



1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6

SVOC DATA PACKAGE

Client Project Information

Project ID:
Project Description:
Contact: Emily Jones

ALSE Project Information

Project ID: FLS100
Contact: Breanne Dusureault
Submission ID(s): L2320141

Final Package Review by:

A handwritten signature in black ink, appearing to read "Breanne Dusureault", is written over a horizontal line.

Date Reviewed: 30-Oct-19



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SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FLS100

Contact: Breanne Dusureault
Submission ID(s): L2316030

Analytical Method: PCB Congeners by EPA TO10A/1668C

Client Project Information

Project ID:

Project Description:
Contact: Emily Jones

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Date Extracted	Date Analyzed
L2316030-1	HEISER-20190719-0725	Puf	25-Jul-19	31-Jul-19	12-Aug-19	14-Aug-19
L2316030-2	CITY-20190719-0725	Puf	25-Jul-19	31-Jul-19	12-Aug-19	14-Aug-19
L2316030-3	RESIDENTIAL-20190719-0725	Puf	25-Jul-19	31-Jul-19	12-Aug-19	14-Aug-19
WG3081836-1	Method Blank	MEDIA	n/a	n/a	12-Aug-19	14-Aug-19
WG3081836-4	Method Blank	REAGENT	n/a	n/a	12-Aug-19	15-Aug-19
WG3081836-2	Laboratory Control Sample	QC	n/a	n/a	12-Aug-19	14-Aug-19

Comments and Notes:

a) Sample Integrity:

The samples were received at 12.7 degrees C., which is above the recommended storage and transportation temperature. However, the brief period at above the recommended temperature is not expected to have a negative impact on data quality.

b) Instrumental Analysis:

The responses for PCB-1, PCB-3 and PCB-15 have been omitted from the highest level of the initial calibration due to detector saturation. Four calibration levels have been used for these targets.

No criteria failures or exceedences.

I certify that this data package is in compliance with the terms and condition of the contract , both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package (hardcopy and/or electronic version) has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Steve Kennedy, Technical Supervisor

3-Oct-19

Date

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SECTION 2: DATA SUMMARY REPORT



1435 Norjohn Court, Unit 1, Burlington, ON, Canada L7L 0E6
Phone: 905-331-3111, FAX: 905-331-4567


Certificate of Analysis

ALS Project Contact:	Breanne Dusureault	Client Name:	Floyd Snider
ALS Project ID:	FLS100	Client Address:	601 Union Street, Suite 600
ALS WO#:	L2320141		Seattle, WA 98101
Date of Report	30-Oct-19		USA
Date of Sample Receipt	31-Jul-19	Client Contact:	Emily Jones
		Client Project ID:	

COMMENTS: PCB Congeners by EPA TO10A/1668C

PCB Congener Group Totals and Total PCB are a sum of detected values, including EMPC values, consistent with USEPA CLP SOW CBC1.2

The samples were received at 12.7 degrees C., which is above the recommended storage and transportation temperature. However, the brief period at above the recommended temperature is not expected to have a negative impact on data quality.

Certified by: 

Steve Kennedy
Technical Supervisor

Results in this certificate relate only to the samples as submitted to the laboratory.
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Sample Analysis Summary Report

Sample Name	HEISER-20190719-0725	CITY-20190719-0725	RESIDENTIAL-20190719-0725
ALS Sample ID	L2320141-1	L2320141-2	L2320141-3
Sample Size	1	1	1
Sample size units	Puf	Puf	Puf
Percent Moisture	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF
Sampling Date	25-Jul-19	25-Jul-19	25-Jul-19
Extraction Date	12-Aug-19	12-Aug-19	12-Aug-19
Target Analytes	pg	pg	pg
PCB-001	33.8	49.9	94.3
PCB-002	<8.5	15.3	19.4
PCB-003	<19	25.2	40.5
PCB-004	102	<140	371
PCB-010	<9.5	<7.1	<8.9
PCB-009	<9.4	<14	<34
PCB-007	<9.3	<7.0	<8.7
PCB-006	27.7	41.5	106
PCB-005	<10	<7.6	<9.5
PCB-008	116	193	413
PCB-014	<8.7	<7.0	<10
PCB-011	229	301	315
PCB-012/013	<8.8	<7.0	23.8
PCB-015	<20	43.0	69.4
PCB-019	<24	33.3	71.8
PCB-018/030	115	173	348
PCB-017	55.9	82.1	158
PCB-027	8.11	11.8	<22
PCB-024	<6.0	3.87	5.09
PCB-016	49.0	<64	<120
PCB-032	<28	44.8	<81
PCB-034	<6.0	<3.5	<5.1
PCB-023	<6.0	<3.5	<5.1
PCB-026/029	<21	<29	65.3
PCB-025	<7.8	<9.4	24.4
PCB-031	86.4	127	230
PCB-020/028	93.5	137	258
PCB-021/033	<50	86.4	152
PCB-022	36.9	<44	89.6
PCB-036	<5.1	<3.0	<4.4
PCB-039	<5.5	<3.3	<4.7
PCB-038	<5.9	<3.4	<5.0
PCB-035	<5.8	<3.4	<7.3
PCB-037	16.7	21.8	<32
PCB-054	<3.1	<2.5	<3.5
PCB-050/053	12.0	20.1	32.7
PCB-045/051	19.4	28.0	38.4
PCB-046	<6.8	<6.0	<15
PCB-052	115	169	210
PCB-073	<4.5	<2.7	<3.3
PCB-043	<7.2	4.4	<5.2
PCB-049/069	<33	57.1	90.2
PCB-048	13.4	18.3	32.6
PCB-044/047/065	75.2	<3.4	148
PCB-059/062/075	<5.8	<5.0	<8.6
PCB-042	14.7	<21	37.4
PCB-040/041/071	29.8	38.3	64.9
PCB-064	24.9	38.0	58.6
PCB-072	<4.1	<3.5	<4.9
PCB-068	<4.1	<3.4	<4.8
PCB-057	<4.4	<3.7	<5.2
PCB-058	<4.4	<3.7	<5.2
PCB-067	<4.2	<3.5	<5.0
PCB-063	<3.8	<3.2	<4.6
PCB-061/070/074/076	72.7	102	138
PCB-066	25.6	28.4	53.5
PCB-055	<4.6	<3.8	<5.4
PCB-056	8.97	<14	<22
PCB-060	<4.5	<7.5	<12
PCB-080	<3.8	<3.2	<4.5
PCB-079	<3.8	<3.2	<4.5
PCB-078	<4.4	<3.7	<5.3
PCB-081	<4.8	<4.2	<5.6
PCB-077	<5.4	<4.6	<6.2
PCB-104	<2.7	<2.3	<2.7
PCB-096	<2.5	<2.3	<2.5
PCB-103	<4.4	<4.2	<5.4
PCB-094	<5.4	<5.1	<6.5
PCB-095	<71	97.8	112
PCB-093/098/100/102	<5.1	<4.8	<6.1

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Sample Analysis Summary Report

Sample Name	HEISER-20190719-0725	CITY-20190719-0725	RESIDENTIAL-20190719-0725
ALS Sample ID	L2320141-1	L2320141-2	L2320141-3
Sample Size	1	1	1
Sample size units	Puf	Puf	Puf
Percent Moisture	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF
Sampling Date	25-Jul-19	25-Jul-19	25-Jul-19
Extraction Date	12-Aug-19	12-Aug-19	12-Aug-19
Target Analytes	pg	pg	pg
PCB-088/091	<7.4	<14	21.0
PCB-084	<17	<32	34.7
PCB-089	<5.3	<5.0	<6.4
PCB-121	<3.6	<3.5	<4.4
PCB-092	<11	20.3	23.7
PCB-090/101/113	82.4	102	126
PCB-083/099	<28	<34	54.5
PCB-112	<3.5	<3.4	<4.3
PCB-086/087/097/109/119/125	34.1	<50	69.8
PCB-085/110/115/116/117	83.9	<100	142
PCB-082	<5.7	<5.5	<7.0
PCB-111	<3.7	<3.5	<4.5
PCB-120	<3.5	<3.4	<4.3
PCB-108/124	<3.9	<2.6	<3.4
PCB-107	<3.6	<2.4	<3.1
PCB-123	<4.6	<3.2	<4.0
PCB-106	<4.0	<2.7	<3.5
PCB-118	<26	45.5	56.7
PCB-122	<4.3	<2.9	<3.7
PCB-114	<4.3	<3.0	<3.7
PCB-105	<4.2	17.0	22.1
PCB-127	<3.7	<2.5	<3.2
PCB-126	<4.4	<3.3	<4.9
PCB-155	<1.9	<1.6	<1.6
PCB-152	<1.8	<1.5	<1.5
PCB-150	<1.9	<1.6	<1.6
PCB-136	11.2	12.7	<11
PCB-145	<2.0	<1.7	<1.7
PCB-148	<2.5	<2.1	<2.1
PCB-135/151	<24	24.5	<21
PCB-154	<2.3	<1.9	<1.9
PCB-144	<2.9	<2.4	<3.0
PCB-147/149	48.3	48.6	49.5
PCB-134/143	<3.8	<3.7	<3.7
PCB-139/140	<3.1	<3.1	<3.0
PCB-131	<4.2	<4.2	<4.1
PCB-142	<3.6	<3.6	<3.5
PCB-132	<15	16.6	18.5
PCB-133	<3.5	<3.4	<3.4
PCB-165	<2.8	<2.7	<2.7
PCB-146	4.39	<5.0	7.07
PCB-161	<2.4	<2.4	<2.4
PCB-153/168	36.8	40.2	38.9
PCB-141	<9.1	7.99	<9.2
PCB-130	<3.7	<3.7	3.70
PCB-137/164	3.54	5.23	<2.7
PCB-129/138/163	29.8	35.2	44.5
PCB-160	<2.7	<2.7	<2.6
PCB-158	<3.1	<2.2	6.59
PCB-128/166	<5.0	<3.4	<3.8
PCB-159	<2.3	<2.2	<2.2
PCB-162	<2.4	<2.4	<2.4
PCB-167	<2.1	<2.2	<2.1
PCB-156/157	<3.3	<2.9	<3.0
PCB-169	<2.4	<2.4	<2.3
PCB-188	<2.4	<2.5	<2.5
PCB-179	<12	5.99	<7.5
PCB-184	<2.2	<2.4	<2.3
PCB-176	<3.3	<2.5	<2.4
PCB-186	<2.4	<2.5	<2.5
PCB-178	<3.1	<3.3	<3.2
PCB-175	<3.0	<3.2	<3.1
PCB-187	23.5	15.3	14.0
PCB-182	<2.9	<3.0	<3.0
PCB-183	7.68	4.5	<5.7
PCB-185	<3.0	<3.2	<3.1
PCB-174	<7.9	<3.9	7.92
PCB-177	<5.3	<4.0	<3.5
PCB-181	<2.9	<3.1	<3.0
PCB-171/173	<3.1	<3.3	<3.2
PCB-172	<3.0	<3.2	<3.1

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Sample Analysis Summary Report

Sample Name	HEISER-20190719-0725	CITY-20190719-0725	RESIDENTIAL-20190719-0725
ALS Sample ID	L2320141-1	L2320141-2	L2320141-3
Sample Size	1	1	1
Sample size units	Puf	Puf	Puf
Percent Moisture	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF
Sampling Date	25-Jul-19	25-Jul-19	25-Jul-19
Extraction Date	12-Aug-19	12-Aug-19	12-Aug-19
Target Analytes	pg	pg	pg
PCB-192	<2.4	<2.6	<2.5
PCB-180/193	<11	10.6	11.9
PCB-191	<2.2	<2.3	<2.3
PCB-170	<3.0	<3.2	<3.2
PCB-190	<2.0	<2.1	<2.1
PCB-189	<2.5	<2.4	<2.5
PCB-202	5.05	3.51	<4.5
PCB-201	<3.0	3.94	<4.8
PCB-204	<2.7	<1.9	<2.6
PCB-197	<2.6	<1.8	<2.5
PCB-200	<2.7	<2.2	<2.7
PCB-198/199	7.09	4.51	<5.8
PCB-196	<3.3	<2.3	<3.2
PCB-203	<3.1	<3.9	<2.9
PCB-195	<3.8	<3.2	<3.8
PCB-194	<3.4	<2.9	<3.5
PCB-205	<3.1	<2.7	<3.1
PCB-208	30.1	27.4	<26
PCB-207	31.7	25.2	<24
PCB-206	<10	<8.9	<12
PCB-209	<43	<40	34.9
Extraction Standards	% Rec	% Rec	% Rec
13C12-PCB-001	37	51	48
13C12-PCB-003	35	51	46
13C12-PCB-004	37	56	47
13C12-PCB-015	37	56	47
13C12-PCB-019	37	57	47
13C12-PCB-037	50	80	70
13C12-PCB-054	50	75	60
13C12-PCB-081	67	93	86
13C12-PCB-077	66	90	85
13C12-PCB-104	60	89	72
13C12-PCB-123	68	93	87
13C12-PCB-118	75	103	94
13C12-PCB-114	73	99	92
13C12-PCB-105	75	100	93
13C12-PCB-126	82	104	104
13C12-PCB-155	66	88	82
13C12-PCB-167	81	103	97
13C12-PCB-156/157	80	102	95
13C12-PCB-169	95	120	118
13C12-PCB-188	66	90	81
13C12-PCB-189	94	118	113
13C12-PCB-202	75	101	89
13C12-PCB-205	85	107	100
13C12-PCB-208	70	91	84
13C12-PCB-206	82	103	95
13C12-PCB-209	89	99	107
Field Spike Standards			
13C12-PCB-031	97	97	96
13C12-PCB-095	75	80	78
13C12-PCB-153	74	80	78
Cleanup Standards			
13C12-PCB-028	53	75	62
13C12-PCB-111	60	78	68
13C12-PCB-178	66	85	74

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Sample Analysis Summary Report

Sample Name	HEISER-20190719-0725	CITY-20190719-0725	RESIDENTIAL-20190719-0725
ALS Sample ID	L2320141-1	L2320141-2	L2320141-3
Sample Size	1	1	1
Sample size units	Puf	Puf	Puf
Percent Moisture	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF
Sampling Date	25-Jul-19	25-Jul-19	25-Jul-19
Extraction Date	12-Aug-19	12-Aug-19	12-Aug-19
Target Analytes	pg	pg	pg
Homologue Group Totals			
Total MonoCB	61.3	90.4	154
Total DiCB	495	733	1330
Total TriCB	592	867	1660
Total TetraCB	450	553	962
Total PentaCB	361	513	667
Total HexaCB	196	202	217
Total HeptaCB	70.7	44.3	50.5
Total OctaCB	15.1	18.1	17.8
Total NonaCB	61.8	52.6	50.0
DecaCB	43.0	40.0	34.9
Total PCB	2350	3110	5150
Toxic Equivalency - (WHO 2005)			
Lower Bound PCB TEQ	0.00	0.00188	0.00236
Mid Point PCB TEQ	0.258	0.204	0.528
Upper Bound PCB TEQ	0.515	0.406	0.564

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Quality Control Summary Report

Sample Name	Method Blank	Method Blank
ALS Sample ID	WG3116369-1	WG3116369-4
Sample Size	1	1
Sample size units	Blank	Blank
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	REAGENT
Sampling Date	n/a	n/a
Extraction Date	12-Aug-19	12-Aug-19
Target Analytes	P9	P9
PCB-001	<1.6	<3.4
PCB-002	<2.1	<3.5
PCB-003	<2.0	<4.6
PCB-004	<12	<52
PCB-010	<7.1	<34
PCB-009	<7.1	<34
PCB-007	<7.0	<35
PCB-006	<7.0	<35
PCB-005	<7.6	<42
PCB-008	<6.5	<29
PCB-014	<6.1	<17
PCB-011	60.6	<35
PCB-012/013	<6.1	<17
PCB-015	<7.3	<22
PCB-019	<3.9	<11
PCB-018/030	<9.8	<9.1
PCB-017	<5.8	<11
PCB-027	<4.2	<7.7
PCB-024	<4.4	<8.1
PCB-016	<6.9	<12
PCB-032	<3.9	<7.3
PCB-034	<3.7	<7.6
PCB-023	<3.7	<7.6
PCB-026/029	<3.5	<7.3
PCB-025	<3.5	<7.2
PCB-031	<12	<9.3
PCB-020/028	18.4	10.3
PCB-021/033	<8.8	<7.5
PCB-022	<4.1	<7.6
PCB-036	<3.1	<6.6
PCB-039	<3.4	<7.2
PCB-038	<3.6	<7.5
PCB-035	<3.6	<7.5
PCB-037	<4.5	<10
PCB-054	<1.8	<6.4
PCB-050/053	<2.8	<6.5
PCB-045/051	<2.9	<6.8
PCB-046	<3.3	<7.6
PCB-052	15.2	<13
PCB-073	<2.2	<5.1
PCB-043	<3.4	<8.2
PCB-049/069	<2.6	<6.0
PCB-048	<2.9	<6.7
PCB-044/047/065	<2.7	15.5
PCB-059/062/075	<2.1	<4.9
PCB-042	<3.3	<7.8
PCB-040/041/071	<3.9	<6.7
PCB-064	4.04	<5.3
PCB-072	<2.7	<5.8
PCB-068	<2.6	<5.7
PCB-057	<2.8	<6.2
PCB-058	<2.8	<6.1
PCB-067	<2.7	<5.9
PCB-063	<2.5	<5.4
PCB-061/070/074/076	<9.1	<6.2
PCB-066	<3.0	<5.9
PCB-055	<2.9	<6.5
PCB-056	<2.9	<6.4
PCB-060	<2.9	<6.4
PCB-080	<2.4	<5.4
PCB-079	<2.4	<5.3
PCB-078	<2.8	<6.3
PCB-081	<3.1	<7.1
PCB-077	<3.4	<8.1
PCB-104	<2.1	<6.0
PCB-096	<2.0	<6.4
PCB-103	<2.5	<7.7
PCB-094	<3.0	<9.5
PCB-095	13.8	<8.1
PCB-093/098/100/102	<2.8	<8.8

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Quality Control Summary Report

Sample Name	Method Blank	Method Blank
ALS Sample ID	WG3116369-1	WG3116369-4
Sample Size	1	1
Sample size units	Blank	Blank
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	REAGENT
Sampling Date	n/a	n/a
Extraction Date	12-Aug-19	12-Aug-19
Target Analytes	P9	P9
PCB-088/091	<2.8	<8.7
PCB-084	<3.0	<9.6
PCB-089	<2.9	<9.5
PCB-121	<2.0	<6.4
PCB-092	<2.7	<8.8
PCB-090/101/113	<9.6	<7.4
PCB-083/099	<2.8	<8.6
PCB-112	<1.9	<6.3
PCB-086/087/097/109/119/125	<2.4	<7.6
PCB-085/110/115/116/117	<5.4	<6.9
PCB-082	<3.2	<10
PCB-111	<2.0	<6.3
PCB-120	<1.9	<6.2
PCB-108/124	<2.0	<6.8
PCB-107	<1.9	<6.4
PCB-123	<2.4	<8.1
PCB-106	<2.1	<7.0
PCB-118	<3.8	<7.6
PCB-122	<2.2	<7.4
PCB-114	<2.3	<8.0
PCB-105	<2.2	<7.9
PCB-127	<1.9	<6.3
PCB-126	<2.3	<9.5
PCB-155	<1.6	<2.5
PCB-152	<1.6	<2.8
PCB-150	<1.6	<2.9
PCB-136	<1.6	<2.9
PCB-145	<1.7	<3.2
PCB-148	<2.2	<3.9
PCB-135/151	<2.2	<4.1
PCB-154	<1.9	<3.5
PCB-144	<2.1	<4.0
PCB-147/149	<2.3	6.09
PCB-134/143	<2.4	<5.0
PCB-139/140	<2.0	<4.1
PCB-131	<2.7	<5.5
PCB-142	<2.4	<4.9
PCB-132	<2.4	<5.0
PCB-133	<2.2	<4.5
PCB-165	<1.8	<3.5
PCB-146	<2.0	<4.0
PCB-161	<1.6	<3.1
PCB-153/168	4.04	<3.4
PCB-141	<2.1	<4.3
PCB-130	<2.4	<4.7
PCB-137/164	<1.8	<3.7
PCB-129/138/163	<3.5	4.85
PCB-160	<1.8	<3.3
PCB-158	<1.4	<2.8
PCB-128/166	<1.8	<3.7
PCB-159	<1.5	<3.0
PCB-162	<1.6	<3.2
PCB-167	<1.4	<2.8
PCB-156/157	<2.0	<3.9
PCB-169	<1.5	<3.4
PCB-188	<1.9	<3.5
PCB-179	<1.8	<3.8
PCB-184	<1.7	<3.6
PCB-176	<1.8	<3.8
PCB-186	<1.9	<4.0
PCB-178	<2.4	<5.0
PCB-175	<2.3	<4.9
PCB-187	<2.2	<4.5
PCB-182	<2.2	<4.8
PCB-183	<2.2	<4.6
PCB-185	<2.4	<5.1
PCB-174	<2.3	<4.8
PCB-177	<2.4	<5.1
PCB-181	<2.3	<4.8
PCB-171/173	<2.4	<5.1
PCB-172	<2.3	<4.8

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Method Blank
ALS Sample ID	WG3116369-1	WG3116369-4
Sample Size	1	1
Sample size units	Blank	Blank
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	REAGENT
Sampling Date	n/a	n/a
Extraction Date	12-Aug-19	12-Aug-19
Target Analytes	P9	P9
PCB-192	<1.9	<3.9
PCB-180/193	<2.0	<4.1
PCB-191	<1.7	<3.5
PCB-170	<2.4	<4.9
PCB-190	<1.5	<3.0
PCB-189	<2.2	<4.0
PCB-202	<1.8	<4.0
PCB-201	<1.7	<4.2
PCB-204	<1.7	<4.3
PCB-197	<1.6	<4.1
PCB-200	<1.7	<4.2
PCB-198/199	<2.2	<5.3
PCB-196	<2.1	<5.1
PCB-203	<1.9	<4.8
PCB-195	<2.2	<4.2
PCB-194	<2.0	<3.8
PCB-205	<1.7	<3.7
PCB-208	<20	<34
PCB-207	22.7	<25
PCB-206	<5.9	<15
PCB-209	30.4	25.7
Extraction Standards	% Rec	% Rec
13C12-PCB-001	50	43
13C12-PCB-003	50	40
13C12-PCB-004	54	46
13C12-PCB-015	54	44
13C12-PCB-019	53	47
13C12-PCB-037	74	50
13C12-PCB-054	67	51
13C12-PCB-081	85	60
13C12-PCB-077	86	59
13C12-PCB-104	77	60
13C12-PCB-123	85	64
13C12-PCB-118	90	67
13C12-PCB-114	89	66
13C12-PCB-105	92	67
13C12-PCB-126	100	68
13C12-PCB-155	83	65
13C12-PCB-167	96	71
13C12-PCB-156/157	97	69
13C12-PCB-169	116	78
13C12-PCB-188	82	65
13C12-PCB-189	114	75
13C12-PCB-202	91	68
13C12-PCB-205	101	79
13C12-PCB-208	84	68
13C12-PCB-206	98	75
13C12-PCB-209	108	85
Field Spike Standards		
13C12-PCB-031	NS	NS
13C12-PCB-095	NS	NS
13C12-PCB-153	NS	NS
Cleanup Standards		
13C12-PCB-028	65	51
13C12-PCB-111	71	56
13C12-PCB-178	76	62

