/kg)} = \frac{(C_{ex} \times V_{ex})}{W_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
W_s = The sample dry weight in kg.

7.2.2.4 The concentration of the native CB in the aqueous phase is computed using the following equation:

$$\text{Concentration in the aqueous phase (pg/L)} = 1000 \times \frac{(C_{ex} \times V_{ex})}{V_s}$$

C_{ex} = Concentration of the compound in the extract.
V_{ex} = The extract volume in ml.
V_s = The sample volume in liters.

7.2.2.5 The analyte concentration must be within the calibration range. If not, dilution should have been made to bring the concentration within the calibration range. Was this criterion met? [ ] ___ ___

NOTE: When the sample extract is diluted by the factor necessary to bring the concentration within the calibration range, the analyst should adjust the concentration of the Labeled injection internal standard to 100 pg/uL in the extract and analyze an aliquot of the diluted extract.

7.3 Clean-up procedures

Clean-up may not be necessary for relatively clean samples (drinking waters, ground waters etc). If the matrix required clean-up, the laboratory has 6 different procedures to choose from (Section 7.5/Method 1668A). Before using any clean-up procedure, the laboratory must demonstrate that the Initial Precision and Recovery (IPR) requirements of the

method can be met using the clean-up procedure.

Labeled clean-up standards $^{13}C_{12}$-2,4,4-TriCB (CB-28), $^{13}C_{12}$-2,3 3,5,5'-PeCB (CB-111), $^{13}C_{12}$-2,2',3,3'5,5',6-HPCB (CB-178) are added to the sample just before the back extraction with base and acid procedure. This occurs before any recommended clean-up procedures are initiated.

7.3.1 Was the percent recovery of the clean-up standards within the recommended range 30-135%? [/] ___ ___

ACTION: If no, and the recovery is less than 30%, qualify all data as estimated "J". If recovery is 0 %, qualify all positive data as estimated "J" and reject "R" all non-detects for that sample.
If recovery is > 135, qualify positive results as estimated, "J".

7.3.2 Check the chromatograms that clean-up procedure was needed for each sample. Were any clean-up procedures needed for either water or soil samples? ___ [ ] ___

ACTION: If yes, check extraction log to verify which clean-up procedures if any were performed. The laboratory is not limited to only one procedure.

1. If no clean-up was performed and the chromatograms indicated that some should have been performed. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of required clean-up for complex samples in Data Assessment.

2. If one type of clean-up was performed, but the chromatograms indicate that additional clean-up should have been utilized. Use professional judgement to assess the effect on the interference on the validity of the data. Document lack of additional clean-up for complex samples in the Data Assessment.

7.3.3 If clean-up procedures were used, did the Laboratory perform clean-up procedures on the Initial Precision and Recovery samples as required by the method? [ ] ___ ___

ACTION: If no, use professional judgement to assess the effect of the interference on the validity of the data. Document lack of IPR documentation for clean-up procedures in the Data Assessment.

8.0 Estimated Detection Limits (EMDL)

8.1 Was an EDL calculated using the formula in section 8.2 for CB congeners reported as non-detect? [/] ___ ___

ACTION: 1. If EDL of an analyte which was not reported as a positive hit is missing, correct manually or contact the Project Officer to request from the laboratory corrections.

8.2 Use the equation below to check EDL calculations:

ALL MATRICES OTHER THAN WATER

$$EDL\ (pg/g) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(W) \times (His^1 + His^2) \times RR}$$

WATER

$$EDL\ (pg/L) = \frac{2.5 \times Qis \times (Hx^1 + Hx^2) \times D}{(V) \times (His^1 + His^2) \times RR}$$

Where:

Hx^1 and Hx^2 = peak heights of the noise for both quantitation ions of the non-detect isomer of interest.

His^1 and His^2 = peak heights of both the quantitation ions of the appropriate internal standards.