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Method Blank
ALS Sample ID	WG3116369-1	WG3116369-4
Sample Size	1	1
Sample size units	Blank	Blank
Percent Moisture	n/a	n/a
Sample Matrix	MEDIA	REAGENT
Sampling Date	n/a	n/a
Extraction Date	12-Aug-19	12-Aug-19
Target Analytes	p9	p9
Homologue Group Totals		
Total MonoCB	2.10	<3.4
Total DiCB	60.6	35.0
Total TriCB	53.1	19.6
Total TetraCB	35.2	28.5
Total PentaCB	32.6	<6.0
Total HexaCB	9.84	10.9
Total HeptaCB	<1.5	<3.0
Total OctaCB	<1.6	<3.7
Total NonaCB	42.7	59.0
DecaCB	30.4	25.7
Total PCB	267	179
Toxic Equivalency - (WHO 2005)		
Lower Bound PCB TEQ	0.00	0.00
Mid Point PCB TEQ	0.138	0.528
Upper Bound PCB TEQ	0.277	1.06

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	Laboratory Control Sample
ALS Sample ID	WG3116369-2

Sample Size	1
Sample size units	n/a
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	12-Aug-19

Target Analytes	% Rec
PCB-001	107
PCB-003	104
PCB-004	99
PCB-015	104
PCB-019	108
PCB-037	101
PCB-054	101
PCB-081	98
PCB-077	100
PCB-104	88
PCB-123	96
PCB-118	96
PCB-114	96
PCB-105	95
PCB-126	93
PCB-155	92
PCB-167	93
PCB-156/157	93
PCB-169	95
PCB-188	93
PCB-189	102
PCB-202	98
PCB-205	89
PCB-208	104
PCB-206	100
PCB-209	112
Extraction Standards	% Rec
13C12-PCB-001	32
13C12-PCB-003	31
13C12-PCB-004	34
13C12-PCB-015	36
13C12-PCB-019	35
13C12-PCB-037	54
13C12-PCB-054	43
13C12-PCB-081	63
13C12-PCB-077	64
13C12-PCB-104	54
13C12-PCB-123	66
13C12-PCB-118	69
13C12-PCB-114	69
13C12-PCB-105	69
13C12-PCB-126	76
13C12-PCB-155	63
13C12-PCB-167	73
13C12-PCB-156/157	73
13C12-PCB-169	86
13C12-PCB-188	62
13C12-PCB-189	86
13C12-PCB-202	70
13C12-PCB-205	78
13C12-PCB-208	66
13C12-PCB-206	74
13C12-PCB-209	84
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
Cleanup Standards	
13C12-PCB-028	46
13C12-PCB-111	53
13C12-PCB-178	57

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	ccv	ccv
ALS Sample ID	H5-19-CCV-680	H5-19-CCV-680
Sample Size	1	1
Sample size units	n/a	n/a
Percent Moisture	n/a	n/a
Sample Matrix	QC	QC
Sampling Date	n/a	n/a
Extraction Date	n/a	n/a
Target Analytes		
	% Rec	% Rec
PCB-001	100	100
PCB-003	98	95
PCB-004	91	92
PCB-015	98	97
PCB-019	95	94
PCB-037	96	95
PCB-054	93	91
PCB-081	96	95
PCB-077	98	97
PCB-104	93	91
PCB-123	92	92
PCB-118	95	92
PCB-114	93	92
PCB-105	93	93
PCB-126	94	94
PCB-155	92	92
PCB-167	89	89
PCB-156/157	91	92
PCB-169	94	94
PCB-188	93	91
PCB-189	97	96
PCB-202	92	92
PCB-205	88	88
PCB-208	101	101
PCB-206	98	99
PCB-209	96	95
Extraction Standards		
	% Rec	% Rec
13C12-PCB-001	91	88
13C12-PCB-003	92	77
13C12-PCB-004	95	96
13C12-PCB-015	88	71
13C12-PCB-019	97	100
13C12-PCB-037	101	75
13C12-PCB-054	108	107
13C12-PCB-081	100	88
13C12-PCB-077	99	84
13C12-PCB-104	110	110
13C12-PCB-123	96	100
13C12-PCB-118	98	105
13C12-PCB-114	97	102
13C12-PCB-105	99	101
13C12-PCB-126	103	102
13C12-PCB-155	105	109
13C12-PCB-167	107	101
13C12-PCB-156/157	104	101
13C12-PCB-169	120	112
13C12-PCB-188	93	92
13C12-PCB-189	120	132
13C12-PCB-202	103	105
13C12-PCB-205	99	100
13C12-PCB-208	82	83
13C12-PCB-206	96	101
13C12-PCB-209	107	116
Field Spike Standards		
	% Rec	% Rec
13C12-PCB-031	90	101
13C12-PCB-095	90	85
13C12-PCB-153	80	82
Cleanup Standards		
	% Rec	% Rec
13C12-PCB-028	98	90
13C12-PCB-111	87	89
13C12-PCB-178	90	90

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-20190719-0725
 ALS Sample ID L2320141-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A34
 Run Date 15-Aug-19 11:18
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.88	33.8	3.2	M,J		50
PCB-002		10.28	<8.5	3.3	M,J,R	8.5	50
PCB-003		10.41	<19	4.2	J,R	19	50
PCB-004		10.58	102	15			50
PCB-010		NotFnd	<9.5	9.5	U		50
PCB-009		NotFnd	<9.4	9.4	U		50
PCB-007		NotFnd	<9.3	9.3	U		50
PCB-006		12.11	27.7	9.3	J		50
PCB-005		NotFnd	<10	10	U		50
PCB-008		12.37	116	8.6			50
PCB-014		NotFnd	<8.7	8.7	U		50
PCB-011		13.87	229	9.0	B		50
PCB-012/013		NotFnd	<8.8	8.8	U		50
PCB-015		14.25	<20	11	J,R	20	50
PCB-019		12.58	<24	6.5	J,R	24	50
PCB-018/030		13.69	115	6.7			50
PCB-017		13.94	55.9	8.0	M		50
PCB-027		14.06	8.11	5.7	J		50
PCB-024		14.16	<6.0	6.0	M,U	1.8	50
PCB-016		14.22	49.0	9.5	M,J		50
PCB-032		14.52	<28	5.4	J,R	28	50
PCB-034		NotFnd	<6.0	6.0	U		50
PCB-023		NotFnd	<6.0	6.0	U		50
PCB-026/029		15.49	<21	5.7	J,R	21	50
PCB-025		15.61	<7.8	5.6	J,R	7.8	50
PCB-031		15.80	86.4	5.4			50
PCB-020/028		15.97	93.5	5.7	B		50
PCB-021/033		16.10	<50	6.0	J,R	50	50
PCB-022		16.34	36.9	6.0	J		50
PCB-036		NotFnd	<5.1	5.1	U		50
PCB-039		NotFnd	<5.5	5.5	U		50
PCB-038		NotFnd	<5.9	5.9	U		50
PCB-035		NotFnd	<5.8	5.8	U		50
PCB-037		18.21	16.7	7.4	M,J		50
PCB-054		NotFnd	<3.1	3.1	U		50
PCB-050/053		15.64	12.0	5.9	J		50
PCB-045/051		16.07	19.4	6.1	J		50
PCB-046		NotFnd	<6.8	6.8	U		50
PCB-052		16.97	115	5.8	B		50
PCB-073		17.10	<4.5	4.5	U		50
PCB-043		NotFnd	<7.2	7.2	U		50
PCB-049/069		17.24	<33	5.4	J,R	33	50
PCB-048		17.40	13.4	6.0	J		50
PCB-044/047/065		17.54	75.2	5.6			50
PCB-059/062/075		17.72	<5.8	4.5	J,R	5.8	50
PCB-042		17.83	14.7	7.0	J		50
PCB-040/041/071		18.10	29.8	6.0	J		50
PCB-064		18.22	24.9	4.8	J,B		50
PCB-072		NotFnd	<4.1	4.1	U		50
PCB-068		18.79	<4.1	4.1	U	2.8	50
PCB-057		NotFnd	<4.4	4.4	U		50
PCB-058		NotFnd	<4.4	4.4	U		50
PCB-067		NotFnd	<4.2	4.2	U		50
PCB-063		NotFnd	<3.8	3.8	U		50
PCB-061/070/074/076		19.58	72.7	4.5			50
PCB-066		19.75	25.6	4.1	J		50
PCB-055		NotFnd	<4.6	4.6	U		50
PCB-056		20.13	8.97	4.5	J		50
PCB-060		NotFnd	<4.5	4.5	U		50
PCB-080		NotFnd	<3.8	3.8	U		50
PCB-079		NotFnd	<3.8	3.8	U		50
PCB-078		NotFnd	<4.4	4.4	U		50
PCB-081	0.0003	NotFnd	<4.8	4.8	U		50
PCB-077	0.0001	NotFnd	<5.4	5.4	U		50
PCB-104		NotFnd	<2.7	2.7	U		50
PCB-096		NotFnd	<2.5	2.5	U		50
PCB-103		NotFnd	<4.4	4.4	U		50
PCB-094		NotFnd	<5.4	5.4	U		50
PCB-095		19.10	<71	4.7	R	71	50
PCB-093/098/100/102		NotFnd	<5.1	5.1	U		50

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-20190719-0725
 ALS Sample ID L2320141-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A34
 Run Date 15-Aug-19 11:18
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.58	<7.4	5.0	M,J,R	7.4	50
PCB-084		19.72	<17	5.5	J,R	17	50
PCB-089		NotFnd	<5.3	5.3	U		50
PCB-121		NotFnd	<3.6	3.6	U		50
PCB-092		20.33	<11	5.0	J,R	11	50
PCB-090/101/113		20.64	82.4	4.3			50
PCB-083/099		20.95	<28	5.1	J,R	28	50
PCB-112		NotFnd	<3.5	3.5	U		50
PCB-086/087/097/109/119/125		21.30	34.1	4.4	M,J		50
PCB-085/110/115/116/117		21.71	83.9	4.0	M		50
PCB-082		NotFnd	<5.7	5.7	U		50
PCB-111		NotFnd	<3.7	3.7	U		50
PCB-120		NotFnd	<3.5	3.5	U		50
PCB-108/124		NotFnd	<3.9	3.9	U		50
PCB-107		23.04	<3.6	3.6	U	1.8	50
PCB-123	0.00003	NotFnd	<4.6	4.6	U		50
PCB-106		NotFnd	<4.0	4.0	U		50
PCB-118	0.00003	23.26	<26	4.1	J,R	26	50
PCB-122		NotFnd	<4.3	4.3	U		50
PCB-114	0.00003	NotFnd	<4.3	4.3	U		50
PCB-105	0.00003	NotFnd	<4.2	4.2	U		50
PCB-127		NotFnd	<3.7	3.7	U		50
PCB-126	0.1	25.49	<4.4	4.4	U	4.2	50
PCB-155		NotFnd	<1.9	1.9	U		50
PCB-152		NotFnd	<1.8	1.8	U		50
PCB-150		NotFnd	<1.9	1.9	U		50
PCB-136		20.95	11.2	1.9	J		50
PCB-145		NotFnd	<2.0	2.0	U		50
PCB-148		NotFnd	<2.5	2.5	U		50
PCB-135/151		22.17	<24	2.6	M,J,R	24	50
PCB-154		NotFnd	<2.3	2.3	U		50
PCB-144		22.48	<2.9	2.5	M,J,R	2.9	50
PCB-147/149		22.67	48.3	3.1	J		50
PCB-134/143		NotFnd	<3.8	3.8	U		50
PCB-139/140		NotFnd	<3.1	3.1	U		50
PCB-131		NotFnd	<4.2	4.2	U		50
PCB-142		NotFnd	<3.6	3.6	U		50
PCB-132		23.36	<15	3.7	J,R	15	50
PCB-133		NotFnd	<3.5	3.5	U		50
PCB-165		NotFnd	<2.8	2.8	U		50
PCB-146		23.89	4.39	3.1	J		50
PCB-161		NotFnd	<2.4	2.4	U		50
PCB-153/168		24.20	36.8	2.7	J,B		50
PCB-141		24.33	<9.1	3.3	J,R	9.1	50
PCB-130		NotFnd	<3.7	3.7	U		50
PCB-137/164		24.66	3.54	2.8	J		50
PCB-129/138/163		24.88	29.8	3.2	J		50
PCB-160		NotFnd	<2.7	2.7	U		50
PCB-158		25.07	<3.1	2.2	J,R	3.1	50
PCB-128/166		25.56	<5.0	2.9	J,R	5.0	50
PCB-159		NotFnd	<2.3	2.3	U		50
PCB-162		NotFnd	<2.4	2.4	U		50
PCB-167	0.00003	NotFnd	<2.1	2.1	U		50
PCB-156/157	0.00003	27.03	<3.3	3.0	J,R	3.3	100
PCB-169	0.03	NotFnd	<2.4	2.4	U		50
PCB-188		NotFnd	<2.4	2.4	U		50
PCB-179		23.72	<12	2.3	J,R	12	50
PCB-184		NotFnd	<2.2	2.2	U		50
PCB-176		24.18	<3.3	2.3	J,R	3.3	50
PCB-186		NotFnd	<2.4	2.4	U		50
PCB-178		NotFnd	<3.1	3.1	U		50
PCB-175		NotFnd	<3.0	3.0	U		50
PCB-187		25.56	23.5	2.8	J		50
PCB-182		NotFnd	<2.9	2.9	U		50
PCB-183		25.86	7.68	2.8	M,J		50
PCB-185		NotFnd	<3.0	3.0	U		50
PCB-174		26.01	<7.9	2.9	M,J,R	7.9	50
PCB-177		26.26	<5.3	3.1	J,R	5.3	50
PCB-181		NotFnd	<2.9	2.9	U		50
PCB-171/173		NotFnd	<3.1	3.1	U		50
PCB-172		NotFnd	<3.0	3.0	U		50

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-20190719-0725
 ALS Sample ID L2320141-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A34
 Run Date 15-Aug-19 11:18
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<2.4	2.4	U		50
PCB-180/193		27.72	<11	2.5	J,R	11	50
PCB-191		NotFnd	<2.2	2.2	U		50
PCB-170		NotFnd	<3.0	3.0	U		50
PCB-190		NotFnd	<2.0	2.0	U		50
PCB-189	0.00003	NotFnd	<2.5	2.5	U		50
PCB-202		26.28	5.05	2.7	M,J		50
PCB-201		26.78	<3.0	2.6	M,J,R	3.0	50
PCB-204		NotFnd	<2.7	2.7	U		50
PCB-197		NotFnd	<2.6	2.6	U		50
PCB-200		27.33	<2.7	2.7	U	1.8	50
PCB-198/199		28.71	7.09	3.4	J		50
PCB-196		NotFnd	<3.3	3.3	U		50
PCB-203		29.16	<3.1	3.1	U	2.0	50
PCB-195		NotFnd	<3.8	3.8	U		50
PCB-194		NotFnd	<3.4	3.4	U		50
PCB-205		NotFnd	<3.1	3.1	U		50
PCB-208		29.74	30.1	6.3	J		50
PCB-207		30.21	31.7	5.9	M,J,B		50
PCB-206		NotFnd	<10	10	U		50
PCB-209		33.62	<43	3.9	J,R	43	50

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.87	37	5-145
13C12-PCB-003	4000	10.40	35	5-145
13C12-PCB-004	4000	10.56	37	5-145
13C12-PCB-015	4000	14.25	37	5-145
13C12-PCB-019	4000	12.57	37	5-145
13C12-PCB-037	4000	18.20	50	5-145
13C12-PCB-054	4000	14.42	50	5-145
13C12-PCB-081	4000	21.79	67	10-145
13C12-PCB-077	4000	22.08	66	10-145
13C12-PCB-104	4000	17.49	60	10-145
13C12-PCB-123	4000	23.08	68	10-145
13C12-PCB-118	4000	23.25	75	10-145
13C12-PCB-114	4000	23.55	73	10-145
13C12-PCB-105	4000	23.90	75	10-145
13C12-PCB-126	4000	25.49	82	10-145
13C12-PCB-155	4000	20.50	66	10-145
13C12-PCB-167	4000	26.40	81	10-145
13C12-PCB-156/157	8000	27.03	80	10-145
13C12-PCB-169	4000	28.68	95	10-145
13C12-PCB-188	4000	23.50	66	10-145
13C12-PCB-189	4000	29.97	94	10-145
13C12-PCB-202	4000	26.28	75	10-145
13C12-PCB-205	4000	31.37	85	10-145
13C12-PCB-208	4000	29.71	70	10-145
13C12-PCB-206	4000	32.45	82	10-145
13C12-PCB-209	4000	33.59	89	10-145

Field Spike Standards

13C12-PCB-031	6000	15.78	97	70-130
13C12-PCB-095	6000	19.10	75	70-130
13C12-PCB-153	6000	24.19	74	70-130

Cleanup Standards

13C12-PCB-028	4000	15.96	53	5-145
13C12-PCB-111	4000	22.02	60	10-145
13C12-PCB-178	4000	25.07	66	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-20190719-0725
 ALS Sample ID L2320141-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information **Run 1**
 Filename 5-190814A34
 Run Date 15-Aug-19 11:18
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			61.3	3.2	J		200
Total DiCB			495	8.6	J		400
Total TriCB			592	5.1	J		400
Total TetraCB			450	3.1	J		800
Total PentaCB			361	2.5	J		800
Total HexaCB			196	1.8	J		800
Total HeptaCB			70.7	2.0	J		400
Total OctaCB			15.1	2.6	J		400
Total NonaCB			61.8	5.9	J		200
DecaCB			43.0	3.9	J		200
Total PCB			2350		J		1600

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ 0.00
 Mid Point PCB TEQ 0.258
 Upper Bound PCB TEQ 0.515

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
 TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
 LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
 M Indicates that a peak has been manually integrated.
 U Indicates that this compound was not detected above the EDL.
 J Indicates that the analyte was positively identified. The associated numerical result is an estimate.
 R Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
 B Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
 EMPC Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name CITY-20190719-0725
 ALS Sample ID L2320141-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A35
 Run Date 15-Aug-19 12:00
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.88	49.9	2.7	J		50
PCB-002		10.28	15.3	2.7	J		50
PCB-003		10.41	25.2	3.5	J		50
PCB-004		10.58	<140	11	R	140	50
PCB-010		NotFnd	<7.1	7.1	U		50
PCB-009		11.84	<14	7.0	J,R	14	50
PCB-007		NotFnd	<7.0	7.0	U		50
PCB-006		12.11	41.5	6.9	J		50
PCB-005		NotFnd	<7.6	7.6	U		50
PCB-008		12.39	193	6.5			50
PCB-014		NotFnd	<7.0	7.0	U		50
PCB-011		13.87	301	7.2	B		50
PCB-012/013		14.05	<7.0	7.0	U	3.7	50
PCB-015		14.26	43.0	8.8	J		50
PCB-019		12.58	33.3	4.9	J		50
PCB-018/030		13.69	173	4.1			50
PCB-017		13.94	82.1	4.9			50
PCB-027		14.07	11.8	3.5	J		50
PCB-024		14.16	3.87	3.6	M,J		50
PCB-016		14.22	<64	5.8	M,R	64	50
PCB-032		14.52	44.8	3.3	J		50
PCB-034		NotFnd	<3.5	3.5	U		50
PCB-023		NotFnd	<3.5	3.5	U		50
PCB-026/029		15.49	<29	3.4	J,R	29	50
PCB-025		15.63	<9.4	3.3	J,R	9.4	50
PCB-031		15.80	127	3.2			50
PCB-020/028		15.97	137	3.4	B		50
PCB-021/033		16.11	86.4	3.5			50
PCB-022		16.34	<44	3.5	J,R	44	50
PCB-036		NotFnd	<3.0	3.0	U		50
PCB-039		NotFnd	<3.3	3.3	U		50
PCB-038		NotFnd	<3.4	3.4	U		50
PCB-035		NotFnd	<3.4	3.4	U		50
PCB-037		18.21	21.8	4.4	J		50
PCB-054		NotFnd	<2.5	2.5	U		50
PCB-050/053		15.64	20.1	3.6	J		50
PCB-045/051		16.06	28.0	3.7	J		50
PCB-046		16.21	<6.0	4.1	J,R	6.0	50
PCB-052		16.97	169	3.5			50
PCB-073		NotFnd	<2.7	2.7	U		50
PCB-043		NotFnd	<4.4	4.4	U		50
PCB-049/069		17.24	57.1	3.3			50
PCB-048		17.41	18.3	3.6	J		50
PCB-044/047/065		NotFnd	<3.4	3.4	U		50
PCB-059/062/075		17.70	<5.0	2.7	J,R	5.0	50
PCB-042		17.83	<21	4.2	J,R	21	50
PCB-040/041/071		18.09	38.3	3.7	M,J		50
PCB-064		18.22	38.0	2.9	J,B		50
PCB-072		NotFnd	<3.5	3.5	U		50
PCB-068		NotFnd	<3.4	3.4	U		50
PCB-057		NotFnd	<3.7	3.7	U		50
PCB-058		NotFnd	<3.7	3.7	U		50
PCB-067		NotFnd	<3.5	3.5	U		50
PCB-063		NotFnd	<3.2	3.2	U		50
PCB-061/070/074/076		19.57	102	3.7			50
PCB-066		19.75	28.4	3.5	J		50
PCB-055		NotFnd	<3.8	3.8	U		50
PCB-056		20.13	<14	3.8	J,R	14	50
PCB-060		20.25	<7.5	3.7	J,R	7.5	50
PCB-080		NotFnd	<3.2	3.2	U		50
PCB-079		NotFnd	<3.2	3.2	U		50
PCB-078		NotFnd	<3.7	3.7	U		50
PCB-081	0.0003	NotFnd	<4.2	4.2	U		50
PCB-077	0.0001	NotFnd	<4.6	4.6	U		50
PCB-104		NotFnd	<2.3	2.3	U		50
PCB-096		NotFnd	<2.3	2.3	U		50
PCB-103		NotFnd	<4.2	4.2	U		50
PCB-094		NotFnd	<5.1	5.1	U		50
PCB-095		19.11	97.8	4.5	B		50
PCB-093/098/100/102		19.30	<4.8	4.8	U		50

ALS Life Sciences

Sample Analysis Report

Sample Name CITY-20190719-0725
 ALS Sample ID L2320141-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information **Run 1**
 Filename 5-190814A35
 Run Date 15-Aug-19 12:00
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.57	<14	4.8	J,R	14	50
PCB-084		19.72	<32	5.2	J,R	32	50
PCB-089		NotFnd	<5.0	5.0	U		50
PCB-121		NotFnd	<3.5	3.5	U		50
PCB-092		20.33	20.3	4.7	J		50
PCB-090/101/113		20.65	102	4.1			50
PCB-083/099		20.95	<34	4.8	J,R	34	50
PCB-112		NotFnd	<3.4	3.4	U		50
PCB-086/087/097/109/119/125		21.30	<50	4.2	M,J,R	50	50
PCB-085/110/115/116/117		21.71	<100	3.8	M,R	100	50
PCB-082		21.91	<5.5	5.5	U	3.4	50
PCB-111		NotFnd	<3.5	3.5	U		50
PCB-120		NotFnd	<3.4	3.4	U		50
PCB-108/124		22.90	<2.6	2.6	U	2.6	50
PCB-107		23.03	<2.4	2.4	U	1.9	50
PCB-123	0.00003	NotFnd	<3.2	3.2	U		50
PCB-106		NotFnd	<2.7	2.7	U		50
PCB-118	0.00003	23.27	45.5	2.7	J		50
PCB-122		NotFnd	<2.9	2.9	U		50
PCB-114	0.00003	NotFnd	<3.0	3.0	U		50
PCB-105	0.00003	23.91	17.0	2.9	J		50
PCB-127		NotFnd	<2.5	2.5	U		50
PCB-126	0.1	NotFnd	<3.3	3.3	U		50
PCB-155		NotFnd	<1.6	1.6	U		50
PCB-152		NotFnd	<1.5	1.5	U		50
PCB-150		NotFnd	<1.6	1.6	U		50
PCB-136		20.95	12.7	1.6	J		50
PCB-145		NotFnd	<1.7	1.7	U		50
PCB-148		NotFnd	<2.1	2.1	U		50
PCB-135/151		22.18	24.5	2.2	J		50
PCB-154		22.30	<1.9	1.9	U	1.2	50
PCB-144		22.47	<2.4	2.1	M,J,R	2.4	50
PCB-147/149		22.67	48.6	3.1	J		50
PCB-134/143		22.79	<3.7	3.7	U	2.6	50
PCB-139/140		NotFnd	<3.1	3.1	U		50
PCB-131		NotFnd	<4.2	4.2	U		50
PCB-142		NotFnd	<3.6	3.6	U		50
PCB-132		23.36	16.6	3.7	J		50
PCB-133		NotFnd	<3.4	3.4	U		50
PCB-165		NotFnd	<2.7	2.7	U		50
PCB-146		23.88	<5.0	3.0	J,R	5.0	50
PCB-161		NotFnd	<2.4	2.4	U		50
PCB-153/168		24.20	40.2	2.6	J,B		50
PCB-141		24.32	7.99	3.2	J		50
PCB-130		NotFnd	<3.7	3.7	U		50
PCB-137/164		24.72	5.23	2.8	M,J		50
PCB-129/138/163		24.89	35.2	3.2	J		50
PCB-160		NotFnd	<2.7	2.7	U		50
PCB-158		NotFnd	<2.2	2.2	U		50
PCB-128/166		25.57	<3.4	2.8	J,R	3.4	50
PCB-159		NotFnd	<2.2	2.2	U		50
PCB-162		NotFnd	<2.4	2.4	U		50
PCB-167	0.00003	NotFnd	<2.2	2.2	U		50
PCB-156/157	0.00003	NotFnd	<2.9	2.9	U	100	
PCB-169	0.03	NotFnd	<2.4	2.4	U		50
PCB-188		NotFnd	<2.5	2.5	U		50
PCB-179		23.73	5.99	2.4	J		50
PCB-184		NotFnd	<2.4	2.4	U		50
PCB-176		NotFnd	<2.5	2.5	U		50
PCB-186		NotFnd	<2.5	2.5	U		50
PCB-178		25.08	<3.3	3.3	M,U		50
PCB-175		NotFnd	<3.2	3.2	U		50
PCB-187		25.55	15.3	2.9	J		50
PCB-182		NotFnd	<3.0	3.0	U		50
PCB-183		25.87	<4.5	2.9	M,J,R	4.5	50
PCB-185		NotFnd	<3.2	3.2	U		50
PCB-174		26.01	<3.9	3.1	M,J,R	3.9	50
PCB-177		26.26	<4.0	3.2	J,R	4.0	50
PCB-181		NotFnd	<3.1	3.1	U		50
PCB-171/173		NotFnd	<3.3	3.3	U		50
PCB-172		NotFnd	<3.2	3.2	U		50

ALS Life Sciences

Sample Analysis Report

Sample Name CITY-20190719-0725
 ALS Sample ID L2320141-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A35
 Run Date 15-Aug-19 12:00
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<2.6	2.6	U		50
PCB-180/193		27.72	10.6	2.7	J		50
PCB-191		NotFnd	<2.3	2.3	U		50
PCB-170		28.39	<3.2	3.2	U	3.0	50
PCB-190		NotFnd	<2.1	2.1	U		50
PCB-189	0.00003	NotFnd	<2.4	2.4	U		50
PCB-202		26.29	3.51	1.9	J		50
PCB-201		26.78	3.94	1.8	J		50
PCB-204		NotFnd	<1.9	1.9	U		50
PCB-197		NotFnd	<1.8	1.8	U		50
PCB-200		27.33	<2.2	1.9	J,R	2.2	50
PCB-198/199		28.71	4.51	2.4	M,J		50
PCB-196		NotFnd	<2.3	2.3	U		50
PCB-203		29.18	<3.9	2.1	J,R	3.9	50
PCB-195		NotFnd	<3.2	3.2	U		50
PCB-194		NotFnd	<2.9	2.9	U		50
PCB-205		NotFnd	<2.7	2.7	U		50
PCB-208		29.73	27.4	5.3	J		50
PCB-207		30.21	25.2	5.1	J,B		50
PCB-206		NotFnd	<8.9	8.9	U		50
PCB-209		33.62	<40	3.7	J,R	40	50

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.87	51	5-145
13C12-PCB-003	4000	10.41	51	5-145
13C12-PCB-004	4000	10.56	56	5-145
13C12-PCB-015	4000	14.25	56	5-145
13C12-PCB-019	4000	12.57	57	5-145
13C12-PCB-037	4000	18.20	80	5-145
13C12-PCB-054	4000	14.43	75	5-145
13C12-PCB-081	4000	21.78	93	10-145
13C12-PCB-077	4000	22.08	90	10-145
13C12-PCB-104	4000	17.49	89	10-145
13C12-PCB-123	4000	23.08	93	10-145
13C12-PCB-118	4000	23.26	103	10-145
13C12-PCB-114	4000	23.55	99	10-145
13C12-PCB-105	4000	23.90	100	10-145
13C12-PCB-126	4000	25.49	104	10-145
13C12-PCB-155	4000	20.50	88	10-145
13C12-PCB-167	4000	26.40	103	10-145
13C12-PCB-156/157	8000	27.03	102	10-145
13C12-PCB-169	4000	28.70	120	10-145
13C12-PCB-188	4000	23.50	90	10-145
13C12-PCB-189	4000	29.97	118	10-145
13C12-PCB-202	4000	26.28	101	10-145
13C12-PCB-205	4000	31.38	107	10-145
13C12-PCB-208	4000	29.71	91	10-145
13C12-PCB-206	4000	32.45	103	10-145
13C12-PCB-209	4000	33.59	99	10-145

Field Spike Standards

13C12-PCB-031	6000	15.79	97	70-130
13C12-PCB-095	6000	19.10	80	70-130
13C12-PCB-153	6000	24.19	80	70-130

Cleanup Standards

13C12-PCB-028	4000	15.96	75	5-145
13C12-PCB-111	4000	22.02	78	10-145
13C12-PCB-178	4000	25.07	85	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name	CITY-20190719-0725	Sampling Date	25-Jul-19	
ALS Sample ID	L2320141-2	Extraction Date	12-Aug-19	Approved: E. Sabljic --e-signature-- 16-Aug-2019
Analysis Method	EPA 1668C	Sample Size	1 Puf	
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	2	

Run Information	Run 1
Filename	5-190814A35
Run Date	15-Aug-19 12:00
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			90.4	2.7	J		200
Total DiCB			733	6.5	J		400
Total TriCB			867	3.0	J		400
Total TetraCB			553	2.5	J		800
Total PentaCB			513	2.3	J		800
Total HexaCB			202	1.5	J		800
Total HeptaCB			44.3	2.1	J		400
Total OctaCB			18.1	1.8	J		400
Total NonaCB			52.6	5.1	J		200
DecaCB			40.0	3.7	J		200
Total PCB			3110		J		1600

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00188
Mid Point PCB TEQ	0.204
Upper Bound PCB TEQ	0.406

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identified. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name RESIDENTIAL-20190719-0725
 ALS Sample ID L2320141-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A36
 Run Date 15-Aug-19 12:42
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.87	94.3	2.4			50
PCB-002		10.27	19.4	2.4	J		50
PCB-003		10.40	40.5	3.1	J		50
PCB-004		10.56	371	14			50
PCB-010		NotFnd	<8.9	8.9	U		50
PCB-009		11.83	<34	8.8	J,R	34	50
PCB-007		NotFnd	<8.7	8.7	U		50
PCB-006		12.09	106	8.7			50
PCB-005		NotFnd	<9.5	9.5	U		50
PCB-008		12.37	413	8.1			50
PCB-014		NotFnd	<10	10	U		50
PCB-011		13.86	315	10	B		50
PCB-012/013		14.05	23.8	10	J		50
PCB-015		14.25	69.4	13			50
PCB-019		12.57	71.8	5.6			50
PCB-018/030		13.68	348	4.6			50
PCB-017		13.93	158	5.5			50
PCB-027		14.05	<22	3.9	J,R	22	50
PCB-024		14.14	5.09	4.1	M,J		50
PCB-016		14.21	<120	6.5	M,R	120	50
PCB-032		14.50	<81	3.7	R	81	50
PCB-034		NotFnd	<5.1	5.1	U		50
PCB-023		NotFnd	<5.1	5.1	U		50
PCB-026/029		15.47	65.3	4.9			50
PCB-025		15.62	24.4	4.8	J		50
PCB-031		15.79	230	4.6			50
PCB-020/028		15.96	258	4.9			50
PCB-021/033		16.10	152	5.1			50
PCB-022		16.33	89.6	5.1			50
PCB-036		NotFnd	<4.4	4.4	U		50
PCB-039		NotFnd	<4.7	4.7	U		50
PCB-038		NotFnd	<5.0	5.0	U		50
PCB-035		17.97	<7.3	4.9	J,R	7.3	50
PCB-037		18.20	<32	6.4	J,R	32	50
PCB-054		NotFnd	<3.5	3.5	U		50
PCB-050/053		15.64	32.7	4.2	J		50
PCB-045/051		16.04	38.4	4.4	J		50
PCB-046		16.21	<15	4.9	J,R	15	50
PCB-052		16.96	210	4.2			50
PCB-073		NotFnd	<3.3	3.3	U		50
PCB-043		NotFnd	<5.2	5.2	U		50
PCB-049/069		17.23	90.2	3.9			50
PCB-048		17.40	32.6	4.3	J		50
PCB-044/047/065		17.52	148	4.0			50
PCB-059/062/075		17.70	<8.6	3.2	J,R	8.6	50
PCB-042		17.81	37.4	5.0	J		50
PCB-040/041/071		18.09	64.9	4.4	M		50
PCB-064		18.21	58.6	3.5			50
PCB-072		NotFnd	<4.9	4.9	U		50
PCB-068		NotFnd	<4.8	4.8	U		50
PCB-057		NotFnd	<5.2	5.2	U		50
PCB-058		NotFnd	<5.2	5.2	U		50
PCB-067		NotFnd	<5.0	5.0	U		50
PCB-063		NotFnd	<4.6	4.6	U		50
PCB-061/070/074/076		19.56	138	5.3			50
PCB-066		19.74	53.5	4.9			50
PCB-055		NotFnd	<5.4	5.4	U		50
PCB-056		20.10	<22	5.3	J,R	22	50
PCB-060		20.23	<12	5.3	J,R	12	50
PCB-080		NotFnd	<4.5	4.5	U		50
PCB-079		NotFnd	<4.5	4.5	U		50
PCB-078		NotFnd	<5.3	5.3	U		50
PCB-081	0.0003	NotFnd	<5.6	5.6	U		50
PCB-077	0.0001	22.09	<6.2	6.2	U	6.0	50
PCB-104		NotFnd	<2.7	2.7	U		50
PCB-096		NotFnd	<2.5	2.5	U		50
PCB-103		18.73	<5.4	5.4	U	1.9	50
PCB-094		NotFnd	<6.5	6.5	U		50
PCB-095		19.10	112	5.7	B		50
PCB-093/098/100/102		19.27	<6.1	6.1	U	1.9	50

ALS Life Sciences

Sample Analysis Report

Sample Name RESIDENTIAL-20190719-0725
 ALS Sample ID L2320141-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information

Run 1

Filename 5-190814A36
 Run Date 15-Aug-19 12:42
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.56	21.0	6.1	J		50
PCB-084		19.71	34.7	6.6	J		50
PCB-089		NotFnd	<6.4	6.4	U		50
PCB-121		NotFnd	<4.4	4.4	U		50
PCB-092		20.32	23.7	6.0	J		50
PCB-090/101/113		20.63	126	5.2			50
PCB-083/099		20.94	54.5	6.1			50
PCB-112		NotFnd	<4.3	4.3	U		50
PCB-086/087/097/109/119/125		21.29	69.8	5.3	M		50
PCB-085/110/115/116/117		21.69	142	4.8	M		50
PCB-082		21.90	<7.0	7.0	J,R	7.0	50
PCB-111		NotFnd	<4.5	4.5	U		50
PCB-120		NotFnd	<4.3	4.3	U		50
PCB-108/124		NotFnd	<3.4	3.4	U		50
PCB-107		23.02	<3.1	3.1	U	1.6	50
PCB-123	0.00003	NotFnd	<4.0	4.0	U		50
PCB-106		NotFnd	<3.5	3.5	U		50
PCB-118	0.00003	23.26	56.7	3.5	M		50
PCB-122		NotFnd	<3.7	3.7	U		50
PCB-114	0.00003	NotFnd	<3.7	3.7	U		50
PCB-105	0.00003	23.90	22.1	3.7	J		50
PCB-127		NotFnd	<3.2	3.2	U		50
PCB-126	0.1	25.49	<4.9	3.6	J,R	4.9	50
PCB-155		NotFnd	<1.6	1.6	U		50
PCB-152		NotFnd	<1.5	1.5	U		50
PCB-150		NotFnd	<1.6	1.6	U		50
PCB-136		20.94	<11	1.6	J,R	11	50
PCB-145		NotFnd	<1.7	1.7	U		50
PCB-148		NotFnd	<2.1	2.1	U		50
PCB-135/151		22.16	<21	2.2	M,J,R	21	50
PCB-154		NotFnd	<1.9	1.9	U		50
PCB-144		22.46	<3.0	2.1	J,R	3.0	50
PCB-147/149		22.65	49.5	3.0	J		50
PCB-134/143		NotFnd	<3.7	3.7	U		50
PCB-139/140		NotFnd	<3.0	3.0	U		50
PCB-131		NotFnd	<4.1	4.1	U		50
PCB-142		NotFnd	<3.5	3.5	U		50
PCB-132		23.33	18.5	3.6	J		50
PCB-133		NotFnd	<3.4	3.4	U		50
PCB-165		NotFnd	<2.7	2.7	U		50
PCB-146		23.86	7.07	3.0	J		50
PCB-161		NotFnd	<2.4	2.4	U		50
PCB-153/168		24.20	38.9	2.6	J,B		50
PCB-141		24.31	<9.2	3.2	J,R	9.2	50
PCB-130		24.55	3.70	3.6	J		50
PCB-137/164		NotFnd	<2.7	2.7	U		50
PCB-129/138/163		24.87	44.5	3.1	J		50
PCB-160		NotFnd	<2.6	2.6	U		50
PCB-158		25.06	6.59	2.1	J		50
PCB-128/166		25.56	<3.8	2.8	J,R	3.8	50
PCB-159		NotFnd	<2.2	2.2	U		50
PCB-162		NotFnd	<2.4	2.4	U		50
PCB-167	0.00003	NotFnd	<2.1	2.1	U		50
PCB-156/157	0.00003	NotFnd	<3.0	3.0	U		100
PCB-169	0.03	NotFnd	<2.3	2.3	U		50
PCB-188		NotFnd	<2.5	2.5	U		50
PCB-179		23.71	<7.5	2.4	J,R	7.5	50
PCB-184		NotFnd	<2.3	2.3	U		50
PCB-176		NotFnd	<2.4	2.4	U		50
PCB-186		NotFnd	<2.5	2.5	U		50
PCB-178		25.07	<3.2	3.2	M,U	2.8	50
PCB-175		NotFnd	<3.1	3.1	U		50
PCB-187		25.54	14.0	2.9	J		50
PCB-182		NotFnd	<3.0	3.0	U		50
PCB-183		25.84	<5.7	2.9	J,R	5.7	50
PCB-185		NotFnd	<3.1	3.1	U		50
PCB-174		26.01	7.92	3.0	J		50
PCB-177		26.23	<3.5	3.2	M,J,R	3.5	50
PCB-181		NotFnd	<3.0	3.0	U		50
PCB-171/173		NotFnd	<3.2	3.2	U		50
PCB-172		NotFnd	<3.1	3.1	U		50

ALS Life Sciences

Sample Analysis Report

Sample Name RESIDENTIAL-20190719-0725
 ALS Sample ID L2320141-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information **Run 1**
 Filename 5-190814A36
 Run Date 15-Aug-19 12:42
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<2.5	2.5	U		50
PCB-180/193		27.69	11.9	2.7	J		50
PCB-191		NotFnd	<2.3	2.3	U		50
PCB-170		NotFnd	<3.2	3.2	U		50
PCB-190		NotFnd	<2.1	2.1	U		50
PCB-189	0.00003	NotFnd	<2.5	2.5	U		50
PCB-202		26.28	<4.5	2.6	M,J,R	4.5	50
PCB-201		26.75	<4.8	2.5	J,R	4.8	50
PCB-204		NotFnd	<2.6	2.6	U		50
PCB-197		NotFnd	<2.5	2.5	U		50
PCB-200		27.30	<2.7	2.5	J,R	2.7	50
PCB-198/199		28.71	<5.8	3.3	J,R	5.8	50
PCB-196		NotFnd	<3.2	3.2	U		50
PCB-203		29.19	<2.9	2.9	U	1.3	50
PCB-195		NotFnd	<3.8	3.8	U		50
PCB-194		NotFnd	<3.5	3.5	U		50
PCB-205		NotFnd	<3.1	3.1	U		50
PCB-208		29.73	<26	6.8	J,R	26	50
PCB-207		30.20	<24	6.6	J,R	24	50
PCB-206		NotFnd	<12	12	U		50
PCB-209		33.60	34.9	3.4	J,B		50

Extraction Standards	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.85	48	5-145
13C12-PCB-003	4000	10.40	46	5-145
13C12-PCB-004	4000	10.55	47	5-145
13C12-PCB-015	4000	14.24	47	5-145
13C12-PCB-019	4000	12.55	47	5-145
13C12-PCB-037	4000	18.19	70	5-145
13C12-PCB-054	4000	14.41	60	5-145
13C12-PCB-081	4000	21.77	86	10-145
13C12-PCB-077	4000	22.07	85	10-145
13C12-PCB-104	4000	17.48	72	10-145
13C12-PCB-123	4000	23.07	87	10-145
13C12-PCB-118	4000	23.25	94	10-145
13C12-PCB-114	4000	23.54	92	10-145
13C12-PCB-105	4000	23.89	93	10-145
13C12-PCB-126	4000	25.48	104	10-145
13C12-PCB-155	4000	20.49	82	10-145
13C12-PCB-167	4000	26.39	97	10-145
13C12-PCB-156/157	8000	27.02	95	10-145
13C12-PCB-169	4000	28.68	118	10-145
13C12-PCB-188	4000	23.49	81	10-145
13C12-PCB-189	4000	29.96	113	10-145
13C12-PCB-202	4000	26.27	89	10-145
13C12-PCB-205	4000	31.37	100	10-145
13C12-PCB-208	4000	29.70	84	10-145
13C12-PCB-206	4000	32.44	95	10-145
13C12-PCB-209	4000	33.58	107	10-145

Field Spike Standards	pg	Time	% Rec	Limits
13C12-PCB-031	6000	15.77	96	70-130
13C12-PCB-095	6000	19.09	78	70-130
13C12-PCB-153	6000	24.18	78	70-130

Cleanup Standards	pg	Time	% Rec	Limits
13C12-PCB-028	4000	15.95	62	5-145
13C12-PCB-111	4000	22.01	68	10-145
13C12-PCB-178	4000	25.06	74	10-145

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Sample Analysis Report

Sample Name RESIDENTIAL-20190719-0725
 ALS Sample ID L2320141-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 25-Jul-19
 Extraction Date 12-Aug-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information **Run 1**
 Filename 5-190814A36
 Run Date 15-Aug-19 12:42
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			154	2.4	J		200
Total DiCB			1330	8.1	J		400
Total TriCB			1660	3.7	J		400
Total TetraCB			962	3.2	J		800
Total PentaCB			667	2.5	J		800
Total HexaCB			217	1.5	J		800
Total HeptaCB			50.5	2.1	J		400
Total OctaCB			17.8	2.5	J		400
Total NonaCB			50.0	6.6	J		200
DecaCB			34.9	3.4	J		200
Total PCB			5150		J		1600

Toxic Equivalency - (WHO 2005)

Lower Bound PCB TEQ	0.00236
Mid Point PCB TEQ	0.528
Upper Bound PCB TEQ	0.564

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
 TEF Indicates the Toxic Equivalency Factor TEQ Indicates the Toxic Equivalency
 LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
 M Indicates that a peak has been manually integrated.
 U Indicates that this compound was not detected above the EDL.
 J Indicates that the analyte was positively identified. The associated numerical result is an estimate.
 R Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
 B Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
 EMPC Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

SVOC DATA PACKAGE

SECTION 3: METHOD SUMMARY

**PCB METHOD SUMMARY
Method 1668**

Introduction:

This summary is to provide ALSE Burlington PCB method details in order to provide persons reviewing or validating this data package sufficient information to re-construct the sample calculation, data verification and review. It incorporates the analysis of PCBs via the following reference methods:

US EPA Office of Water, Method 1668A
US EPA Office of Water, Method 1668C

Any deviations to what is listed herein would be listed in the project narrative.

To avoid the confusion and conflicting nomenclature within the methods, we have defined the labeled standards in terms relating to the time of addition to the sample or extract. Therefore;

The Field or Sampling Standards are added prior to field sampling
The Extraction Standards are added prior to extraction
The Clean-up Standards are added prior to extract clean-up
The Injection Standards are added prior to extract injection.

Calibration Standard Levels:

Six levels of standard are available for calibration as listed in Table 1. The low point (the CS0) is below method requirements and therefore is optional.