D = dilution factor

Qis = quantity (ng) of the appropriate internal standard added to the sample prior to extraction.

RR = Relative response factor from the initial calibration.

V = Volume of sample extracted in liters.

W = Sample dry weight.

NOTE: The validator should check the EDL data to verify that peak heights and not areas were used for this calculation. If the area algorithm was used, the validator should contact the Project Officer to request recalculations from the laboratory.

ACTION: If the spot check calculations yielded EDLs ≤ 15% difference from those reported in Form I, correct manually. If the difference between the validator's value and the Form I's values are > 15% contact the Project Officer to request from the laboratory for an explanation and a copy of the laboratory's calculations.

9.0 <u>Method Blanks</u>

9.1 Has a method blank per matrix been extracted and analyzed with each batch of 20 samples? [✓] ___ ___

9.2 If samples of some matrix were analyzed in different events (i.e. different shifts or days) has one blank for each matrix been extracted and analyzed for each event? [ ] ___ ✓

9.3 Were the method blanks treated as a sample, i.e. spiked with Labeled Toxics/LOC/Window Defining Mixture, Labeled Internal and Labeled Cleanup standards? [✓] ___ ___

Note: 1 Liter of reagent water is used for aqueous samples, 10 gram sand for soil/sediment samples and 1.0 gram of corn oil for tissue samples.

9.4 Were any CB present in the method blank at a concentration less than the estimate minimum level (EML) of Table 2/Method 1668A or one-third the regulatory compliance limits? [✓] ___ ___

Note: The EML in Table 2 of the method are based on common contamination levels. A laboratory may establish an minimum level (ML) for a CB lower than the EMLs in Table 2. MLs may be established as low as the lowest calibration point. Check project plan regarding compliance limits.

ACTION: 1. If the proper number of method blanks were not analyzed, document in Data Assessment. If the validator feels that the validity of the data is seriously compromised and validation of data without the method blanks would be flawed, then notify the Project Officer. If decision is made to proceed with the validation process, consider the following actions: no action taken on non-detected analytes. If an analyte has a reported concentration that is > 5 times the EML, qualify "J" and all concentrations ≤ 5 times the EML are qualified "R" due to possibility of contamination.

2. A. If the congener concentration in the sample is less than five times the concentration in the blank, flag the congener reported value with a "U" qualifier.

B. If the concentration of the congener in the sample is greater than five times the concentration in the blank, no action is needed.

10.0 Labeled Internal and Cleanup Compound Recoveries

10.1 Were the samples spiked with all the labeled compounds as specified in the method? [/] ___ ___

10.2 Are all labeled compound recoveries within the required limits ? [ ] / ___

Note: The percent recovery for the Labeled Toxics/LOC/Window Defining Congeners is 25-150%, except 15-150% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB. 30-135% for Cleanup Standards.

10.3 If not, were samples reanalyzed? [ ] ___ /

ACTION: 1. If the labeled compound recovery was below the lower limit, qualify as estimate with "J" the positive data for the associated compound.

2. No action on non-detects if the labeled compound recovery is above the upper limit.

3. If the labeled compound recovery is 0%, notify project officer. At a minimum, qualify positive value as estimate "J" and reject non-detects with "R" qualifier.

Note 1: If a labeled compound recovery is low, and the cleanup standards are not, the recovery problem may be associated with the extraction procedure or related to a particular difficult matrix. In this case, reanalysis may only serve to confirm a "matrix effect".

Note 2: Low recoveries of the labeled compounds and Cleanup standards suggest that losses may be due to the performance of the clean up steps. Re-extraction and reanalysis of the sample may yield better results.

Recalculate the percent recovery for each labeled standard in the sample extract, Rec_l, using the formula:

$$\% \, Rec_l = \frac{(A_{l1} + A_{l2}) \times Q_{is} \times 100}{(A_{is1} + A_{is2}) \times RF \times Q_l}$$

$A_{l1} + A_{l2}$ = integrated areas of the two quantitation ions of the appropriate labeled compound.