Table 1. Concentration of CB congeners in calibration and calibration verification standards

Solution concentration (ng/mL)

CB congener	IUPAC ¹	CS-0.2 (Hi sens)2	CS-1	CS-2	CS-3 (VER)	CS-4	CS-5
Native Toxics/LOC							
2-MoCB	1	0.2	1	5	50	400	2000
4-MoCB	3	0.2	1	5	50	400	2000
2,2'-DiCB	4	0.2	1	5	50	400	2000
4,4'-DiCB	15	0.2	1	5	50	400	2000
2,2',6'-TriCB	19	0.2	1	5	50	400	2000
3,4,4'-TriCB	37	0.2	1	5	50	400	2000
2,2',6,6'-TeCB	54	0.2	1	5	50	400	2000
3,3',4,4'-TeCB	77	0.2	1	5	50	400	2000
3,4,4',5'-TeCB	81	0.2	1	5	50	400	2000
2,2',4,6,6'-PeCB	104	0.2	1	5	50	400	2000
2,3,3',4,4'-PeCB	105	0.2	1	5	50	400	2000
2,3,4,4',5'-PeCB	114	0.2	1	5	50	400	2000
2,3',4,4',5'-PeCB	118	0.2	1	5	50	400	2000
2',3,4,4',5'-PeCB	123	0.2	1	5	50	400	2000
3,3',4,4',5'-PeCB	126	0.2	1	5	50	400	2000
2,2',4,4',6,6'-HxCB	155	0.2	1	5	50	400	2000
2,3,3',4,4',5'-HxCB	156	0.2	1	5	50	400	2000
2,3,3',4,4',5'-HxCB	157	0.2	1	5	50	400	2000
2,3',4,4',5,5'-HxCB	167	0.2	1	5	50	400	2000
3,3',4,4',5,5'-HxCB	169	0.2	1	5	50	400	2000
2,2',3,4',5,6,6'-HpCB	188	0.2	1	5	50	400	2000
2,3,3',4,4',5,5'-HpCB	189	0.2	1	5	50	400	2000
2,2',3,3',5,5',6,6'-OxCB	202	0.2	1	5	50	400	2000
2,3,3',4,4',5,5',6-OxCB	205	0.2	1	5	50	400	2000
2,2',3,3',4,4',5,5',6-NoCB	206	0.2	1	5	50	400	2000
2,2',3,3',4,4',5,5',6,6'-NoCB	208	0.2	1	5	50	400	2000
DeCB 209	209	0.2	1	5	50	400	2000
Labeled Toxics/LOC/window-defining							
13C12-2-MoCB	1L	100	100	100	100	100	100
13C12-4-MoCB	3L	100	100	100	100	100	100
13C12-2,2'-DiCB	4L	100	100	100	100	100	100
13C12-4,4'-DiCB	15L	100	100	100	100	100	100
13C12-2,2',6'-TriCB	19L	100	100	100	100	100	100
13C12-3,4,4'-TriCB	37L	100	100	100	100	100	100
13C12-2,2',6,6'-TeCB	54L	100	100	100	100	100	100
13C12-3,3',4,4'-TeCB	77L	100	100	100	100	100	100
13C12-3,4,4',5'-TeCB	81L	100	100	100	100	100	100
13C12-2,2',4,6,6'-PeCB	104L	100	100	100	100	100	100
13C12-2,3,3',4,4'-PeCB	105L	100	100	100	100	100	100
13C12-2,3,4,4',5'-PeCB	114L	100	100	100	100	100	100
13C12-2,3',4,4',5'-PeCB	118L	100	100	100	100	100	100
13C12-2',3,4,4',5'-PeCB	123L	100	100	100	100	100	100
13C12-3,3',4,4',5'-PeCB	126L	100	100	100	100	100	100
13C12-2,2',4,4',6,6'-HxCB	155L	100	100	100	100	100	100
13C12-2,3,3',4,4',5'-HxCB	156L	100	100	100	100	100	100
13C12-2,3,3',4,4',5'-HxCB	157L	100	100	100	100	100	100
13C12-2,3',4,4',5,5'-HxCB	167L	100	100	100	100	100	100
13C12-3,3',4,4',5,5'-HxCB	169L	100	100	100	100	100	100
13C12-2,2',3,4',5,6,6'-HpCB	188L	100	100	100	100	100	100
13C12-2,3,3',4,4',5,5'-HpCB	189L	100	100	100	100	100	100
13C12-2,2',3,3',5,5',6,6'-OxCB	202L	100	100	100	100	100	100
13C12-2,3,3',4,4',5,5',6-OxCB	205L	100	100	100	100	100	100
13C12-2,2',3,3',4,4',5,5',6-NoCB	206L	100	100	100	100	100	100
13C12-2,2',3,3',4,4',5,5',6,6'-NoCB	208L	100	100	100	100	100	100
13C12-DeCB 209L	209L	100	100	100	100	100	100
Labeled clean-up							
13C12-2,4,4'-TriCB	28L	100	100	100	100	100	100
13C12-2,3,3',5,5'-PeCB	111L	100	100	100	100	100	100
13C12-2,2',3,3',5,5',6-HpCB	178L	100	100	100	100	100	100
Labeled injection internal							
13C12-2,5-DiCB	9L	100	100	100	100	100	100
13C12-2,2',5,5'-TeCB	52L	100	100	100	100	100	100
13C12-2,2',4,4',5,5'-PeCB	101L	100	100	100	100	100	100
13C12-2,2',3,4,4',5'-HxCB	138L	100	100	100	100	100	100
13C12-2,2',3,3',4,4',5,5'-OxCB	194L	100	100	100	100	100	100

Method Control Limits for 1668A

The initial and continuing calibration control limits for both methods are presented in Table 2 below. For the initial calibration CS1 and for each calibration verification CS3, the signal to noise ratio for each quantification ion for labelled and non-labelled analytes must be greater than or equal to 10:1

Table 2A. QC acceptance criteria for chlorinated biphenyls in VER, IPR, OPR, and samples ¹

Congener	IUPAC Number ²	Test conc (ng/mL)	VER (%)	IPR		OPR (%)	Labelled compound recovery in samples (%)
				RSD (%)	X (%)		
2-MoCB	1	50	70-130	40	60-140	50-150	
4-MoCB	3	50	70-130	40	60-140	50-150	
2,2'-DiCB	4	50	70-130	40	60-140	50-150	
4,4'-DiCB	15	50	70-130	40	60-140	50-150	
2,2',6-TrCB	19	50	70-130	40	60-140	50-150	
3,4,4'-TrCB	37	50	70-130	40	60-140	50-150	
2,2',6,6'-TeCB	54	50	70-130	40	60-140	50-150	
3,3',4,4'-TeCB	77	50	70-130	40	60-140	50-150	
3,4,4',5-TeCB	81	50	70-130	40	60-140	50-150	
2,2',4,6,6'-PeCB	104	50	70-130	40	60-140	50-150	
2,3,3',4,4'-PeCB	105	50	70-130	40	60-140	50-150	
2,3,4,4',5-PeCB	114	50	70-130	40	60-140	50-150	
2,3',4,4',5-PeCB	118	50	70-130	40	60-140	50-150	
2',3,4,4',5-PeCB	123	50	70-130	40	60-140	50-150	
3,3',4,4',5-PeCB	126	50	70-130	40	60-140	50-150	
2,2',4,4',6,6'-HxCB	155	50	70-130	40	60-140	50-150	
2,3,3',4,4',5-HxCB ³	156	50	70-130	40	60-140	50-150	
2,3,3',4,4',5'-HxCB ³	157	50	70-130	40	60-140	50-150	
2,3',4,4',5,5'-HxCB	167	50	70-130	40	60-140	50-150	
3,3',4,4',5,5'-HxCB	169	50	70-130	40	60-140	50-150	
2,2',3,4',5,6,6'-HpCB	188	50	70-130	40	60-140	50-150	
2,3,3',4,4',5,5'-HpCB	189	50	70-130	40	60-140	50-150	
2,2',3,3',5,5',6,6'-OcCB	202	50	70-130	40	60-140	50-150	
2,3,3',4,4',5,5',6-OcCB	205	50	70-130	40	60-140	50-150	
2,2',3,3',4,4',5,5',6-NoCB	206	50	70-130	40	60-140	50-150	
2,2',3,3',4,4',5,5',6,6'-NoCB	208	50	70-130	40	60-140	50-150	
DeCB	209	50	70-130	40	60-140	50-150	
13C12-2-MoCB	1L	100	50-150	50	35-135	30-140	25-150
13C12-4-MoCB	3L	100	50-150	50	35-135	30-140	25-150
13C12-2,2'-DiCB	4L	100	50-150	50	35-135	30-140	25-150
13C12-4,4'-DiCB	15L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',6-TrCB	19L	100	50-150	50	35-135	30-140	25-150
13C12-3,4,4'-TrCB	37L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',6,6'-TeCB	54L	100	50-150	50	35-135	30-140	25-150
13C12-3,3',4,4'-TCB	77L	100	50-150	50	35-135	30-140	25-150
13C12-3,4,4',5-TeCB	81L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',4,6,6'-PeCB	104L	100	50-150	50	35-135	30-140	25-150
13C12-2,3,3',4,4'-PeCB	105L	100	50-150	50	35-135	30-140	25-150
13C12-2,3,4,4',5-PeCB	114L	100	50-150	50	35-135	30-140	25-150
13C12-2,3',4,4',5-PeCB	118L	100	50-150	50	35-135	30-140	25-150
13C12-2',3,4,4',5-PeCB	123L	100	50-150	50	35-135	30-140	25-150
13C12-3,3',4,4',5-PeCB	126L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',4,4',6,6'-HxCB	155L	100	50-150	50	35-135	30-140	25-150
13C12-2,3,3',4,4',5-HxCB ³	156L	100	50-150	50	35-135	30-140	25-150
13C12-2,3,3',4,4',5'-HxCB ³	157L	100	50-150	50	35-135	30-140	25-150
13C12-2,3',4,4',5,5'-HxCB	167L	100	50-150	50	35-135	30-140	25-150
13C12-3,3',4,4',5,5'-HxCB	169L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',3,4',5,6,6'-HpCB	188L	100	50-150	50	35-135	30-140	25-150
13C12-2',3,3',4,4',5,5'-HpCB	189L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',3,3',5,5',6,6'-OcCB	202L	100	50-150	50	35-135	30-140	25-150
13C12-2,3,3',4,4',5,5',6-OcCB	205L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',3,3',4,4',5,5',6-NoCB	206L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',3,3',4,4',5,5',6,6'-NoCB	208L	100	50-150	50	35-135	30-140	25-150
13C12-2,2',3,3',4,4',5,5',6,6'-DeCB	209L	100	50-150	50	35-135	30-140	25-150
Cleanup standard							
13C12-2,4,4'-TrCB	28L	100	60-130	45	45-120	40-125	30-135
13C12-2,3,3',5,5'-PeCB	111L	100	60-130	45	45-120	40-125	30-135
13C12-2,2',3,3',5,5',6-HpCB	178L	100	60-130	45	45-120	40-125	30-135

1. QC acceptance criteria for IPR, OPR, and samples based on a 20 ul extract final volume

2. Suffix "L" indicates labelled compound.

3. PCBs 156 and 157 are tested as the sum of two concentrations

Method Control Limits for 1668C

The initial and continuing calibration control limits for both methods are presented in Table 2 below. For the initial calibration CS1 and for each calibration verification CS3, the signal to noise ratio for each quantification ion for labelled and non-labelled analytes must be greater than or equal to 10:1

Table 2A. QC acceptance criteria for chlorinated biphenyls in VER, IPR, OPR, and samples ¹

Congener	IUPAC Number ²	Test conc (ng/mL)	VER (%)	IPR		OPR (%)	Labelled compound recovery in samples (%)
				RSD (%)	X (%)		
2-MoCB	1	50	75 - 125	25	70 - 130	60 - 135	
4-MoCB	3	50	75 - 125	25	70 - 130	60 - 135	
2,2'-DiCB	4	50	75 - 125	25	70 - 130	60 - 135	
4,4'-DiCB	15	50	75 - 125	25	70 - 130	60 - 135	
2,2',6-TrCB	19	50	75 - 125	25	70 - 130	60 - 135	
3,4,4'-TrCB	37	50	75 - 125	25	70 - 130	60 - 135	
2,2',6,6'-TeCB	54	50	75 - 125	25	70 - 130	60 - 135	
3,3',4,4'-TeCB	77	50	75 - 125	25	70 - 130	60 - 135	
3,4,4',5-TeCB	81	50	75 - 125	25	70 - 130	60 - 135	
2,2',4,6,6'-PeCB	104	50	75 - 125	25	70 - 130	60 - 135	
2,3,3',4,4'-PeCB	105	50	75 - 125	25	70 - 130	60 - 135	
2,3,4,4',5-PeCB	114	50	75 - 125	25	70 - 130	60 - 135	
2,3',4,4',5-PeCB	118	50	75 - 125	25	70 - 130	60 - 135	
2',3,4,4',5-PeCB	123	50	75 - 125	25	70 - 130	60 - 135	
3,3',4,4',5-PeCB	126	50	75 - 125	25	70 - 130	60 - 135	
2,2',4,4',6,6'-HxCB	155	50	75 - 125	25	70 - 130	60 - 135	
2,3,3',4,4',5-HxCB ³	156	50	75 - 125	25	70 - 130	60 - 135	
2,3,3',4,4',5'-HxCB ³	157	50	75 - 125	25	70 - 130	60 - 135	
2,3',4,4',5,5'-HxCB	167	50	75 - 125	25	70 - 130	60 - 135	
3,3',4,4',5,5'-HxCB	169	50	75 - 125	25	70 - 130	60 - 135	
2,2',3,4',5,6,6'-HpCB	188	50	75 - 125	25	70 - 130	60 - 135	
2,3,3',4,4',5,5'-HpCB	189	50	75 - 125	25	70 - 130	60 - 135	
2,2',3,3',5,5',6,6'-OcCB	202	50	75 - 125	25	70 - 130	60 - 135	
2,3,3',4,4',5,5',6-OcCB	205	50	75 - 125	25	70 - 130	60 - 135	
2,2',3,3',4,4',5,5',6-NoCB	206	50	75 - 125	25	70 - 130	60 - 135	
2,2',3,3',4,5,5',6,6'-NoCB	208	50	75 - 125	25	70 - 130	60 - 135	
DeCB	209	50	75 - 125	25	70 - 130	60 - 135	
13C12-2-MoCB	1L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-4-MoCB	3L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-2,2'-DiCB	4L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-4,4'-DiCB	15L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-2,2',6-TrCB	19L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-3,4,4'-TrCB	37L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-2,2',6,6'-TeCB	54L	100	50 - 145	70	20 - 135	5 - 145	5 - 145
13C12-3,3',4,4'-TeCB	77L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-3,4,4',5-TeCB	81L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',4,6,6'-PeCB	104L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3,3',4,4'-PeCB	105L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3,4,4',5-PeCB	114L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3',4,4',5-PeCB	118L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2',3,4,4',5-PeCB	123L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-3,3',4,4',5-PeCB	126L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',4,4',6,6'-HxCB	155L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3,3',4,4',5-HxCB ³	156L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3,3',4,4',5'-HxCB ³	157L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3',4,4',5,5'-HxCB	167L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-3,3',4,4',5,5'-HxCB	169L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,4',5,6,6'-HpCB	188L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2',3,3',4,4',5,5'-HpCB	189L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,3',5,5',6,6'-OcCB	202L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,3,3',4,4',5,5',6-OcCB	205L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,3',4,4',5,5',6-NoCB	206L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,3',4,5,5',6,6'-NoCB	208L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,3',4,4',5,5',6,6'-DeCB	209L	100	50 - 145	50	45 - 135	10 - 145	10 - 145
Cleanup standards							
13C12-2,4,4'-TrCB	28L	100	65 - 135	70	20 - 135	5 - 145	5 - 145
13C12-2,3,3',5,5'-PeCB	111L	100	75 - 125	50	45 - 135	10 - 145	10 - 145
13C12-2,2',3,3',5,5',6-HpCB	178L	100	75 - 125	50	45 - 135	10 - 145	10 - 145

1. QC acceptance criteria for IPR, OPR, and samples based on a 20-µL extract final volume

2. Suffix "L" indicates labeled compound.

3. CBs 156/157 and 156L/157L are tested as the sum of the two congeners

Reporting Limits:

Unless indicated in the otherwise, the PCB results are reported down to 2.5:1 signal to noise for each isomer grouping for each extract injection. This is consistent to SW846 8290 defined protocols (i.e. EDL or Estimated Detection Limit) and is commonly applied throughout the industry to any or all the HRMS performance based methods applicable to this method summary.

Method Blank:

The Method Blank must be below the EMLs published in the required method, 1668A or 1668C.

MS/MSD:

The % relative difference between the MS and MSD spike recoveries should be less than or equal to 20%.

Instrument/Run Performance Criteria:

- 1 Elution windows must be defined by a 'Window Performance Mix' at the beginning of each 12-hour run sequence
- 2 GC performance criteria of 40% maximum valley between PCB-34/PCB-23, and PCB-187/PCB-182 (Octyl Column).
- 3 At the beginning of and just following the end of each 12 hour run sequence, the instrument must be checked to demonstrate a resolution of 10,000 within each quantification window (8,000 minimum across the window).
- 4 The relative retention times (RRT) of the compounds in the daily 209 congener mix must fall into the ranges presented in Table 4.
- 5 The RT in the daily CS3 verification standards must be within 15 seconds of the CS3 in the initial calibration run.
- 6 The maximum time between scans within a descriptor is 1 second.
- 7 Lock mass deviations to the average response must be less than or equal 20%.

Laboratory Duplicates:

The % relative difference between duplicates should be less than or equal to 25% but only where the response is greater than the low calibration standard.

Analyte Identification Criteria:

- 1 Ion ratio must be within 15% of theoretical or within 10% of the most recent CS3.
- 2 The retention time (RT) of the peak maxima for each pair of quantification ions must be no more than 2 seconds (i.e. 2 scans) difference.
- 3 The retention time (RT) of the peak maxima of all native analytes for which a labeled analogue is used must be within -1 to +3 seconds of the RT of corresponding ¹³C₁₂-labelled isomer of that injection run.
- 4 For those native analytes without a corresponding labelled isomer, the relative retention time (RRT) must be within 0.005 of the relative retention time observed in the daily 209 congener run.

DEVIATIONS AND CLARIFICATIONS FROM THE PRIMARY REFERENCES

The reference methods applicable to this document are:

US EPA Office of Water, Method 1668A
US EPA Office of Water, Method 1668C

These methods are referred-to herein as Method 1668

The following changes and clarifications apply:

1) As stated in method 1668, alternate columns and column systems are allowable changes to the method. In the context of the method, it is clear that Table 2 of this method (including retention times, relative retention times, and quantitation references) is specific to the Octyl GC column if used exactly as suggested in the method.

As a performance based method, changes in the internal standard references could be considered an improvement even when using the SPB-Octyl column. However when using an alternate column system (which may or may not include use of the Octyl column), optimization of the quantitation references can be an important part of optimizing the method. Consider that the MS acquisition method must be divided into mass descriptors or 'functions', each one defining the masses that are monitored during that time range. When monitoring for all 209 PCB congeners, there are large chromatographic regions where elution of target compounds is nearly continuous with little separation between peaks. In addition, there is a slight acquisition "gap" that occurs at each function change (for Water's instruments 1-2 seconds, for Thermo instruments 6-8 seconds), and also the likelihood of slight retention time shifts from one run to another. Consequently, choosing the exact location of each function boundary can be challenging. For a 1668 method, there are typically between 5 and 8 functions dependent upon the column, the GC conditions, the instrument and the choice of the function boundaries by the laboratory. Each function can have 1 to as many as 4 chlorination levels. When optimizing the quantification model in the case where RT and elution patterns have changed – even slightly - the best choice of internal standard references can and should change dependent upon target retention times and placement of function boundaries. For example, the best quantification is achieved using an internal standard reference that elutes at close to the same retention time. Another consideration is that it is best practice where possible (i.e. generally allows for more accurate target determinations) to have the internal standard reference within the same function rather than quantify a target relative to an internal standard from an outside function.

The quantification references used in this analysis are detailed in Table 3.

2) The absolute retention time criterion for decachlorobiphenyl of 55 minutes is not generally followed and is an unnecessary restriction since method 1668 was developed without the use of electronic pressure control on the GC injection system, and there are GC performance criteria that can be met without this restriction. As a result, the RRT criteria of 1668 may not be applicable.

3) Although not clearly stated in method 1668, we maintain that each and every individual clean-up procedure is, by definition, performance-based and optional. There is not an expectation within the industry to follow exactly the descriptions of clean-ups in reference methods. Adaptations which meet or exceed the required performance criteria are therefore acceptable within the scope of each reference method. The reference method descriptions are intended as guidelines or templates available to help the laboratory to define effective in-house clean-up methods. The objective within the laboratory is to provide quality clean extracts to the instrument for analysis. Each individual clean-up is part of the laboratory's available tools in order to achieve this objective.

4) There are differences within the individual reference methods as to the precise spiking protocols for adding extraction standards and native spikes (for LCS, MS and MSD). To ensure consistency within the laboratory between HRMS methods, the PCB preparative method requires solid samples (including stack and ambient sorbants/filters) to be spiked in the soxhlet extractor from a nonane solution and waters are spiked before filtering from an acetone solution. .

5) Sub-sampling of solids and pre-extraction processing is done in a manner that minimizes potential for cross-contamination. These processes are designed around SW846 protocols rather than 1668 protocols. Solids are sub-sampled directly from the bottle as submitted to the laboratory wherever practical. If the sample is submitted such that homogenization in the bottle is impractical (eg. the bottle is too full or lumps cannot be broken down), then transferring the sample to a tray or another bottle maybe in order.

6) The concentration of labelled and native spiking solutions are not consistent with those listed in all of the reference methods. These concentrations are prepared at levels convenient and expedient for accurate laboratory processing.

7) Extraction and injection standard concentrations differ from 1668, in order to aid precise measurement and standardise volumes with other reference methods such as PCDD/F by 1613B.

8) Method 1668C recognizes the option to use the 209 congener mix as the daily calibration verification solution rather than the CS3. This document acknowledges and allows either calibration option for both 1668A and 1668C analytical approaches.

9) For method 1668C analysis, the OPR labelled recovery limits are the same as for the sample recovery limits in method 1668C. This represents a broader acceptance range for the OPR than is currently listed in method 1668C. However, the control of the native (i.e. non-labelled) recovery limits is the key item to demonstrate/monitor in the OPR. Furthermore, in the OPR performance, it is important to demonstrate these native controls are maintained within the same range of labelled recoveries as is observed in the sample data.

Table 3: Quantitation References for Native and Labeled CBs

CI No. ¹	Congener No. ^{2,3}	RT Ref ⁴	Quantitation Reference ⁵
Native Compounds			
1	1	1L	1L
1	2	3L	1L/3L
1	3	3L	3L
2	4	4L	4L
2	10	4L	4L/15L
2	9	4L	4L/15L
2	7	4L	4L/15L
2	6	4L	4L/15L
2	5	4L	4L/15L
2	8	4L	4L/15L
2	14	15L	4L/15L
2	11	15L	4L/15L
2	13/12	15L	4L/15L
2	15	15L	15L
3	19	19L	19L
3	30/18	19L	19L/37L
3	17	19L	19L/37L
3	27	19L	19L/37L
3	24	19L	19L/37L
3	16	19L	19L/37L
3	32	19L	19L/37L
3	34	19L	19L/37L
3	23	19L	19L/37L
3	26/29	19L	19L/37L
3	25	37L	19L/37L
3	31	37L	19L/37L
3	28/20	37L	19L/37L
3	21/33	37L	19L/37L
3	22	37L	19L/37L
3	36	37L	19L/37L
3	39	37L	19L/37L
3	38	37L	19L/37L
3	35	37L	19L/37L
3	37	37L	37L
4	54	54L	54L
4	50/53	54L	54L/81L/77L
4	45/51	54L	54L/81L/77L
4	46	54L	54L/81L/77L
4	52	54L	54L/81L/77L
4	73	54L	54L/81L/77L
4	43	54L	54L/81L/77L
4	69/49	54L	54L/81L/77L
4	48	54L	54L/81L/77L
4	44/47/65	54L	54L/81L/77L
4	59/62/75	54L	54L/81L/77L
4	42	54L	54L/81L/77L
4	41/40/71	54L	54L/81L/77L
4	64	54L	54L/81L/77L
4	72	81L	54L/81L/77L
4	68	81L	54L/81L/77L

CI No. ¹	Congener No. ^{2,3}	RT Ref ⁴	Quantitation Reference ⁵
4	57	81L	54L/81L/77L
4	58	81L	54L/81L/77L
4	67	81L	54L/81L/77L
4	63	81L	54L/81L/77L
4	61/70/74/76	81L	54L/81L/77L
4	66	81L	54L/81L/77L
4	55	81L	54L/81L/77L
4	56	81L	54L/81L/77L
4	60	81L	54L/81L/77L
4	80	81L	54L/81L/77L
4	79	81L	54L/81L/77L
4	78	81L	54L/81L/77L
4	81	81L	81L
4	77	77L	77L
5	104	104L	104L
5	96	104L	104L/123L/114L/118L
5	103	104L	104L/123L/114L/118L
5	94	104L	104L/123L/114L/118L
5	95	104L	104L/123L/114L/118L
5	95/100/93/102/98	104L	104L/123L/114L/118L
5	88/91	104L	104L/123L/114L/118L
5	84	104L	104L/123L/114L/118L
5	89	104L	104L/123L/114L/118L
5	121	104L	104L/123L/114L/118L
5	92	123L	104L/123L/114L/118L
5	113/90/101	104L	104L/123L/114L/118L
5	83/99	104L	104L/123L/114L/118L
5	112	104L	104L/123L/114L/118L
5	108/119/86/97/125/87	104L	104L/123L/114L/118L
5	117/116/85/110/115	104L	104L/123L/114L/118L
5	82	104L	104L/123L/114L/118L
5	111	104L	104L/123L/114L/118L
5	120	104L	104L/123L/114L/118L
5	107/124	104L	104L/123L/114L/118L
5	109	104L	104L/123L/114L/118L
5	123	123L	123L
5	106	123L	104L/123L/114L/118L
5	118	118L	118L
5	122	118L	104L/123L/114L/118L
5	114	114L	114L
5	105	105L	105L
5	127	105L	104L/123L/114L/118L
5	126	126L	126L
6	155	155L	155L
6	152	155L	155L/156L/157L/167L
6	150	155L	155L/156L/157L/167L
6	136	155L	155L/156L/157L/167L
6	145	155L	155L/156L/157L/167L
6	148	155L	155L/156L/157L/167L
6	151/135	135L	155L/156L/157L/167L
6	154	155L	155L/156L/157L/167L
6	144	155L	155L/156L/157L/167L
6	147/149	155L	155L/156L/157L/167L
6	134/143	155L	155L/156L/157L/167L

CI No. ¹	Congener No. ^{2,3}	RT Ref ⁴	Quantitation Reference ⁵
6	139/140	155L	155L/156L/157L/167L
6	131	155L	155L/156L/157L/167L
6	142	155L	155L/156L/157L/167L
6	132	155L	155L/156L/157L/167L
6	133	155L	155L/156L/157L/167L
6	165	167L	155L/156L/157L/167L
6	146	167L	155L/156L/157L/167L
6	161	167L	155L/156L/157L/167L
6	153/168	167L	155L/156L/157L/167L
6	141	167L	155L/156L/157L/167L
6	130	167L	155L/156L/157L/167L
6	137/164	167L	155L/156L/157L/167L
6	138/163/129	167L	155L/156L/157L/167L
6	160	167L	155L/156L/157L/167L
6	158	167L	155L/156L/157L/167L
6	128/166	167L	155L/156L/157L/167L
6	159	167L	155L/156L/157L/167L
6	162	167L	155L/156L/157L/167L
6	167	167L	155L/156L/157L/167L
6	156/157	156L/157L	156L/157L
6	169	169L	169L
7	188	188L	188L
7	179	188L	188L/189L
7	184	188L	188L/189L
7	176	188L	188L/189L
7	186	188L	188L/189L
7	178	188L	188L/189L
7	175	188L	188L/189L
7	187	188L	188L/189L
7	182	188L	188L/189L
7	183	188L	188L/189L
7	185	188L	188L/189L
7	174	188L	188L/189L
7	177	188L	188L/189L
7	181	188L	188L/189L
7	171/173	188L	188L/189L
7	172	189L	188L/189L
7	192	189L	188L/189L
7	180/193	189L	188L/189L
7	191	189L	188L/189L
7	170	189L	188L/189L
7	190	189L	188L/189L
7	189	189L	189L
8	202	202L	202L
8	201	202L	202L/205L
8	204	202L	202L/205L
8	197	202L	202L/205L
8	200	202L	202L/205L
8	198/199	202L	202L/205L
8	196	205L	202L/205L
8	203	205L	202L/205L
8	195	205L	202L/205L
8	194	205L	202L/205L
8	205	205L	205L
9	208	208L	208L
9	207	208L	208L/206L
9	206	206L	206L
10	209	209L	209L

CI No. ¹	Congener No. ^{2,3}	RT Ref ⁴	Quantitation Reference ⁵
Labelled Extraction Standards			
1	1L	9L	9L
1	3L	9L	9L
2	4L	9L	9L
2	15L	9L	9L
3	19L	9L	9L
3	37L	52L	52L
4	54L	52L	52L
4	81L	101L	101L
4	77L	101L	101L
5	104L	101L	101L
5	123L	101L	101L
5	118L	101L	101L
5	114L	101L	101L
5	105L	101L	101L
5	126L	101L	101L
6	155L	101L	101L
6	167L	138L	138L
6	156L/157L	157L	138L
6	169L	138L	138L
7	188L	138L	138L
7	189L	138L	138L
8	202L	138L	138L
8	205L	194L	194L
9	208L	194L	194L
9	206L	194L	194L
10	209L	194L	194L
Labelled clean-up standards			
3	28L	52L	52L
5	111L	101L	101L
7	178L	138L	138L
Labelled injection internal standards			
2	9L	138L	138L
4	52L	138L	138L
5	101L	138L	138L
6	138L	138L	138L
8	194L	138L	138L

1. Number of chlorines on congener.
2. Suffix "L" indicates labelled compound.
3. Multiple congeners in a box indicates a group of congeners that co-elute or may not be adequately resolved on a 30-m SPB-Octyl column. Congeners included in the group are listed as the last entry in the box.
4. Retention time reference that is used to locate target congener.
5. Labelled congeners that form the quantitation reference. Areas from the exact m/z's of the congeners listed in the quantitation

Table 5: HRMS Instrumental Descriptor Parameters

Function and chlorine level	m/z	m/z type	m/z formula	Substance
Fn-1; Cl-1	180.9888	QC	C4F7	PFK
	188.0393	M	12C12 H9 35Cl	Cl-1 CB
	190.0363	M+2	12C12 H9 37Cl	Cl-1 CB
	200.0795	M	13C12 H9 35Cl	13C12 Cl-1 CB
	202.0766	M+2	13C12 H9 37Cl	13C12 Cl-1 CB
	204.9983	QC	C6F7	PFK
	218.9856	lock	C4 F9	PFK
	230.9850	QC	C5F9	PFK
Fn-2; Cl-2,3	204.9883	QC	C6F7	PFK
	218.9856	QC	C4F9	PFK
	222.0003	M	12C12 H8 35Cl2	Cl-2 PCB
	223.9974	M+2	12C12 H8 35Cl 37Cl	Cl-2 PCB
	225.9944	M+4	12C12 H8 37Cl2	Cl-2 PCB
	234.0406	M	13C12 H8 35Cl2	13C12 Cl-2 PCB
	236.0376	M+2	13C12 H8 35Cl 37 Cl	13C12 Cl-2 PCB
	242.9856	lock	C6 F9	PFK
	255.9613	M	12C12 H7 35Cl3	Cl-3 PCB
	257.9584	M+2	12C12 H7 35Cl2 37Cl	Cl-3 PCB
	268.0016	M	13C12 H7 35Cl3	13C12 Cl-3 PCB
	269.9986	M+2	13C12 H7 35Cl2 37Cl 13C12	13C12 Cl-3 PCB
Fn-3 Cl-3,4,5	255.9613	M	12C12 H7 35Cl3	Cl-3 PCB
	257.9584	M+2	12C12 H7 35Cl2 37Cl	Cl-3 PCB
	268.0016	M	13C12 H7 35Cl3	13C12 Cl-3 PCB
	269.9986	M+2	13C12 H7 35Cl2 37Cl 13C12	13C12 Cl-3 PCB
	280.9825	lock	C6 F11	PFK
	289.9224	M	12C12 H6 35Cl4	Cl-4 PCB
	291.9194	M+2	12C12 H6 35Cl3 37Cl	Cl-4 PCB
	301.9626	M	13C12 H6 35Cl4	13C12 Cl-4 PCB
	303.9597	M+2	13C12 H6 35Cl3 37Cl	13C12 Cl-4 PCB
	323.8834	M	12C12 H5 35Cl5	Cl-5 PCB
	325.8804	M+2 1	2C12 H5 35Cl4 37Cl	Cl-5 PCB
	327.8775	M+4	12C12 H5 35Cl3 37Cl2	Cl-5 PCB
	337.9207	M+2	13C12 H5 35Cl4 37Cl	13C12 Cl-5 PCB
	339.9178	M+4	13C12 H5 35Cl3 37Cl2	13C12 Cl-5 PCB
	Fn-4 Cl-4,5,6	280.9824		C6 F11
289.9224		M	12C12 H6 35Cl4	Cl-4 PCB
291.9194		M+2	12C12 H6 35Cl3 37Cl	Cl-4 PCB
293.9165		M+4	12C12 H6 35Cl2 37Cl2	Cl-4 PCB
301.9626		M+2	13C12 H6 35Cl3 37Cl	13C12 Cl-4 PCB
303.9597		M+4	13C12 H6 35Cl2	13C12 Cl-4 PCB
323.8834		M	12C12 H5 35Cl5	Cl-5 PCB
325.8804		M+2	12C12 H5 35Cl4 37Cl	Cl-5 PCB
327.8775		M+4	12C12 H5 35Cl3 37Cl2	Cl-5 PCB
330.9792		lock	C7 F15	PFK
337.9207		M+2	13C12 H5 35Cl4 37Cl 13C12	Cl-5 PCB
339.9178		M+4	13C12 H5 35Cl3 37Cl2	13C12 Cl-5 PCB
359.8415		M+2	13C12 H4 35Cl5 37Cl	Cl-6 PCB
361.8385		M+4	13C12 H4 35Cl4 37Cl2	Cl-6 PCB
363.8356		M+6	13C12 H4 35Cl3 37Cl2	Cl-6 PCB
371.8817		M+2	13C12 H4 35Cl5 37Cl	13C12 Cl-6 PCB
373.8788		M+4	13C12 H4 35Cl4 37Cl2	13C12 Cl-6 PCB

Function and chlorine level	m/z	m/z type	m/z formula	Substance
Fn-5 Cl-5,6,7	323.8834	M	12C12 H5 35Cl5	Cl-5 PCB
	325.8804	M+2	12C12 H5 35Cl4 37Cl	Cl-5 PCB
	327.8775	M+4	12C12 H5 35Cl3 37Cl2	Cl-5 PCB
	337.9207	M+2	13C12 H5 35Cl4 37Cl	13C12 Cl-5 PCB
	339.9178	M+4	13C12 H5 35Cl3 37Cl2	13C12 Cl-5 PCB
	354.9792	lock	C9 F13	PFK
	359.8415	M+2	12C12 H4 35Cl5 37Cl	Cl-6 PCB
	361.8385	M+4	12C12 H4 35Cl4 37Cl2	Cl-6 PCB
	363.8356	M+6	12C12 H4 35Cl3 37Cl3	Cl-6 PCB
	371.8817	M+2	13C12 H4 35Cl5 37Cl	13C12 Cl-6 PCB
	373.8788	M+4	13C12 H4 35Cl4 37Cl2	13C12 Cl-6 PCB
	393.8025	M+2	12C12 H3 35Cl6 37Cl	Cl-7 PCB
	395.7995	M+4	12C12 H3 35Cl5 37Cl2	Cl-7 PCB
	397.7966	M+6	12C12 H3 35Cl4 37Cl3	Cl-7 PCB
	405.8428	M+2	13C12 H3 35Cl6 37Cl	13C12 Cl-7 PCB
	407.8398	M+4	13C12 H3 35Cl5 37Cl2	13C12 Cl-7 PCB
	427.7635	M+2	12C12 H2 35Cl7 37Cl	Cl-8 PCB
	429.7606	M+4	12C12 H2 35Cl6 37Cl2	Cl-8 PCB
	431.7576	M+6	12C12 H2 35Cl5 37Cl3	Cl-8 PCB
	439.8038	M+2	13C12 H2 35Cl7 37Cl	13C12 Cl-8 PCB
441.8008	M+4	13C12 H2 35Cl6 37Cl2	13C12 Cl-8 PCB	
Fn-6 Cl-7,8,9,10	393.8025	M+2	12C12 H3 35Cl6 37Cl	Cl-7 PCB
	395.7995	M+4	12C12 H3 35Cl5 37Cl2	Cl-7 PCB
	397.7966	M+6	12C12 H3 35Cl4 37Cl3	Cl-7 PCB
	405.8428	M+2	13C12 H3 35Cl6 37Cl 13C12	Cl-7 PCB
	407.8398	M+4	13C12 H3 35Cl5 37Cl2	13C12 Cl-7 PCB
	427.7635	M+2	12C12 H2 35Cl7 37Cl	Cl-8 PCB
	429.7606	M+4	12C12 H2 35Cl6 37Cl2	Cl-8 PCB
	431.7576	M+6	12C12 H2 35Cl5 37Cl3	Cl-8 PCB
	439.8038	M+2	13C12 H2 35Cl7 37Cl	13C12 Cl-8 PCB
	441.8008	M+4	13C12 H2 35Cl6 37Cl2	13C12 Cl-8 PCB
	442.9728	QC	C10 F13	PFK
	454.9728	lock	C11 F13	PFK
	461.7246	M+2	12C12 H1 35Cl8 37Cl	Cl-9 PCB
	463.7216	M+4	12C12 H1 35Cl7 37Cl2	Cl-9 PCB
	465.7187	M+6	12C12 H1 35Cl6 37Cl3	Cl-9 PCB
	473.7648	M+2	13C12 H1 35Cl8 37Cl	13C12 Cl-9 PCB
475.7619	M+4	13C12 H1 35Cl7 37Cl2	13C12 Cl-9 PCB	
495.6856	M+2	13C12 H4 35Cl9 37Cl	Cl-10 PCB	
Fn-7	497.6826	M+4	12C12 35Cl8 37Cl2	Cl-10 PCB
	499.6797	M+6	12C12 35Cl7 37Cl3	Cl-10 PCB
	509.7229	M+4	13C12 H4 35Cl8 37Cl2	13C12 Cl-10 PCB
	511.7199	M+6	13C12 H4 35Cl8 37Cl4	13C12 Cl-10 PCB
	516.9697	lock	C13F19	PFK

Data Calculations:

a) Analyte Concentrations:

The relative response factor of each target relative to the standard against which it is to be calculated is determined using the area responses of both quantification ions via equation 9.1.

In cases where a native target is calculated against an exact labelled analogue, the quantification will be considered to be by isotope dilution. In other cases, the quantification will be considered to be by internal standard.

$$\text{RRF} = \frac{(A_{1t} + A_{2t}) C_s}{(A_{1s} + A_{2s}) C_t} \quad \text{Equ. 9.1}$$

Where,

$A_{1t} + A_{2t}$ = The areas of the two quantification ions for the target analyte

$A_{1s} + A_{2s}$ = The areas of the two quantification ions for the labelled compound against which the target analyte will be calculated.

C_t = The concentration in the calibration standard of the target analyte.

C_s = The concentration in the calibration standard of the labelled compound against which the target will be calculated.

For all analytes to be quantified and from the initial calibration series of standard injections, a table of RRFs is prepared. The relative standard deviation (%RSD, or the coefficient of variance) is checked to confirm that the appropriate method criteria has been met as listed in Table 3. The average of the five or six levels of standard for each analyte, RRF_{av} is applied for quantification of samples according to Equations 9.2 and 9.3 below.

$$\text{Amount in sample (pg)} = \frac{(A_{1n} + A_{2n}) Q_i}{(A_{1t} + A_{2t}) (\text{RRF}_{av})} \quad \text{Equ. 9.2}$$

$$\text{Concentration in sample (pg/g or pg/l)} = \frac{(A_{1n} + A_{2n}) Q_i}{(A_{1t} + A_{2t}) (\text{RRF}_{av}) (W_s)} \quad \text{Equ. 9.3}$$

Where,

Q_i = The amount (pg) of labelled compound added to the sample

W_s = The weight (g) or volume (l) of sample

b) Extraction, Clean-up, and Sampling Standard Recovery Calculation:

The extraction, clean-up, and sampling standard recoveries are determined by Equation 9.4 below.

$$\% \text{ Recovery} = (\text{Amount in sample}) / (\text{Amount added to sample}) \times 100 \quad \text{Equ. 9.4}$$

c) Estimated Detection Limit

$$\text{EDL} = \frac{2.5 \times H_x \times Q_{es}}{H_{es} \times W \times \text{RRF}_{av}} \quad \text{Equ. 9.5}$$

Where,

EDL = estimated detection limit for homologous PCB

H_x = sum of the height of the noise level for each quantification ions for the unlabelled PCB.

H_{es} = Sum of the heights of responses of both quantification ions for the labelled extraction standard.

W = weight of volume of sample

RRF_{av} = average relative response factor

Q_{es} = Amount of extraction standard added

Chromatogram Annotation Codes

All manually integrated peaks are expanded and reprinted with the following annotations:

* Analyst Initials AA
 * Date YYMMDD
 * integration code CC

The Syntax is:

AAYYMMDDCC

Example:

SK111220MB

Code	Mnemonic	Description
MB	Manual Baseline	The peak was manually integrated because the initial baseline was determined incorrectly by the software
MS	Manual Split	The peak was manually integrated because the peak was incorrectly or not split by the software
MJ/MC	Manual Join/Manual Combine	The peak was manually integrated because the peak was split by the software and the peak should be integrated as a single peak
MA	Manual Add	The peak was manually integrated because the signal:noise ratio was judged to be >2.5
MD	Manual Delete	The peak was excluded because the signal:noise ratio was judged to be <2.5
MX	Manual Exclude	The peak was excluded due to an interference
NH	Noise Height	The noise height for Estimated Detection Limit calculation was chosen by the analyst (automated noise height not appropriate)
MT	Manual Time	The peak retention time was manually chosen

The following explanatory annotation codes may appear on the chromatograms of peaks that have been reviewed:

Code	Mnemonic	Description
+	Detected Peak	A peak was detected at this mass and retention time that was above 2.5:1 signal to noise
<	Below Detection Limit	The signal at this mass and retention time was below 2.5:1 signal to noise
EMPC	Estimated Maximum Possible Concentration	The signal at this mass and retention time is an interference such that the target compound could not be confirmed
X-RT	Not Detected due to Retention Time non-conformance	The signal at this retention time could not be used to positively identify the target compound because of retention time non-conformance (apex of quantification and confirmation ions do not maximize within the same two seconds, or the retention time of the peak does not fall within the expected range with respect to its labeled analogue)
X-LOC	Not Detected due to interference from a higher level of chlorination	The signal at this retention time is attributable to a fragment from a co-eluting compound at a higher level of chlorination, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)
X-DPE	Not Detected due to diphenyl ether interference	The signal at this retention time is attributable to interference from a chlorinated diphenyl ether, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)
X-IF	Not Detected due to interference	The signal at this retention time is attributable to a co-eluting interference, and cannot be used to positively identify the target. The result is expressed as an Estimated Maximum Possible Concentration (EMPC)

SVOC DATA PACKAGE

SECTION 4: CALIBRATION DATA

Including:

for Multi-Point Calibration(s)

- Multi-Point Calibration Tables
- Individual Quantitation Reports

for Continuing Calibration(s)

- Individual Quantitation Reports

ALS Life Sciences

Calibration Summary Report

Calibration Level	Filename	Run Date
CS-1	5-190502B01	02-May-2019 12:04
CS-2	5-190502B04	02-May-2019 14:13
CS-3	5-190502B03	02-May-2019 13:31
CS-4	5-190502B06	02-May-2019 15:38
CS-5	5-190502B05	02-May-2019 14:56

Approved:	<i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Relative Response Factors					Mean	% RSD
	CS-1	CS-2	CS-3	CS-4	CS-5		
PCB-001	1.065	1.105	1.063	1.107		1.085	2%
PCB-003	1.124	1.134	1.117	1.153		1.132	1%
PCB-004	0.896	0.907	0.889	0.932	0.935	0.912	2%
PCB-015	0.987	1.060	1.025	1.084		1.039	4%
PCB-019	1.117	1.165	1.150	1.176	1.152	1.152	2%
PCB-037	1.025	1.074	1.024	1.073	1.075	1.054	3%
PCB-054	1.028	1.039	1.034	1.062	1.070	1.047	2%
PCB-081	1.278	1.195	1.141	1.187	1.172	1.195	4%
PCB-077	1.092	1.123	1.105	1.153	1.142	1.123	2%
PCB-104	1.116	1.175	1.138	1.166	1.156	1.150	2%
PCB-123	1.060	1.093	1.040	1.064	1.064	1.064	2%
PCB-118	1.112	1.167	1.137	1.175	1.162	1.151	2%
PCB-114	1.129	1.189	1.132	1.181	1.185	1.163	3%
PCB-105	1.240	1.174	1.104	1.163	1.163	1.169	4%
PCB-126	1.124	1.187	1.156	1.189	1.186	1.168	2%
PCB-155	1.065	1.075	1.039	1.069	1.065	1.063	1%
PCB-167	1.280	1.235	1.163	1.205	1.194	1.215	4%
PCB-156/157	1.259	1.252	1.182	1.215	1.206	1.223	3%
PCB-169	1.121	1.158	1.153	1.192	1.183	1.161	2%
PCB-188	0.959	1.046	0.981	1.013	1.003	1.000	3%
PCB-189	0.916	0.967	0.942	0.995	0.985	0.961	3%
PCB-202	1.069	1.106	1.067	1.094	1.086	1.084	2%
PCB-205	0.908	0.972	0.966	0.990	0.980	0.963	3%
PCB-208	1.104	1.113	1.078	1.110	1.110	1.103	1%
PCB-206	1.140	1.128	1.107	1.121	1.134	1.126	1%
PCB-209	0.886	0.917	0.892	0.912	0.905	0.902	1%
Extraction Standards							
13C12-PCB-001	0.999	0.986	0.986	1.000	1.024	0.999	2%
13C12-PCB-003	0.923	0.925	0.901	0.946	0.962	0.931	3%
13C12-PCB-004	0.628	0.634	0.636	0.631	0.640	0.634	1%
13C12-PCB-015	0.933	0.907	0.901	0.967	0.988	0.939	4%
13C12-PCB-019	0.484	0.488	0.485	0.492	0.502	0.490	1%
13C12-PCB-037	1.588	1.570	1.544	1.621	1.648	1.594	3%
13C12-PCB-054	1.339	1.351	1.348	1.344	1.349	1.346	0%
13C12-PCB-081	1.617	1.599	1.586	1.580	1.618	1.600	1%
13C12-PCB-077	1.643	1.623	1.603	1.599	1.627	1.619	1%
13C12-PCB-104	1.399	1.422	1.415	1.368	1.401	1.401	1%
13C12-PCB-123	1.453	1.412	1.445	1.429	1.456	1.439	1%
13C12-PCB-118	1.426	1.390	1.420	1.386	1.423	1.409	1%
13C12-PCB-114	1.375	1.330	1.349	1.336	1.348	1.348	1%
13C12-PCB-105	1.384	1.357	1.379	1.353	1.365	1.368	1%
13C12-PCB-126	1.320	1.295	1.291	1.285	1.297	1.298	1%
13C12-PCB-155	1.502	1.546	1.547	1.508	1.519	1.524	1%
13C12-PCB-167	1.182	1.202	1.185	1.184	1.189	1.188	1%
13C12-PCB-156/157	1.147	1.154	1.141	1.146	1.133	1.144	1%
13C12-PCB-169	1.078	1.082	1.068	1.096	1.076	1.080	1%
13C12-PCB-188	1.287	1.299	1.325	1.301	1.302	1.303	1%
13C12-PCB-189	1.074	1.114	1.107	1.077	1.091	1.093	2%
13C12-PCB-202	1.082	1.104	1.119	1.095	1.093	1.099	1%
13C12-PCB-205	1.234	1.241	1.246	1.245	1.260	1.245	1%
13C12-PCB-208	1.079	1.095	1.116	1.086	1.081	1.091	1%
13C12-PCB-206	0.683	0.698	0.709	0.721	0.717	0.706	2%
13C12-PCB-209	1.022	1.031	1.056	1.078	1.084	1.054	3%
Field Spike Standards							
13C12-PCB-031	1.467	1.457	1.315	1.435	1.426	1.420	4%
13C12-PCB-095	0.693	0.713	0.623	0.695	0.698	0.684	5%
13C12-PCB-153	1.042	1.013	0.924	1.025	1.032	1.007	5%
Cleanup Standards							
13C12-PCB-028	1.884	1.901	1.685	1.863	1.879	1.842	5%
13C12-PCB-111	1.337	1.338	1.211	1.325	1.343	1.311	4%
13C12-PCB-178	0.965	0.985	0.887	0.975	0.978	0.958	4%