$A_{is1} + A_{is2}$= integrated areas of the two quantitation ions of the appropriate internal standard.

Q_l = quantity of the appropriate labeled compound

Q_{is} = quantity of the appropriate internal standard injected

RF = Response factor of the labeled compounds as determined by the five-point calibration.

11.0 Determination of CBs on a DB-1 Column

11.1 The DB-1 column is optional and is capable of uniquely resolving the congener 156 and 157 that are not resolved on the SPB-octyl column and for resolution of other CB congeners. Was the laboratory required to analyze sample extracts on the DB-1 column? [ ] / ___

Note: The two-column system is capable of resolving a total of approximately 180 CB congeners.

ACTION: If yes, were the WDM, and Cleanup standards added to all samples, standards, blanks, etc? If no, check PO or project plan regarding modifications. [ ] ___ /

Note: Window-defining congeners - the beginning and ending congeners at each level of

chlorination are the same as for the SPB-octyl column.

12.0 Sample Reanalysis

12.1 The Project Officer will evaluate the need for reanalyzing the samples with qualified data based on site-specific Data Quality Objectives.

12.2 Due to a variety of situations (see below) that may occur during sample analysis, the laboratory is required to reanalyze or re-extract and reanalyze certain samples. If a reanalysis was required but was not performed, contact the Project Officer to initiate reanalysis. List in data assessment all re-extractions and reanalyses and identify the sample data summaries which must be used by the data user (when more than one analysis is submitted for a sample).

Lab must re-extract and/or re-analyzed samples when the following criteria are not met:

1. WDM must be met before any standard, samples, QC samples and required blank are analyzed.

2. Initial calibration criteria as outline in section 5.2.1, 5.2.3 - 5.2.9 above must be met.

3. Calibration verification standard criteria as outline in section 6.1.1 - 6.1.4 above must be met.

4. A method blank was not extracted and analyzed with each batch of samples/instrument.

ACTION: For criteria 1, 2, 3, or 4 notify the Project Officer to discuss possible re-analysis of sample by the laboratory.

13.0 Precision and Recovery (PAR)/Laboratory Control Sample (LCS)

The laboratory is required to show initial demonstration of capability, to evaluate and document data quality. Laboratory performance is compared to established performance criteria to determine if results of analyses meet the performance characteristics of the method.

The laboratory must perform and submit data to establish the ability to generate acceptable precision and accuracy.

13.1 Did the laboratory analyzed an Initial Precision and Recovery (IPR) standard containing the Native Toxics/LOC congeners, Labeled Toxics/LOC/WDM and Labeled cleanup standards? [✓] ___ ___

ACTION: If no, contact the Project Officer to request resubmittals from the laboratory.

If data is not available, check the project plan or discuss the issue with the Project Officer. If a decision is made to proceed with validation, use professional judgement. All data at a minimum should be qualified as estimated "J". Technically according to the method, data and system performance is unacceptable for all compounds. Analyses should not have continued as per the method. Document under contract non-compliance in Data Assessment.

13.2 Did the IPR standard deviation (s) and average concentration (x) passed criteria as outlined below? [ ] ___ [✓]

1. %RSD < 40% and 60-140% recovery for Native Toxics/LOC congeners
2. %RSD < 50% and 35-135% recovery for Labeled Toxics/LOC/WDM (20-135% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. %RSD < 45% and 45-120% recovery for Labeled cleanup standards

ACTION: If no, qualify effected congeners as estimate "J"

The laboratory must analyzed an Ongoing Precision and Recovery standard (OPR) periodically, at the beginning of 12 hour shift after the analysis of the CS3 calibration verification (CV), and before the analysis of any sample in each set .