ALS Life Sciences

Calibration Report

ALS Sample ID **H5-19-CS1-005**
 Analysis Method EPA 1668C
 Analysis Type Calibration

Filename 5-190502801	Inst # HRMS-5	Column SPBOCTYL64948-03A	Run Date 02-May-2019 12:04	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
PCB-001	8.9	3.14	1.00	7.88E+04	1.065
PCB-003	10.44	3.32	1.00	7.69E+04	1.124
PCB-004	10.61	1.55	1.00	4.17E+04	0.896
PCB-015	14.3	1.57	1.00	6.82E+04	0.987
PCB-019	12.62	1.10	1.00	4.01E+04	1.117
PCB-037	18.25	1.07	1.00	6.12E+04	1.025
PCB-054	14.47	0.78	1.00	5.18E+04	1.028
PCB-081	21.82	0.81	1.00	6.69E+04	1.278
PCB-077	22.13	0.81	1.00	5.80E+04	1.092
PCB-104	17.55	1.62	1.00	5.05E+04	1.116
PCB-123	23.13	1.39	1.00	4.99E+04	1.060
PCB-118	23.3	1.59	1.00	5.13E+04	1.112
PCB-114	23.59	1.56	1.00	5.02E+04	1.129
PCB-105	23.94	1.56	1.00	5.55E+04	1.240
PCB-126	25.54	1.60	1.00	4.80E+04	1.124
PCB-155	20.55	1.31	1.00	5.18E+04	1.065
PCB-167	26.44	1.26	1.00	5.39E+04	1.280
PCB-156/157	27.07	1.23	2.00	1.03E+05	1.259
PCB-169	28.74	1.31	1.00	4.30E+04	1.121
PCB-188	23.54	1.00	1.00	4.39E+04	0.959
PCB-189	30.02	1.06	1.00	3.50E+04	0.916
PCB-202	26.32	0.89	1.00	4.12E+04	1.069
PCB-205	31.41	0.86	1.00	2.83E+04	0.908
PCB-208	29.76	0.80	1.00	3.01E+04	1.104
PCB-206	32.51	0.70	1.00	1.97E+04	1.140
PCB-209	33.64	1.20	1.00	2.29E+04	0.886

Extraction Standards

13C12-PCB-001	8.9	3.15	100.00	7.40E+06	0.999
13C12-PCB-003	10.44	3.12	100.00	6.84E+06	0.923
13C12-PCB-004	10.59	1.60	100.00	4.66E+06	0.628
13C12-PCB-015	14.29	1.58	100.00	6.92E+06	0.933
13C12-PCB-019	12.61	1.04	100.00	3.59E+06	0.484
13C12-PCB-037	18.24	1.06	100.00	5.97E+06	1.588
13C12-PCB-054	14.46	0.79	100.00	5.04E+06	1.339
13C12-PCB-081	21.81	0.79	100.00	5.23E+06	1.617
13C12-PCB-077	22.12	0.79	100.00	5.32E+06	1.643
13C12-PCB-104	17.53	1.58	100.00	4.53E+06	1.399
13C12-PCB-123	23.11	1.59	100.00	4.70E+06	1.453
13C12-PCB-118	23.29	1.58	100.00	4.61E+06	1.426
13C12-PCB-114	23.58	1.61	100.00	4.45E+06	1.375
13C12-PCB-105	23.93	1.60	100.00	4.48E+06	1.384
13C12-PCB-126	25.52	1.60	100.00	4.27E+06	1.320
13C12-PCB-155	20.54	1.26	100.00	4.86E+06	1.502
13C12-PCB-167	26.43	1.29	100.00	4.21E+06	1.182
13C12-PCB-156/157	27.06	1.31	200.00	8.17E+06	1.147
13C12-PCB-169	28.73	1.30	100.00	3.84E+06	1.078
13C12-PCB-188	23.53	1.07	100.00	4.58E+06	1.287
13C12-PCB-189	30.01	1.06	100.00	3.83E+06	1.074
13C12-PCB-202	26.31	0.90	100.00	3.85E+06	1.082
13C12-PCB-205	31.4	0.89	100.00	3.12E+06	1.234
13C12-PCB-208	29.75	0.78	100.00	2.73E+06	1.079
13C12-PCB-206	32.49	0.79	100.00	1.73E+06	0.683
13C12-PCB-209	33.63	1.20	100.00	2.59E+06	1.022

Field Spike Standards

13C12-PCB-031	15.82	1.06	100.00	7.02E+06	1.467
13C12-PCB-095	19.13	1.59	100.00	3.17E+06	0.693
13C12-PCB-153	24.22	1.31	100.00	4.43E+06	1.042

Cleanup Standards

13C12-PCB-028	16	1.06	100.00	7.09E+06	1.884
13C12-PCB-111	22.06	1.58	100.00	4.32E+06	1.337
13C12-PCB-178	25.1	1.05	100.00	3.44E+06	0.965

Injection Standards

13C12-PCB-9	11.87	1.58	100.00	7.41E+06	-
13C12-PCB-52	16.99	0.81	100.00	3.76E+06	-
13C12-PCB-101	20.67	1.58	100.00	3.24E+06	-
13C12-PCB-138	24.91	1.30	100.00	3.56E+06	-
13C12-PCB-194	31.13	0.90	100.00	2.53E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H5-19-CS2-005**
 Analysis Method EPA 1668C
 Analysis Type Calibration

Filename 5-190502804	Inst # HRMS-5	Column SPBOCTYL64948-03A	Run Date 02-May-2019 14:13	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
PCB-001	8.88	3.21	5.00	3.39E+05	1.105
PCB-003	10.41	3.30	5.00	3.27E+05	1.134
PCB-004	10.58	1.55	5.00	1.79E+05	0.907
PCB-015	14.26	1.56	5.00	2.99E+05	1.060
PCB-019	12.58	1.06	5.00	1.77E+05	1.165
PCB-037	18.22	1.04	5.00	2.62E+05	1.074
PCB-054	14.44	0.79	5.00	2.18E+05	1.039
PCB-081	21.8	0.76	5.00	2.53E+05	1.195
PCB-077	22.1	0.77	5.00	2.41E+05	1.123
PCB-104	17.51	1.63	5.00	2.21E+05	1.175
PCB-123	23.1	1.61	5.00	2.04E+05	1.093
PCB-118	23.26	1.61	5.00	2.15E+05	1.167
PCB-114	23.57	1.57	5.00	2.09E+05	1.189
PCB-105	23.92	1.58	5.00	2.11E+05	1.174
PCB-126	25.51	1.57	5.00	2.03E+05	1.187
PCB-155	20.51	1.26	5.00	2.20E+05	1.075
PCB-167	26.42	1.25	5.00	2.11E+05	1.235
PCB-156/157	27.05	1.20	10.00	4.11E+05	1.252
PCB-169	28.71	1.23	5.00	1.78E+05	1.158
PCB-188	23.52	1.01	5.00	1.93E+05	1.046
PCB-189	29.99	1.01	5.00	1.53E+05	0.967
PCB-202	26.3	0.87	5.00	1.74E+05	1.106
PCB-205	31.39	0.90	5.00	1.23E+05	0.972
PCB-208	29.74	0.78	5.00	1.24E+05	1.113
PCB-206	32.47	0.80	5.00	8.01E+04	1.128
PCB-209	33.61	1.20	5.00	9.61E+04	0.917

Extraction Standards

13C12-PCB-001	8.86	3.11	100.00	6.14E+06	0.986
13C12-PCB-003	10.4	3.06	100.00	5.76E+06	0.925
13C12-PCB-004	10.57	1.61	100.00	3.95E+06	0.634
13C12-PCB-015	14.25	1.57	100.00	5.64E+06	0.907
13C12-PCB-019	12.57	1.04	100.00	3.04E+06	0.488
13C12-PCB-037	18.2	1.04	100.00	4.87E+06	1.570
13C12-PCB-054	14.43	0.79	100.00	4.19E+06	1.351
13C12-PCB-081	21.79	0.79	100.00	4.23E+06	1.599
13C12-PCB-077	22.08	0.79	100.00	4.29E+06	1.623
13C12-PCB-104	17.5	1.60	100.00	3.76E+06	1.422
13C12-PCB-123	23.08	1.58	100.00	3.74E+06	1.412
13C12-PCB-118	23.25	1.59	100.00	3.68E+06	1.390
13C12-PCB-114	23.55	1.60	100.00	3.52E+06	1.330
13C12-PCB-105	23.9	1.60	100.00	3.59E+06	1.357
13C12-PCB-126	25.5	1.60	100.00	3.43E+06	1.295
13C12-PCB-155	20.5	1.26	100.00	4.09E+06	1.546
13C12-PCB-167	26.39	1.31	100.00	3.42E+06	1.202
13C12-PCB-156/157	27.03	1.30	200.00	6.57E+06	1.154
13C12-PCB-169	28.7	1.30	100.00	3.08E+06	1.082
13C12-PCB-188	23.51	1.06	100.00	3.70E+06	1.299
13C12-PCB-189	29.98	1.05	100.00	3.17E+06	1.114
13C12-PCB-202	26.29	0.91	100.00	3.14E+06	1.104
13C12-PCB-205	31.38	0.90	100.00	2.52E+06	1.241
13C12-PCB-208	29.71	0.79	100.00	2.23E+06	1.095
13C12-PCB-206	32.46	0.79	100.00	1.42E+06	0.698
13C12-PCB-209	33.6	1.20	100.00	2.10E+06	1.031

Field Spike Standards

13C12-PCB-031	15.79	1.05	100.00	5.76E+06	1.457
13C12-PCB-095	19.1	1.60	100.00	2.62E+06	0.713
13C12-PCB-153	24.18	1.28	100.00	3.51E+06	1.013

Cleanup Standards

13C12-PCB-028	15.96	1.05	100.00	5.90E+06	1.901
13C12-PCB-111	22.02	1.60	100.00	3.54E+06	1.338
13C12-PCB-178	25.08	1.06	100.00	2.80E+06	0.985

Injection Standards

13C12-PCB-9	11.83	1.60	100.00	6.23E+06	-
13C12-PCB-52	16.96	0.81	100.00	3.10E+06	-
13C12-PCB-101	20.63	1.58	100.00	2.65E+06	-
13C12-PCB-138	24.87	1.29	100.00	2.85E+06	-
13C12-PCB-194	31.1	0.91	100.00	2.03E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H5-19-CS3-005**
 Analysis Method EPA 1668C
 Analysis Type Calibration

Filename 5-190502803	Inst # HRMS-5	Column SPBOCTYL64948-03A	Run Date 02-May-2019 13:31	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
PCB-001	8.89	3.15	50.00	1.97E+06	1.063
PCB-003	10.43	3.21	50.00	1.89E+06	1.117
PCB-004	10.59	1.49	50.00	1.06E+06	0.889
PCB-015	14.27	1.56	50.00	1.74E+06	1.025
PCB-019	12.59	1.07	50.00	1.05E+06	1.150
PCB-037	18.23	1.04	50.00	1.52E+06	1.024
PCB-054	14.45	0.80	50.00	1.34E+06	1.034
PCB-081	21.81	0.77	50.00	1.49E+06	1.141
PCB-077	22.11	0.78	50.00	1.46E+06	1.105
PCB-104	17.52	1.58	50.00	1.33E+06	1.138
PCB-123	23.11	1.58	50.00	1.24E+06	1.040
PCB-118	23.28	1.57	50.00	1.33E+06	1.137
PCB-114	23.58	1.59	50.00	1.26E+06	1.132
PCB-105	23.92	1.57	50.00	1.25E+06	1.104
PCB-126	25.52	1.54	50.00	1.23E+06	1.156
PCB-155	20.53	1.26	50.00	1.32E+06	1.039
PCB-167	26.42	1.23	50.00	1.24E+06	1.163
PCB-156/157	27.05	1.23	100.00	2.42E+06	1.182
PCB-169	28.73	1.24	50.00	1.11E+06	1.153
PCB-188	23.53	1.04	50.00	1.17E+06	0.981
PCB-189	29.99	1.03	50.00	9.37E+05	0.942
PCB-202	26.3	0.89	50.00	1.07E+06	1.067
PCB-205	31.4	0.90	50.00	7.73E+05	0.966
PCB-208	29.74	0.80	50.00	7.72E+05	1.078
PCB-206	32.49	0.80	50.00	5.04E+05	1.107
PCB-209	33.63	1.17	50.00	6.05E+05	0.892

Extraction Standards

13C12-PCB-001	8.88	3.14	100.00	3.71E+06	0.986
13C12-PCB-003	10.41	3.13	100.00	3.39E+06	0.901
13C12-PCB-004	10.58	1.58	100.00	2.39E+06	0.636
13C12-PCB-015	14.26	1.58	100.00	3.39E+06	0.901
13C12-PCB-019	12.58	1.04	100.00	1.82E+06	0.485
13C12-PCB-037	18.21	1.05	100.00	2.96E+06	1.544
13C12-PCB-054	14.44	0.80	100.00	2.58E+06	1.348
13C12-PCB-081	21.8	0.79	100.00	2.61E+06	1.586
13C12-PCB-077	22.09	0.79	100.00	2.64E+06	1.603
13C12-PCB-104	17.51	1.58	100.00	2.33E+06	1.415
13C12-PCB-123	23.1	1.59	100.00	2.38E+06	1.445
13C12-PCB-118	23.26	1.59	100.00	2.34E+06	1.420
13C12-PCB-114	23.57	1.60	100.00	2.22E+06	1.349
13C12-PCB-105	23.91	1.61	100.00	2.27E+06	1.379
13C12-PCB-126	25.51	1.60	100.00	2.13E+06	1.291
13C12-PCB-155	20.51	1.26	100.00	2.55E+06	1.547
13C12-PCB-167	26.41	1.30	100.00	2.13E+06	1.185
13C12-PCB-156/157	27.03	1.30	200.00	4.10E+06	1.141
13C12-PCB-169	28.71	1.31	100.00	1.92E+06	1.068
13C12-PCB-188	23.51	1.05	100.00	2.38E+06	1.325
13C12-PCB-189	29.98	1.06	100.00	1.99E+06	1.107
13C12-PCB-202	26.29	0.91	100.00	2.01E+06	1.119
13C12-PCB-205	31.39	0.91	100.00	1.60E+06	1.246
13C12-PCB-208	29.72	0.78	100.00	1.43E+06	1.116
13C12-PCB-206	32.46	0.79	100.00	9.10E+05	0.709
13C12-PCB-209	33.6	1.19	100.00	1.36E+06	1.056

Field Spike Standards

13C12-PCB-031	15.8	1.05	100.00	3.14E+06	1.315
13C12-PCB-095	19.11	1.59	100.00	1.45E+06	0.623
13C12-PCB-153	24.19	1.29	100.00	2.00E+06	0.924

Cleanup Standards

13C12-PCB-028	15.97	1.05	100.00	3.23E+06	1.685
13C12-PCB-111	22.03	1.60	100.00	1.99E+06	1.211
13C12-PCB-178	25.09	1.05	100.00	1.59E+06	0.887

Injection Standards

13C12-PCB-9	11.84	1.59	100.00	3.76E+06	-
13C12-PCB-52	16.97	0.80	100.00	1.92E+06	-
13C12-PCB-101	20.64	1.57	100.00	1.65E+06	-
13C12-PCB-138	24.88	1.30	100.00	1.80E+06	-
13C12-PCB-194	31.1	0.91	100.00	1.28E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H5-19-CS4-005**
 Analysis Method EPA 1668C
 Analysis Type Calibration

Filename 5-190502806	Inst # HRMS-5	Column SPBOCTYL64948-03A	Run Date 02-May-2019 15:38	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
PCB-001	8.86	3.17	400.00	2.92E+07	1.107
PCB-003	10.4	3.21	400.00	2.88E+07	1.153
PCB-004	10.57	1.50	400.00	1.55E+07	0.932
PCB-015	14.24	1.57	400.00	2.76E+07	1.084
PCB-019	12.57	1.07	400.00	1.52E+07	1.176
PCB-037	18.19	1.03	400.00	2.41E+07	1.073
PCB-054	14.43	0.79	400.00	1.98E+07	1.062
PCB-081	21.78	0.78	400.00	2.30E+07	1.187
PCB-077	22.07	0.78	400.00	2.27E+07	1.153
PCB-104	17.5	1.58	400.00	1.96E+07	1.166
PCB-123	23.08	1.56	400.00	1.87E+07	1.064
PCB-118	23.25	1.56	400.00	2.00E+07	1.175
PCB-114	23.54	1.58	400.00	1.94E+07	1.181
PCB-105	23.89	1.56	400.00	1.93E+07	1.163
PCB-126	25.49	1.58	400.00	1.88E+07	1.189
PCB-155	20.5	1.26	400.00	1.98E+07	1.069
PCB-167	26.39	1.23	400.00	1.85E+07	1.205
PCB-156/157	27.02	1.23	800.00	3.62E+07	1.215
PCB-169	28.69	1.24	400.00	1.70E+07	1.192
PCB-188	23.51	1.03	400.00	1.71E+07	1.013
PCB-189	29.97	1.02	400.00	1.39E+07	0.995
PCB-202	26.29	0.90	400.00	1.56E+07	1.094
PCB-205	31.38	0.90	400.00	1.14E+07	0.990
PCB-208	29.72	0.80	400.00	1.11E+07	1.110
PCB-206	32.46	0.80	400.00	7.46E+06	1.121
PCB-209	33.6	1.18	400.00	9.08E+06	0.912

Extraction Standards

13C12-PCB-001	8.86	3.12	100.00	6.59E+06	1.000
13C12-PCB-003	10.39	3.07	100.00	6.24E+06	0.946
13C12-PCB-004	10.55	1.58	100.00	4.16E+06	0.631
13C12-PCB-015	14.23	1.57	100.00	6.37E+06	0.967
13C12-PCB-019	12.55	1.03	100.00	3.24E+06	0.492
13C12-PCB-037	18.18	1.06	100.00	5.62E+06	1.621
13C12-PCB-054	14.42	0.79	100.00	4.66E+06	1.344
13C12-PCB-081	21.76	0.79	100.00	4.86E+06	1.580
13C12-PCB-077	22.06	0.78	100.00	4.91E+06	1.599
13C12-PCB-104	17.48	1.57	100.00	4.20E+06	1.368
13C12-PCB-123	23.06	1.57	100.00	4.39E+06	1.429
13C12-PCB-118	23.24	1.59	100.00	4.26E+06	1.386
13C12-PCB-114	23.53	1.62	100.00	4.11E+06	1.336
13C12-PCB-105	23.88	1.60	100.00	4.16E+06	1.353
13C12-PCB-126	25.48	1.60	100.00	3.95E+06	1.285
13C12-PCB-155	20.48	1.25	100.00	4.64E+06	1.508
13C12-PCB-167	26.38	1.29	100.00	3.84E+06	1.184
13C12-PCB-156/157	27.01	1.31	200.00	7.44E+06	1.146
13C12-PCB-169	28.68	1.31	100.00	3.56E+06	1.096
13C12-PCB-188	23.48	1.06	100.00	4.22E+06	1.301
13C12-PCB-189	29.96	1.05	100.00	3.49E+06	1.077
13C12-PCB-202	26.26	0.92	100.00	3.55E+06	1.095
13C12-PCB-205	31.36	0.89	100.00	2.87E+06	1.245
13C12-PCB-208	29.7	0.78	100.00	2.51E+06	1.086
13C12-PCB-206	32.45	0.79	100.00	1.67E+06	0.721
13C12-PCB-209	33.58	1.19	100.00	2.49E+06	1.078

Field Spike Standards

13C12-PCB-031	15.77	1.03	100.00	6.35E+06	1.435
13C12-PCB-095	19.09	1.56	100.00	2.95E+06	0.695
13C12-PCB-153	24.17	1.29	100.00	4.04E+06	1.025

Cleanup Standards

13C12-PCB-028	15.94	1.04	100.00	6.45E+06	1.863
13C12-PCB-111	22.01	1.60	100.00	4.07E+06	1.325
13C12-PCB-178	25.07	1.04	100.00	3.16E+06	0.975

Injection Standards

13C12-PCB-9	11.82	1.59	100.00	6.59E+06	-
13C12-PCB-52	16.94	0.80	100.00	3.46E+06	-
13C12-PCB-101	20.62	1.57	100.00	3.07E+06	-
13C12-PCB-138	24.86	1.31	100.00	3.25E+06	-
13C12-PCB-194	31.08	0.89	100.00	2.31E+06	-

ALS Life Sciences

Calibration Report

ALS Sample ID **H5-19-CS5-005**
 Analysis Method EPA 1668C
 Analysis Type Calibration

Filename 5-190502805	Inst # HRMS-5	Column SPBOCTYL64948-03A	Run Date 02-May-2019 14:56	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
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Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
PCB-001	0	0.00	2000.00	0.00E+00	0.000
PCB-003	0	0.00	2000.00	0.00E+00	0.000
PCB-004	10.57	1.51	2000.00	6.14E+07	0.935
PCB-015	0	0.00	2000.00	0.00E+00	0.000
PCB-019	12.57	1.07	2000.00	5.94E+07	1.152
PCB-037	18.18	1.04	2000.00	9.47E+07	1.075
PCB-054	14.43	0.79	2000.00	7.73E+07	1.070
PCB-081	21.77	0.80	2000.00	8.91E+07	1.172
PCB-077	22.07	0.79	2000.00	8.73E+07	1.142
PCB-104	17.5	1.57	2000.00	7.61E+07	1.156
PCB-123	23.08	1.57	2000.00	7.28E+07	1.064
PCB-118	23.25	1.56	2000.00	7.77E+07	1.162
PCB-114	23.54	1.58	2000.00	7.50E+07	1.185
PCB-105	23.89	1.57	2000.00	7.46E+07	1.163
PCB-126	25.49	1.59	2000.00	7.23E+07	1.186
PCB-155	20.5	1.27	2000.00	7.60E+07	1.065
PCB-167	26.39	1.24	2000.00	7.04E+07	1.194
PCB-156/157	27.02	1.23	4000.00	1.36E+08	1.206
PCB-169	28.69	1.24	2000.00	6.31E+07	1.183
PCB-188	23.51	1.03	2000.00	6.47E+07	1.003
PCB-189	29.97	1.04	2000.00	5.33E+07	0.985
PCB-202	26.29	0.91	2000.00	5.89E+07	1.086
PCB-205	31.38	0.91	2000.00	4.36E+07	0.980
PCB-208	29.72	0.80	2000.00	4.24E+07	1.110
PCB-206	32.46	0.80	2000.00	2.87E+07	1.134
PCB-209	33.6	1.18	2000.00	3.47E+07	0.905

Extraction Standards

13C12-PCB-001	8.86	3.10	100.00	5.26E+06	1.024
13C12-PCB-003	10.39	3.08	100.00	4.94E+06	0.962
13C12-PCB-004	10.55	1.58	100.00	3.28E+06	0.640
13C12-PCB-015	14.23	1.56	100.00	5.07E+06	0.988
13C12-PCB-019	12.55	1.06	100.00	2.58E+06	0.502
13C12-PCB-037	18.17	1.05	100.00	4.41E+06	1.648
13C12-PCB-054	14.42	0.81	100.00	3.61E+06	1.349
13C12-PCB-081	21.76	0.79	100.00	3.80E+06	1.618
13C12-PCB-077	22.06	0.79	100.00	3.82E+06	1.627
13C12-PCB-104	17.49	1.58	100.00	3.29E+06	1.401
13C12-PCB-123	23.06	1.58	100.00	3.42E+06	1.456
13C12-PCB-118	23.24	1.61	100.00	3.34E+06	1.423
13C12-PCB-114	23.53	1.59	100.00	3.17E+06	1.348
13C12-PCB-105	23.88	1.60	100.00	3.21E+06	1.365
13C12-PCB-126	25.48	1.57	100.00	3.05E+06	1.297
13C12-PCB-155	20.49	1.26	100.00	3.57E+06	1.519
13C12-PCB-167	26.38	1.30	100.00	2.95E+06	1.189
13C12-PCB-156/157	27.01	1.31	200.00	5.62E+06	1.133
13C12-PCB-169	28.68	1.31	100.00	2.67E+06	1.076
13C12-PCB-188	23.49	1.05	100.00	3.23E+06	1.302
13C12-PCB-189	29.96	1.06	100.00	2.71E+06	1.091
13C12-PCB-202	26.26	0.91	100.00	2.71E+06	1.093
13C12-PCB-205	31.36	0.92	100.00	2.23E+06	1.260
13C12-PCB-208	29.71	0.78	100.00	1.91E+06	1.081
13C12-PCB-206	32.45	0.79	100.00	1.27E+06	0.717
13C12-PCB-209	33.58	1.19	100.00	1.92E+06	1.084

Field Spike Standards

13C12-PCB-031	15.77	1.04	100.00	4.98E+06	1.426
13C12-PCB-095	19.09	1.58	100.00	2.31E+06	0.698
13C12-PCB-153	24.17	1.30	100.00	3.10E+06	1.032

Cleanup Standards

13C12-PCB-028	15.94	1.03	100.00	5.03E+06	1.879
13C12-PCB-111	22.01	1.60	100.00	3.16E+06	1.343
13C12-PCB-178	25.07	1.04	100.00	2.42E+06	0.978

Injection Standards

13C12-PCB-9	11.82	1.58	100.00	5.13E+06	-
13C12-PCB-52	16.94	0.80	100.00	2.68E+06	-
13C12-PCB-101	20.62	1.57	100.00	2.35E+06	-
13C12-PCB-138	24.86	1.30	100.00	2.48E+06	-
13C12-PCB-194	31.08	0.90	100.00	1.77E+06	-

186	13C-PCB-156/157	4571184	1.317	NO	27.02	214.5776	14.022	1.144	107.3	3966	3779	36433772	27714144	9185.7	7334.1	2598305	1972879	1.0665	26.98	27.05	15-Aug-19	4:18:30	HS-19-WDM-679	1
187	13C-PCB-159	242832	1.313	NO	28.68	120.9679	17.861	1.08	121	3966	3779	2438710	18497248	6146.1	4895	1380604	1052028	1.1536	28.65	28.72	15-Aug-19	4:18:30	HS-19-WDM-679	1
188	13C-PCB-188	2315236	1.049	NO	23	95.41849	19.099	1.303	95.4	2897	2971	2284324	21451840	7816.8	7220.9	1185577	1129599	0.9461	23.47	23.53	15-Aug-19	4:18:30	HS-19-WDM-679	1
189	13C-PCB-189	2552722	1.068	NO	26.97	125.4195	18.206	1.093	125.4	3983	4590	24005938	22301198	6518.5	4546.3	1318076	1234146	0.9643	29.94	30.01	15-Aug-19	4:18:30	HS-19-WDM-679	1
190	13C-PCB-205	2120295	0.968	NO	29.27	103.603	18.797	1.099	103.6	1530	4440	18936984	20789744	5275.1	4673.1	1029233	1111223	1.0564	26.23	26.3	15-Aug-19	4:18:30	HS-19-WDM-679	1
191	13C-PCB-205	2271203	0.874	NO	31.37	103.05	17.061	1.245	103	2990	4333	18071498	20997134	6044	4776.1	1025257	1211946	1.0091	31.33	31.4	15-Aug-19	4:18:30	HS-19-WDM-679	1
192	13C-PCB-208	1611683	0.781	NO	29.71	83.417	18.49	1.091	83.4	2706	2254	13395853	16143640	4628.9	7417.9	702878.3	394854.8	0.936	29.68	29.75	15-Aug-19	4:18:30	HS-19-WDM-679	1
193	13C-PCB-206	1244534	0.789	NO	32.45	99.5717	15.55	0.706	99.6	2706	2254	8536382	10603168	3155.2	4793.9	548970.2	895533.3	1.044	32.42	32.49	15-Aug-19	4:18:30	HS-19-WDM-679	1
194	13C-PCB-209	2104195	1.193	NO	33.59	112.7734	13.648	1.054	112.8	1525	1471	15624309	13024890	10246.7	8656.8	1144847	1695483.3	1.0807	33.56	33.62	15-Aug-19	4:18:30	HS-19-WDM-679	1
195	13C-PCB-9	482514	1.572	NO	11.83	100	19.005	48251.4	100	11980	3390	56033329	36289760	4844.7	10097	2969585	1868929	0.4766	11.79	11.86	15-Aug-19	4:18:30	HS-19-WDM-679	1
196	13C-PCB-82	2092050	0.825	NO	16.95	100	21.413	20920.5	100	7934	3743	20255960	24380472	2552.9	6514.2	945944.8	1146105	0.8815	16.91	16.98	15-Aug-19	4:18:30	HS-19-WDM-679	1
197	13C-PCB-101	1691942	1.597	NO	20.62	100	21.353	16919.2	100	2545	1688	22020990	13923919	8393.9	8242.8	1039832	651209.9	0.8293	20.59	20.65	15-Aug-19	4:18:30	HS-19-WDM-679	1
198	13C-PCB-138	1862166	1.347	NO	34.87	100	18.971	18621.66	100	3966	3779	20275190	14972676	5111.8	3962.3	1068720	793454.8	0	24.83	24.9	15-Aug-19	4:18:30	HS-19-WDM-679	1
199	13C-PCB-194	1770266	0.87	NO	20.08	100	16.891	17702.66	100	2990	4333	13968671	16124249	4671.8	3722.8	820999.1	943277.3	1.25	31.05	31.12	15-Aug-19	4:18:30	HS-19-WDM-679	1
200	Total HxCB-F1					200353.9		21.797		1926		6399900												
201	Total DCB-F1					33853.03		4.691		1962		9018839												
202	Total DCB-F2					38979.65		8.977		5973		65330487												
203	Total TCb-F1					28.07572				1931		7430988												
204	Total TCb-F2					15653.89		1.233		2621		67144563												
205	Total TCb-F3					327108.6		3.749		5933		1.68E+08												
206	Total TCb-F2					57.02037				1945		17913862												
207	Total TCb-F3					1100		1.048		1027		2.95E+08												
208	Total TCb-F4					472623.4		9.302		1		2.88E+08												
209	Total PCB-F3					926.9802		25.9		528		39459190												
210	Total PCB-F4					192749.8		1.014		1279		3.3E+08												
211	Total PCB-F5					1199603		33.01		22116		1.98E+08												
212	Total HxCB-F4					1237.964		7.087		1581		1.41E+08												
213	Total HxCB-F5					813887.9		12.285		2432		3.72E+08												
214	Total HxCB-F5					294037		3.309		1667		2.20E+08												
215	Total HxCB-F6					57.10543				2305		15309988												
216	Total OCb-F5					678.4121		11.274		1183		1.34E+08												
217	Total OCb-F6					277562.9		24.861		1867		38337509												
218	Total NCB-F6					246.5178		64.202		1954		34048489												
219	Total DCb-F7					92.00135				529		12713970												
220	Total 13C-HxCB-F1					189.8781				2098		1.32E+08												
221	Total 13C-DCB-F1					198.5807		24293.06		11690		94022541												
222	Total 13C-DCB-F2					52.59286				15453		50716144												
223	Total 13C-TCb-F1					96.78751				35896		25291211												
224	Total 13C-TCb-F3					290.524				36332		1.1E+08												
225	Total 13C-TCb-F2					109.8222				6262		30919116												
226	Total 13C-TCb-F3					103.3381		20920.5		7934		20857867												
227	Total 13C-TCb-F4					205.7246				8954		43846471												
228	Total 13C-PCb-F3					110.5516				1389		34391376												
229	Total 13C-PCb-F4					214.627		5694.008		2645		65204904												
230	Total 13C-PCb-F5					598.5052				4691		1.36E+08												
231	Total 13C-HCB-F4					106.4736				1383		32537017												
232	Total 13C-HCB-F5					648.0189		3841.461		3966		1.29E+08												
233	Total 13C-HCB-F5					182.7946				2897		38632370												
234	Total 13C-HCB-F6					125.4195				3683		25329166												
235	Total 13C-OCb-F5					103.603				1530		19051120												
236	Total 13C-OCb-F6					213.5633		8915.48		2990		32766448												
237	Total 13C-NCB-F6					182.9842				2706		21607838												
238	Total 13C-DCb-F7					112.7734				1525		15624309												
239	Lockmass F1									0		161248												
240	Lockmass F2									0		49238												
241	Lockmass F3									0		668340												
242	Lockmass F4									0		338281												
243	Lockmass F5									0		148952												
244	Lockmass F6									0		99429												
245	Lockmass F7									0		34880												

186	13C-PCB-156/157	476620	1.315	NO	27.05	218.5678	13.962	1.144	107.8	4263	3124	37821608	28684570	8873.1	9181.2	2708862	2059759	1.0864	27.02	27.09	15-Aug-19	15:57:48	HS-19-WDM-685	1
187	13C-PCB-169	2629789	1.312	NO	28.72	128.8778	17.321	1.108	125.9	4263	3124	28583849	19915986	4082.1	6278.6	1491792	1137027	1.1533	28.69	28.75	15-Aug-19	15:57:48	HS-19-WDM-685	1
188	13C-PCB-188	2413617	1.055	NO	23.54	95.79464	19.169	1.303	95.8	1963	1728	23748888	22458344	12097.9	12996.3	1238602	1174715	0.9452	23.5	23.57	15-Aug-19	15:57:48	HS-19-WDM-685	1
189	13C-PCB-189	2805964	1.071	NO	30	132.5271	18.121	1.063	132.5	2910	2099	26242016	24645328	9016.9	11741.5	1448202	1352732	0.9639	29.96	30.03	15-Aug-19	15:57:48	HS-19-WDM-685	1
190	13C-PCB-202	2129595	0.913	NO	26.3	100.2094	18.645	1.099	100.2	1190	1071	19844740	20568148	15916	19466.6	9190303	1113471	1.0563	26.34	26.34	15-Aug-19	15:57:48	HS-19-WDM-685	1
191	13C-PCB-205	2522462	0.898	NO	31.4	104.2005	16.722	1.245	104.2	1732	1964	19809966	22400804	11435.3	11403.6	1184691	1337770	1.0091	31.37	31.44	15-Aug-19	15:57:48	HS-19-WDM-685	1
192	13C-PCB-208	1819873	0.779	NO	23.74	85.35513	18.547	1.051	85.4	978	1843	1470152	19039260	10084.9	10309.8	7328864	1017867	0.9556	23.71	23.77	15-Aug-19	15:57:48	HS-19-WDM-685	1
193	13C-PCB-206	1346344	0.789	NO	32.49	98.07663	15.665	0.706	98.1	976	1843	9300343	11612864	9529	6300.1	593724.4	752019.1	1.044	32.46	32.52	15-Aug-19	15:57:48	HS-19-WDM-685	1
194	13C-PCB-209	2242750	1.194	NO	33.63	109.4346	13.602	1.054	109.4	826	776	16804417	13833975	20397	17825.1	1220729	1020201	1.0808	33.6	33.67	15-Aug-19	15:57:48	HS-19-WDM-685	1
195	13C-PCB-9	5291342	1.58	NO	11.87	100	19.168	50513.42	100	11511	3255	89297204	37816132	9191.4	11617.5	3003236	1957844	0.4706	11.83	11.9	15-Aug-19	15:57:48	HS-19-WDM-685	1
196	13C-PCB-82	2162597	0.834	NO	16.99	100	20.837	21682.97	100	3483	2657	20630088	24838768	5999.4	9347.9	985778.2	1182519	0.6821	16.95	17.02	15-Aug-19	15:57:48	HS-19-WDM-685	1
197	13C-PCB-101	1749606	1.588	NO	20.66	100	21.032	17498.06	100	2020	1422	22488078	13968137	11335.4	9814.8	1070156	670549.9	0.8296	20.63	20.69	15-Aug-19	15:57:48	HS-19-WDM-685	1
198	13C-PCB-138	1933672	1.32	NO	24.9	100	18.774	19336.72	100	4263	3124	26552570	15713045	4845.2	5029.3	1100084	833588.1	0	24.87	24.94	15-Aug-19	15:57:48	HS-19-WDM-685	1
199	13C-PCB-194	1944400	0.879	NO	31.12	100	16.626	19444	100	1732	1964	16397760	17580828	8888.3	8949	909720.4	1034680	1.2497	31.09	31.15	15-Aug-19	15:57:48	HS-19-WDM-685	1
200	Total HxCB-F1					25479.7			21.755			69469399												
201	Total DCB-F1					37203.21			4.602			2173	90999652											
202	Total DCB-F2					51623.94			6.044			3738	60722529											
203	Total TCb-F1					28.10152			1.183			7655909												
204	Total TCb-F2					19653.87			1.238			2630	61962175											
205	Total TCb-F3					391044.1			3.791			3586	1.85E+08											
206	Total TCb-F2					57.43602			0.803			18939472												
207	Total TCb-F3					1551.229			1.033			1531	2.75E+08											
208	Total TCb-F4					534154.6			9.334			11970	2.9E+08											
209	Total PCB-F5					815.286			30.709			815	39784251											
210	Total PCB-F4					31700.52			0.868			292445	3.45E+08											
211	Total PCB-F5					1142015			33.766			2181	2.01E+08											
212	Total HxCB-F4					502.5018			7.108			778	1.41E+08											
213	Total HxCB-F5					1003378			12.37			3592	3.84E+08											
214	Total HxCB-F6					376909.3			3.266			2493	2.34E+08											
215	Total HxCB-F6					57.25982			1.791			11290393												
216	Total OCb-F5					4487.663			11.272			984	1.39E+08											
217	Total OCb-F6					372978.8			24.799			1788	40237478											
218	Total NCB-F6					246.0536			64.022			1369	36860945											
219	Total DCb-F7					91.7082			1.024			1320515												
220	Total 13C-HxCB-F1					198.1581			3973			1.43E+08												
221	Total 13C-DCB-F1					198.7986			25287.83			11511	96268851											
222	Total 13C-DCB-F2					30.8689			1.7784			62180500												
223	Total 13C-TCb-F1					94.33341			31119			28905258												
224	Total 13C-TCb-F3					292.2574			31457			1.14E+08												
225	Total 13C-TCb-F2					198.7051			3225			31994447												
226	Total 13C-TCb-F3					103.5394			21682.97			2483	21244497											
227	Total 13C-TCb-F4					207.998			4344			48898547												
228	Total 13C-PCb-F3					107.8753			930			34050857												
229	Total 13C-PCb-F4					273.5561			8899.487			2020	65588763											
230	Total 13C-PCb-F5					511.7638			3597			1.41E+08												
231	Total 13C-HCB-F4					102.9737			3985.96			1149	3002402											
232	Total 13C-HCB-F5					657.5473			1.061			4263	1.33E+08											
233	Total 13C-HCB-F6					183.3048			1963			40351805												
234	Total 13C-HCB-F6					132.5271			2910			28245366												
235	Total 13C-OCb-F5					100.2094			1190			19030348												
236	Total 13C-OCb-F6					218.2586			9786.865			1732	36254225											
237	Total 13C-NCB-F6					183.4318			978			24021042												
238	Total 13C-DCb-F7					109.4346			826			16604417												
239	Lockmass F1								408229															
240	Lockmass F2								162823															
241	Lockmass F3								318725															
242	Lockmass F4								228178															
243	Lockmass F5								97169															
244	Lockmass F6								44635															
245	Lockmass F7								25462															

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a	Approved: <i>E. Sabljic</i> --e-signature-- 16-Aug-2019
ALS Sample ID	H5-19-CCV-680	Extraction Date	n/a	
Analysis Method	EPA 1668C	Sample Size	1 n/a	
Analysis Type	CCV	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Run Information		Run 1
Filename	5-190814A23	
Run Date	15-Aug-19 03:24	
Final Volume	25	ul
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS5 SPBOCTYL65972-01A	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
PCB-001	50	8.88	100	75-125	
PCB-003	50	10.40	98	75-125	
PCB-004	50	10.56	91	75-125	
PCB-015	50	14.23	98	75-125	
PCB-019	50	12.55	95	75-125	
PCB-037	50	18.18	96	75-125	
PCB-054	50	14.42	93	75-125	
PCB-081	50	21.77	96	75-125	
PCB-077	50	22.07	98	75-125	
PCB-104	50	17.48	93	75-125	
PCB-123	50	23.08	92	75-125	
PCB-118	50	23.25	95	75-125	
PCB-114	50	23.55	93	75-125	
PCB-105	50	23.89	93	75-125	
PCB-126	50	25.48	94	75-125	
PCB-155	50	20.50	92	75-125	
PCB-167	50	26.40	89	75-125	
PCB-156/157	100	27.03	91	75-125	
PCB-169	50	28.68	94	75-125	
PCB-188	50	23.50	93	75-125	
PCB-189	50	29.97	97	75-125	
PCB-202	50	26.28	92	75-125	
PCB-205	50	31.38	88	75-125	
PCB-208	50	29.71	101	75-125	
PCB-206	50	32.45	98	75-125	
PCB-209	50	33.60	96	75-125	
Extraction Standards					
		Time	% Rec	Limits	
13C12-PCB-001	100	8.87	91	50-145	
13C12-PCB-003	100	10.40	92	50-145	
13C12-PCB-004	100	10.55	95	50-145	
13C12-PCB-015	100	14.22	88	50-145	
13C12-PCB-019	100	12.55	97	50-145	
13C12-PCB-037	100	18.17	101	50-145	
13C12-PCB-054	100	14.41	108	50-145	
13C12-PCB-081	100	21.76	100	50-145	
13C12-PCB-077	100	22.06	99	50-145	
13C12-PCB-104	100	17.48	110	50-145	
13C12-PCB-123	100	23.07	96	50-145	
13C12-PCB-118	100	23.23	98	50-145	
13C12-PCB-114	100	23.54	97	50-145	
13C12-PCB-105	100	23.88	99	50-145	
13C12-PCB-126	100	25.47	103	50-145	
13C12-PCB-155	100	20.48	105	50-145	
13C12-PCB-167	100	26.39	107	50-145	
13C12-PCB-156/157	200	27.02	104	50-145	
13C12-PCB-169	100	28.67	120	50-145	
13C12-PCB-188	100	23.49	93	50-145	
13C12-PCB-189	100	29.96	120	50-145	
13C12-PCB-202	100	26.27	103	50-145	
13C12-PCB-205	100	31.35	99	50-145	
13C12-PCB-208	100	29.70	82	50-145	
13C12-PCB-206	100	32.44	96	50-145	
13C12-PCB-209	100	33.58	107	50-145	
Field Spike Standards					
13C12-PCB-031	100	15.77	90	70-130	
13C12-PCB-095	100	19.08	90	70-130	
13C12-PCB-153	100	24.18	80	70-130	
Cleanup Standards					
13C12-PCB-028	100	15.94	98	65-135	
13C12-PCB-111	100	22.01	87	75-125	
13C12-PCB-178	100	25.06	90	75-125	

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a	Approved: <i>E. Sabljic</i> --e-signature-- 16-Aug-2019
ALS Sample ID	H5-19-CCV-680	Extraction Date	n/a	
Analysis Method	EPA 1668C	Sample Size	1 n/a	
Analysis Type	CCV	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Run Information		Run 1
Filename	5-190814A39	
Run Date	15-Aug-19 14:49	
Final Volume	25 ul	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRMS5 SPBOCTYL65972-01A	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
PCB-001	50	8.87	100	75-125	
PCB-003	50	10.41	95	75-125	
PCB-004	50	10.56	92	75-125	
PCB-015	50	14.25	97	75-125	
PCB-019	50	12.57	94	75-125	
PCB-037	50	18.20	95	75-125	
PCB-054	50	14.43	91	75-125	
PCB-081	50	21.78	95	75-125	
PCB-077	50	22.08	97	75-125	
PCB-104	50	17.49	91	75-125	
PCB-123	50	23.08	92	75-125	
PCB-118	50	23.26	92	75-125	
PCB-114	50	23.55	92	75-125	
PCB-105	50	23.90	93	75-125	
PCB-126	50	25.49	94	75-125	
PCB-155	50	20.50	92	75-125	
PCB-167	50	26.40	89	75-125	
PCB-156/157	100	27.03	92	75-125	
PCB-169	50	28.68	94	75-125	
PCB-188	50	23.50	91	75-125	
PCB-189	50	29.97	96	75-125	
PCB-202	50	26.28	92	75-125	
PCB-205	50	31.37	88	75-125	
PCB-208	50	29.71	101	75-125	
PCB-206	50	32.45	99	75-125	
PCB-209	50	33.60	95	75-125	
Extraction Standards					
		Time	% Rec	Limits	
13C12-PCB-001	100	8.85	88	50-145	
13C12-PCB-003	100	10.40	77	50-145	
13C12-PCB-004	100	10.55	96	50-145	
13C12-PCB-015	100	14.24	71	50-145	
13C12-PCB-019	100	12.55	100	50-145	
13C12-PCB-037	100	18.19	75	50-145	
13C12-PCB-054	100	14.41	107	50-145	
13C12-PCB-081	100	21.77	88	50-145	
13C12-PCB-077	100	22.07	84	50-145	
13C12-PCB-104	100	17.48	110	50-145	
13C12-PCB-123	100	23.07	100	50-145	
13C12-PCB-118	100	23.23	105	50-145	
13C12-PCB-114	100	23.54	102	50-145	
13C12-PCB-105	100	23.89	101	50-145	
13C12-PCB-126	100	25.48	102	50-145	
13C12-PCB-155	100	20.49	109	50-145	
13C12-PCB-167	100	26.39	101	50-145	
13C12-PCB-156/157	200	27.02	101	50-145	
13C12-PCB-169	100	28.68	112	50-145	
13C12-PCB-188	100	23.49	92	50-145	
13C12-PCB-189	100	29.96	132	50-145	
13C12-PCB-202	100	26.27	105	50-145	
13C12-PCB-205	100	31.35	100	50-145	
13C12-PCB-208	100	29.70	83	50-145	
13C12-PCB-206	100	32.44	101	50-145	
13C12-PCB-209	100	33.58	116	50-145	
Field Spike Standards					
13C12-PCB-031	100	15.78	101	70-130	
13C12-PCB-095	100	19.09	85	70-130	
13C12-PCB-153	100	24.18	82	70-130	
Cleanup Standards					
13C12-PCB-028	100	15.95	90	65-135	
13C12-PCB-111	100	22.01	89	75-125	
13C12-PCB-178	100	25.06	90	75-125	