13.3 Was the ~~Ongoing Precision and Recovery (OPR)~~ BCS3 standard analyzed at the required frequency? ☑ ___ ___

13.4 Did the ~~OPR~~ BCS3 standard passed the concentration criteria limits in ~~outline below~~ QAPP? ☑ ___ ___

1. 50-150% recovery for Native Toxics/LOC congeners
2. 30-140% recovery for Labeled Toxics/LOC/WDM (15-140% for $^{13}C_{12}$ -2- MoCB and $^{13}C_{12}$ -4- MoCB)
3. 40-125% recovery for Labeled cleanup standards

ACTION: If no, qualify affected congeners as estimate "J". All samples that do not have a passing OPR standard are potentially affected for that analyte.

Note: The laboratory might use laboratory control sample (LCS) for IPR and laboratory control sample duplicate (LCSD) for OPR.

The following sections may be incorporated in the validation process on a case by case basis depending upon the requirements of the Project Plan. Sometimes a laboratory will provide data for some of the following sections on a routine basis. If not a requirement of the Project Plan, then professional judgement is needed to qualify data based on additional information.

14.0 Toxicity Equivalency Factor (TEF)

NOTE: Certain CB congeners have been shown to cause toxic responses similar to those cause by 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD), the most potent congener. The concept of toxic equivalency factor (TEF; Reference 3) has been developed to facilitate risk assessment and regulatory control of exposure.

The TEF value concentrations are listed in the following Table 1 (Reference 3)

Target Analyte	TEF Value
CB-77	0.0001
CB-81	0.0001
CB-105	0.0001
CB-114	0.0005
CB-118	0.0001
CB-123	0.0001
CB-126	0.1
CB-156/147	0.0005
CB-167	0.00001
CB-169	0.01
CB-189	0.0001

When calculating the 2,3,7,8-TCDD Toxicity Equivalency of a sample for the above CB congeners, only the positive reported values must be included in the calculations. The Toxicity Equivalency (TEQ) concentration is the sum of each concentration of each individual toxic congener value and multiplied by their respective TEF value.

14.1 Did the lab include EDL values in the TEF adjusted concentration calculations? [✓] ___ ___

ACTION: 1. If yes, the toxicity equivalency calculations were not calculated properly, notify the Project Officer to arrange for laboratory resubmittals.

NOTE: Any qualifications such as "J" applied to target compounds should be also applied to their associated total congener concentration.

15.0 Rinsate Blank/Rinse Blank *(Region 2 QA guidelines recommend rinse blanks for all projects)*

15.1 One rinsate blank should be collected for each batch of 20 soil samples or one per day Whichever is more frequent. Were rinsate blanks collected at the above frequency? [✓] ___ ___

15.2 Do any rinsate blanks show the presence of any CB congener at amount above the detection limits (i.e. reported as positive value)? [✓] ___ ___

ACTION: If any qualification is needed due to rinsate blank contamination, follow the guidelines outlined under Method Blanks, section 9, Actions 1 and 2.

16.0 Performance Evaluation Sample (PES)

NOTE: This type of sample may not be available at this time. In many cases, laboratories will substitute matrix spike/matrix spike duplicate (MS/MSD). If PEM(s) were not analyzed but MS/MSD data were submitted, skip this section and go to section 17.

16.1 One or more PES is supplied to the Laboratory. The frequency of this QC sample is one per group of 20 environmental samples or one per samples collected over one week period, whichever occurs first (check project plan).

16.2 Was a PES analyzed at the frequency described above? [___] ✓ ___

16.3 Were the percent recovery of CB congeners within the 50 to 150 percent control limits? [___] ___ ✓

ACTION: 1. If any CB congener fall outside the 50-150 percent control limit, flag positive and non-detect data as estimate "J". However, if the recovery is below 20%, qualify all associated non-detects "R" and positive hits as "J". Notify the Project Officer. Reanalysis may be initiated.

17.0 Matrix Spike (MS) Field Sample

Note: Matrix spike is not required by this method although Labs may routinely perform this analysis as part of internal QA/QC and submit this data as part of the package. Verify requirements with Project Officer.

17.1 Was a matrix spike analyzed at the frequency of one per SDG samples per matrix? [___] ✓ ___

17.2 Were the percent recovery of the spiking congeners within 60 to 140 percent? [___] ___ ✓

ACTION: If problems such as interferences are observed, use professional judgement to assess the quality of the data. The 60-140% limits of the matrix spike data may be used to flag data of the spiked sample only. *The matrix spike data of the PE blank* sample are more important and must be used primarily in data validation.

17.3 Was a matrix spike duplicate analyzed? [ ] ___ ✓

ACTION: No action required. A matrix spike duplicate is not required. Use professional judgement if there is a large difference in concentrations reported between MS and MSD. Qualifications if any, can only be performed on the sample that was used for this criteria.

18.0 Environmental Duplicate Samples *(recommended in Region 2 for all Projects)*

NOTE: Do not confuse an environmental duplicate with a matrix spike duplicate. An environmental duplicate is a sample that has been divided into 2 parts (extracted and analyzed as two different samples) or as 2 separate samples from the same location sent by the sampling crew. This sample is not spike with any additional compounds other than those compounds required by the method for analysis of all routine samples.

18.1 For every batch of 20 samples or samples collected over a period of one week, whichever is less, there must be a sample designated as duplicate. Were duplicate samples collected at the above frequency? [ ] ✓ ___

18.2 Did results of the duplicate samples agree within 25% relative difference for water samples and 50% for other type of samples? [ ] ___ ✓

ACTION: The duplicate results can be used in conjunction of other QC data. Use professional judgement.

19.0 REFERENCES

They are important references for technical information and are submitted here as part of this method's documentation.

1. Method 1668, Revision A, "Chlorinated Biphenyl Congeners in Water, Soil, sediment, Biosolids and Tissue by HRGC/HRMS, August 20, 2003.

2. EPA Statement of Work for Chlorinated Biphenyl (CB) Congeners, Multi-Media, Multi-Concentration, CBC01.0, May 2005.

3. Van den Berg, Linda Birnbaum, Albetus T.C., "Environmental Health Perspectives 106:12, 775-792, 1998.

Addendum to US EPA Region II SOP No. HW-46 Revision 1 (September 2008) for Data Validation of EPA Method 1668 Results from Remedial Investigation Water Column Monitoring / High Volume Chemical Data Collection LPRRP QAPP (HV QAPP).

4.0 Definitions

DYNAMIC SPIKE: The dynamic spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the capture efficiency of all target analytes on the sorbent (PUF). It is introduced into the water stream during sample collection, after the solids filters, and immediately before the PUF in the sampling system.

STATIC SPIKE: The static spike is a mixture of isotopically labeled analogs of selected PCB congeners designed to evaluate the retention of target analytes on the PUF and monitor breakthrough. It is introduced on the PUF before sample collection.

SURROGATES: The dynamic and static spikes act as surrogates to evaluate the sampling system analyte capture and retention efficiency in the operationally defined dissolved phase of the sampled water.

7.0 Sample Analyses and Identification

7.2.2.6 Has the amount of any native target compound in the secondary PUF exceeded the criteria in Worksheet #28 of the HV QAPP? The secondary PUF is used to monitor breakthrough of the primary PUF by native target compounds.

ACTION:

If the amount of any native target compound in the secondary PUF exceeds the HV QAPP criteria then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

10.0 Labeled Compound Recoveries

10.4 Have the labeled compounds used as surrogates in the dynamic and static spike been within the required limits per Worksheet #28 of the HV QAPP?

ACTIONS:

1. If any static spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.

2. If any dynamic spike recovery is below the lower limit or greater than the upper limit then narrate the exceedance in the data validation memo text. This is for informational purposes only per the QAPP and data qualifiers should not be applied based on the exceedance.