SVOC DATA PACKAGE

SECTION 5: QC SAMPLE DATA

Including:

- Laboratory Method Blank Analysis Reports
- Laboratory Control Sample Analysis Reports
- Matrix Spike Analysis Reports
- Other QC Sample Analysis Reports (where applicable)

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-1	Extraction Date	12-Aug-19		
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	MEDIA	Split Ratio	2		
					Approved: E. Sabljic --e-signature-- 16-Aug-2019

Run Information	Run 1
Filename	5-190814A27
Run Date	15-Aug-19 06:23
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.85	<1.6	1.6	U	1.3	50
PCB-002		10.26	<2.1	1.6	M,J,R	2.1	50
PCB-003		NotFnd	<2.0	2.0	U		50
PCB-004		NotFnd	<12	12	U		50
PCB-010		NotFnd	<7.1	7.1	U		50
PCB-009		NotFnd	<7.1	7.1	U		50
PCB-007		NotFnd	<7.0	7.0	U		50
PCB-006		NotFnd	<7.0	7.0	U		50
PCB-005		NotFnd	<7.6	7.6	U		50
PCB-008		NotFnd	<6.5	6.5	U		50
PCB-014		NotFnd	<6.1	6.1	U		50
PCB-011		13.85	60.6	6.3			50
PCB-012/013		NotFnd	<6.1	6.1	U		50
PCB-015		NotFnd	<7.3	7.3	U		50
PCB-019		NotFnd	<3.9	3.9	U		50
PCB-018/030		13.66	<9.8	4.9	J,R	9.8	50
PCB-017		13.90	<5.8	5.8	M,U	4.6	50
PCB-027		NotFnd	<4.2	4.2	U		50
PCB-024		NotFnd	<4.4	4.4	U		50
PCB-016		NotFnd	<6.9	6.9	U		50
PCB-032		14.49	<3.9	3.9	M,U	3.6	50
PCB-034		NotFnd	<3.7	3.7	U		50
PCB-023		NotFnd	<3.7	3.7	U		50
PCB-026/029		NotFnd	<3.5	3.5	U		50
PCB-025		NotFnd	<3.5	3.5	U		50
PCB-031		15.77	<12	3.3	J,R	12	50
PCB-020/028		15.95	18.4	3.5	J		50
PCB-021/033		16.09	<8.8	3.7	J,R	8.8	50
PCB-022		16.31	<4.1	3.7	J,R	4.1	50
PCB-036		NotFnd	<3.1	3.1	U		50
PCB-039		NotFnd	<3.4	3.4	U		50
PCB-038		NotFnd	<3.6	3.6	U		50
PCB-035		NotFnd	<3.6	3.6	U		50
PCB-037		NotFnd	<4.5	4.5	U		50
PCB-054		NotFnd	<1.8	1.8	U		50
PCB-050/053		15.62	<2.8	2.8	U	1.0	50
PCB-045/051		16.03	<2.9	2.9	U	2.5	50
PCB-046		NotFnd	<3.3	3.3	U		50
PCB-052		16.94	15.2	2.8	J		50
PCB-073		NotFnd	<2.2	2.2	U		50
PCB-043		NotFnd	<3.4	3.4	U		50
PCB-049/069		17.20	<2.6	2.6	U	2.5	50
PCB-048		17.36	<2.9	2.9	U		50
PCB-044/047/065		NotFnd	<2.7	2.7	U		50
PCB-059/062/075		NotFnd	<2.1	2.1	U		50
PCB-042		NotFnd	<3.3	3.3	U		50
PCB-040/041/071		18.06	<3.9	2.9	M,J,R	3.9	50
PCB-064		18.18	4.04	2.3	J		50
PCB-072		NotFnd	<2.7	2.7	U		50
PCB-068		NotFnd	<2.6	2.6	U		50
PCB-057		NotFnd	<2.8	2.8	U		50
PCB-058		NotFnd	<2.8	2.8	U		50
PCB-067		NotFnd	<2.7	2.7	U		50
PCB-063		NotFnd	<2.5	2.5	U		50
PCB-061/070/074/076		19.54	<9.1	2.8	M,J,R	9.1	50
PCB-066		19.72	<3.0	2.6	J,R	3.0	50
PCB-055		NotFnd	<2.9	2.9	U		50
PCB-056		NotFnd	<2.9	2.9	U		50
PCB-060		NotFnd	<2.9	2.9	U		50
PCB-080		20.32	<2.4	2.4	U	0.93	50
PCB-079		NotFnd	<2.4	2.4	U		50
PCB-078		NotFnd	<2.8	2.8	U		50
PCB-081	0.0003	NotFnd	<3.1	3.1	U		50
PCB-077	0.0001	NotFnd	<3.4	3.4	U		50
PCB-104		NotFnd	<2.1	2.1	U		50
PCB-096		NotFnd	<2.0	2.0	U		50
PCB-103		NotFnd	<2.5	2.5	U		50
PCB-094		NotFnd	<3.0	3.0	U		50
PCB-095		19.08	13.8	2.6	J		50
PCB-093/098/100/102		NotFnd	<2.8	2.8	U		50

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name **Method Blank**
 ALS Sample ID WG3116369-1
 Analysis Method EPA 1668C
 Analysis Type Blank
 Sample Matrix MEDIA

Sampling Date n/a
 Extraction Date 12-Aug-19
 Sample Size 1 Blank
 Percent Moisture n/a
 Split Ratio 2

Approved:
E. Sabljic
 --e-signature--
 16-Aug-2019

Run Information **Run 1**
 Filename 5-190814A27
 Run Date 15-Aug-19 06:23
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		NotFnd	<2.8	2.8	U		50
PCB-084		NotFnd	<3.0	3.0	U		50
PCB-089		NotFnd	<2.9	2.9	U		50
PCB-121		NotFnd	<2.0	2.0	U		50
PCB-092		NotFnd	<2.7	2.7	U		50
PCB-090/101/113		20.62	<9.6	2.4	J,R	9.6	50
PCB-083/099		20.92	<2.8	2.8	M,U	1.3	50
PCB-112		NotFnd	<1.9	1.9	U		50
PCB-086/087/097/109/119/125		NotFnd	<2.4	2.4	U		50
PCB-085/110/115/116/117		21.68	<5.4	2.2	J,R	5.4	50
PCB-082		NotFnd	<3.2	3.2	U		50
PCB-111		NotFnd	<2.0	2.0	U		50
PCB-120		NotFnd	<1.9	1.9	U		50
PCB-108/124		NotFnd	<2.0	2.0	U		50
PCB-107		NotFnd	<1.9	1.9	U		50
PCB-123	0.00003	NotFnd	<2.4	2.4	U		50
PCB-106		NotFnd	<2.1	2.1	U		50
PCB-118	0.00003	23.23	<3.8	2.2	M,J,R	3.8	50
PCB-122		NotFnd	<2.2	2.2	U		50
PCB-114	0.00003	NotFnd	<2.3	2.3	U		50
PCB-105	0.00003	NotFnd	<2.2	2.2	U		50
PCB-127		NotFnd	<1.9	1.9	U		50
PCB-126	0.1	NotFnd	<2.3	2.3	U		50
PCB-155		NotFnd	<1.6	1.6	U		50
PCB-152		NotFnd	<1.6	1.6	U		50
PCB-150		NotFnd	<1.6	1.6	U		50
PCB-136		NotFnd	<1.6	1.6	U		50
PCB-145		NotFnd	<1.7	1.7	U		50
PCB-148		NotFnd	<2.2	2.2	U		50
PCB-135/151		22.16	<2.2	2.2	U	0.97	50
PCB-154		NotFnd	<1.9	1.9	U		50
PCB-144		NotFnd	<2.1	2.1	U		50
PCB-147/149		22.63	<2.3	2.0	J,R	2.3	50
PCB-134/143		NotFnd	<2.4	2.4	U		50
PCB-139/140		NotFnd	<2.0	2.0	U		50
PCB-131		NotFnd	<2.7	2.7	U		50
PCB-142		NotFnd	<2.4	2.4	U		50
PCB-132		NotFnd	<2.4	2.4	U		50
PCB-133		NotFnd	<2.2	2.2	U		50
PCB-165		NotFnd	<1.8	1.8	U		50
PCB-146		NotFnd	<2.0	2.0	U		50
PCB-161		NotFnd	<1.6	1.6	U		50
PCB-153/168		24.18	4.04	1.7	M,J		50
PCB-141		NotFnd	<2.1	2.1	U		50
PCB-130		NotFnd	<2.4	2.4	U		50
PCB-137/164		NotFnd	<1.8	1.8	U		50
PCB-129/138/163		24.85	<3.5	2.1	J,R	3.5	50
PCB-160		NotFnd	<1.8	1.8	U		50
PCB-158		NotFnd	<1.4	1.4	U		50
PCB-128/166		NotFnd	<1.8	1.8	U		50
PCB-159		NotFnd	<1.5	1.5	U		50
PCB-162		NotFnd	<1.6	1.6	U		50
PCB-167	0.00003	NotFnd	<1.4	1.4	U		50
PCB-156/157	0.00003	NotFnd	<2.0	2.0	U		100
PCB-169	0.03	NotFnd	<1.5	1.5	U		50
PCB-188		NotFnd	<1.9	1.9	U		50
PCB-179		NotFnd	<1.8	1.8	U		50
PCB-184		NotFnd	<1.7	1.7	U		50
PCB-176		NotFnd	<1.8	1.8	U		50
PCB-186		NotFnd	<1.9	1.9	U		50
PCB-178		NotFnd	<2.4	2.4	U		50
PCB-175		NotFnd	<2.3	2.3	U		50
PCB-187		NotFnd	<2.2	2.2	U		50
PCB-182		NotFnd	<2.2	2.2	U		50
PCB-183		NotFnd	<2.2	2.2	U		50
PCB-185		NotFnd	<2.4	2.4	U		50
PCB-174		NotFnd	<2.3	2.3	U		50
PCB-177		NotFnd	<2.4	2.4	U		50
PCB-181		NotFnd	<2.3	2.3	U		50
PCB-171/173		NotFnd	<2.4	2.4	U		50
PCB-172		NotFnd	<2.3	2.3	U		50

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-1	Extraction Date	12-Aug-19		
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	MEDIA	Split Ratio	2		
					Approved: E. Sabljic --e-signature-- 16-Aug-2019

Run Information	Run 1
Filename	5-190814A27
Run Date	15-Aug-19 06:23
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<1.9	1.9	U		50
PCB-180/193		NotFnd	<2.0	2.0	U		50
PCB-191		NotFnd	<1.7	1.7	U		50
PCB-170		NotFnd	<2.4	2.4	U		50
PCB-190		NotFnd	<1.5	1.5	U		50
PCB-189	0.00003	NotFnd	<2.2	2.2	U		50
PCB-202		NotFnd	<1.8	1.8	U		50
PCB-201		NotFnd	<1.7	1.7	U		50
PCB-204		NotFnd	<1.7	1.7	U		50
PCB-197		NotFnd	<1.6	1.6	U		50
PCB-200		NotFnd	<1.7	1.7	U		50
PCB-198/199		NotFnd	<2.2	2.2	U		50
PCB-196		NotFnd	<2.1	2.1	U		50
PCB-203		NotFnd	<1.9	1.9	U		50
PCB-195		NotFnd	<2.2	2.2	U		50
PCB-194		NotFnd	<2.0	2.0	U		50
PCB-205		NotFnd	<1.7	1.7	U		50
PCB-208		29.70	<20	3.7	J,R	20	50
PCB-207		30.18	22.7	3.5	J		50
PCB-206		NotFnd	<5.9	5.9	U		50
PCB-209		33.58	30.4	3.4	J		50

Extraction Standards	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.84	50	5-145
13C12-PCB-003	4000	10.38	50	5-145
13C12-PCB-004	4000	10.54	54	5-145
13C12-PCB-015	4000	14.21	54	5-145
13C12-PCB-019	4000	12.54	53	5-145
13C12-PCB-037	4000	18.17	74	5-145
13C12-PCB-054	4000	14.40	67	5-145
13C12-PCB-081	4000	21.75	85	10-145
13C12-PCB-077	4000	22.06	86	10-145
13C12-PCB-104	4000	17.47	77	10-145
13C12-PCB-123	4000	23.05	85	10-145
13C12-PCB-118	4000	23.22	90	10-145
13C12-PCB-114	4000	23.52	89	10-145
13C12-PCB-105	4000	23.86	92	10-145
13C12-PCB-126	4000	25.46	100	10-145
13C12-PCB-155	4000	20.47	83	10-145
13C12-PCB-167	4000	26.38	96	10-145
13C12-PCB-156/157	8000	27.00	97	10-145
13C12-PCB-169	4000	28.66	116	10-145
13C12-PCB-188	4000	23.48	82	10-145
13C12-PCB-189	4000	29.95	114	10-145
13C12-PCB-202	4000	26.26	91	10-145
13C12-PCB-205	4000	31.34	101	10-145
13C12-PCB-208	4000	29.69	84	10-145
13C12-PCB-206	4000	32.43	98	10-145
13C12-PCB-209	4000	33.56	108	10-145

Field Spike Standards	pg	Time	% Rec	Limits
13C12-PCB-031	0			NS
13C12-PCB-095	0			NS
13C12-PCB-153	0			NS

Cleanup Standards	pg	Time	% Rec	Limits
13C12-PCB-028	4000	15.93	65	5-145
13C12-PCB-111	4000	21.99	71	10-145
13C12-PCB-178	4000	25.05	76	10-145

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-1	Extraction Date	12-Aug-19		Approved: <i>E. Sabljic</i> --e-signature-- 16-Aug-2019
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	MEDIA	Split Ratio	2		

Run Information	Run 1
Filename	5-190814A27
Run Date	15-Aug-19 06:23
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			2.10	1.6	J		200
Total DiCB			60.6	6.1	J		400
Total TriCB			53.1	3.1	J		400
Total TetraCB			35.2	1.8	J		800
Total PentaCB			32.6	1.9	J		800
Total HexaCB			9.84	1.4	J		800
Total HeptaCB			<1.5	1.5	U		400
Total OctaCB			<1.6	1.6	U		400
Total NonaCB			42.7	3.5	J		200
Total DecaCB			30.4	3.4	J		200
Total PCB			267		J		1600
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.00				
Mid Point PCB TEQ			0.138				
Upper Bound PCB TEQ			0.277				

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that the analyte was positively identified. The associated numerical result is an estimate.
R	Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a	
ALS Sample ID	WG3116369-4	Extraction Date	12-Aug-19	
Analysis Method	EPA 1668C	Sample Size	1	Blank
Analysis Type	Blank	Percent Moisture	n/a	
Sample Matrix	REAGENT	Split Ratio	2	

Approved:
E. Sabljic
--e-signature--
16-Aug-2019

Run Information	Run 1
Filename	5-190815A03
Run Date	15-Aug-19 17:20
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.88	<3.4	3.4	U	2.5	50
PCB-002		NotFnd	<3.5	3.5	U		50
PCB-003		NotFnd	<4.6	4.6	U		50
PCB-004		NotFnd	<52	52	U		50
PCB-010		NotFnd	<34	34	U		50
PCB-009		NotFnd	<34	34	U		50
PCB-007		NotFnd	<35	35	U		50
PCB-006		NotFnd	<35	35	U		50
PCB-005		NotFnd	<42	42	U		50
PCB-008		NotFnd	<29	29	U		50
PCB-014		NotFnd	<17	17	U		50
PCB-011		13.88	<35	18	M,J,R	35	50
PCB-012/013		NotFnd	<17	17	U		50
PCB-015		NotFnd	<22	22	U		50
PCB-019		NotFnd	<11	11	U		50
PCB-018/030		NotFnd	<9.1	9.1	U		50
PCB-017		NotFnd	<11	11	U		50
PCB-027		NotFnd	<7.7	7.7	U		50
PCB-024		NotFnd	<8.1	8.1	U		50
PCB-016		NotFnd	<12	12	U		50
PCB-032		NotFnd	<7.3	7.3	U		50
PCB-034		NotFnd	<7.6	7.6	U		50
PCB-023		NotFnd	<7.6	7.6	U		50
PCB-026/029		NotFnd	<7.3	7.3	U		50
PCB-025		NotFnd	<7.2	7.2	U		50
PCB-031		15.81	<9.3	6.9	M,J,R	9.3	50
PCB-020/028		15.97	10.3	7.3	J		50
PCB-021/033		16.11	<7.5	7.5	M,U	6.5	50
PCB-022		NotFnd	<7.6	7.6	U		50
PCB-036		NotFnd	<6.6	6.6	U		50
PCB-039		NotFnd	<7.2	7.2	U		50
PCB-038		NotFnd	<7.5	7.5	U		50
PCB-035		NotFnd	<7.5	7.5	U		50
PCB-037		NotFnd	<10	10	U		50
PCB-054		NotFnd	<6.4	6.4	U		50
PCB-050/053		NotFnd	<6.5	6.5	U		50
PCB-045/051		NotFnd	<6.8	6.8	U		50
PCB-046		NotFnd	<7.6	7.6	U		50
PCB-052		16.97	<13	6.4	J,R	13	50
PCB-073		NotFnd	<5.1	5.1	U		50
PCB-043		NotFnd	<8.2	8.2	U		50
PCB-049/069		NotFnd	<6.0	6.0	U		50
PCB-048		NotFnd	<6.7	6.7	U		50
PCB-044/047/065		17.56	15.5	6.2	J		50
PCB-059/062/075		NotFnd	<4.9	4.9	U		50
PCB-042		NotFnd	<7.8	7.8	U		50
PCB-040/041/071		NotFnd	<6.7	6.7	U		50
PCB-064		NotFnd	<5.3	5.3	U		50
PCB-072		NotFnd	<5.8	5.8	U		50
PCB-068		NotFnd	<5.7	5.7	U		50
PCB-057		NotFnd	<6.2	6.2	U		50
PCB-058		NotFnd	<6.1	6.1	U		50
PCB-067		NotFnd	<5.9	5.9	U		50
PCB-063		NotFnd	<5.4	5.4	U		50
PCB-061/070/074/076		19.58	<6.2	6.2	M,U	5.3	50
PCB-066		NotFnd	<5.9	5.9	U		50
PCB-055		NotFnd	<6.5	6.5	U		50
PCB-056		NotFnd	<6.4	6.4	U		50
PCB-060		NotFnd	<6.4	6.4	U		50
PCB-080		NotFnd	<5.4	5.4	U		50
PCB-079		NotFnd	<5.3	5.3	U		50
PCB-078		NotFnd	<6.3	6.3	U		50
PCB-081	0.0003	NotFnd	<7.1	7.1	U		50
PCB-077	0.0001	NotFnd	<8.1	8.1	U		50
PCB-104		NotFnd	<6.0	6.0	U		50
PCB-096		NotFnd	<6.4	6.4	U		50
PCB-103		NotFnd	<7.7	7.7	U		50
PCB-094		NotFnd	<9.5	9.5	U		50
PCB-095		NotFnd	<8.1	8.1	U		50
PCB-093/098/100/102		NotFnd	<8.8	8.8	U		50

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-4	Extraction Date	12-Aug-19		
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	REAGENT	Split Ratio	2		
					Approved: E. Sabljic --e-signature-- 16-Aug-2019

Run Information	Run 1
Filename	5-190815A03
Run Date	15-Aug-19 17:20
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPB0CTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		NotFnd	<8.7	8.7	U		50
PCB-084		NotFnd	<9.6	9.6	U		50
PCB-089		NotFnd	<9.5	9.5	U		50
PCB-121		NotFnd	<6.4	6.4	U		50
PCB-092		NotFnd	<8.8	8.8	U		50
PCB-090/101/113		NotFnd	<7.4	7.4	U		50
PCB-083/099		NotFnd	<8.6	8.6	U		50
PCB-112		NotFnd	<6.3	6.3	U		50
PCB-086/087/097/109/119/125		NotFnd	<7.6	7.6	U		50
PCB-085/110/115/116/117		NotFnd	<6.9	6.9	U		50
PCB-082		NotFnd	<10	10	U		50
PCB-111		NotFnd	<6.3	6.3	U		50
PCB-120		NotFnd	<6.2	6.2	U		50
PCB-108/124		NotFnd	<6.8	6.8	U		50
PCB-107		NotFnd	<6.4	6.4	U		50
PCB-123	0.00003	NotFnd	<8.1	8.1	U		50
PCB-106		NotFnd	<7.0	7.0	U		50
PCB-118	0.00003	NotFnd	<7.6	7.6	U		50
PCB-122		NotFnd	<7.4	7.4	U		50
PCB-114	0.00003	NotFnd	<8.0	8.0	U		50
PCB-105	0.00003	NotFnd	<7.9	7.9	U		50
PCB-127		NotFnd	<6.3	6.3	U		50
PCB-126	0.1	NotFnd	<9.5	9.5	U		50
PCB-155		NotFnd	<2.5	2.5	U		50
PCB-152		NotFnd	<2.8	2.8	U		50
PCB-150		NotFnd	<2.9	2.9	U		50
PCB-136		NotFnd	<2.9	2.9	U		50
PCB-145		NotFnd	<3.2	3.2	U		50
PCB-148		NotFnd	<3.9	3.9	U		50
PCB-135/151		NotFnd	<4.1	4.1	U		50
PCB-154		NotFnd	<3.5	3.5	U		50
PCB-144		NotFnd	<4.0	4.0	U		50
PCB-147/149		22.67	6.09	4.1	M,J		50
PCB-134/143		NotFnd	<5.0	5.0	U		50
PCB-139/140		NotFnd	<4.1	4.1	U		50
PCB-131		NotFnd	<5.5	5.5	U		50
PCB-142		NotFnd	<4.9	4.9	U		50
PCB-132		NotFnd	<5.0	5.0	U		50
PCB-133		NotFnd	<4.5	4.5	U		50
PCB-165		NotFnd	<3.5	3.5	U		50
PCB-146		NotFnd	<4.0	4.0	U		50
PCB-161		NotFnd	<3.1	3.1	U		50
PCB-153/168		24.21	<3.4	3.4	U	2.9	50
PCB-141		NotFnd	<4.3	4.3	U		50
PCB-130		NotFnd	<4.7	4.7	U		50
PCB-137/164		NotFnd	<3.7	3.7	U		50
PCB-129/138/163		24.88	4.85	4.2	J		50
PCB-160		NotFnd	<3.3	3.3	U		50
PCB-158		NotFnd	<2.8	2.8	U		50
PCB-128/166		NotFnd	<3.7	3.7	U		50
PCB-159		NotFnd	<3.0	3.0	U		50
PCB-162		NotFnd	<3.2	3.2	U		50
PCB-167	0.00003	NotFnd	<2.8	2.8	U		50
PCB-156/157	0.00003	NotFnd	<3.9	3.9	U	100	
PCB-169	0.03	NotFnd	<3.4	3.4	U		50
PCB-188		NotFnd	<3.5	3.5	U		50
PCB-179		NotFnd	<3.8	3.8	U		50
PCB-184		NotFnd	<3.6	3.6	U		50
PCB-176		NotFnd	<3.8	3.8	U		50
PCB-186		NotFnd	<4.0	4.0	U		50
PCB-178		NotFnd	<5.0	5.0	U		50
PCB-175		NotFnd	<4.9	4.9	U		50
PCB-187		NotFnd	<4.5	4.5	U		50
PCB-182		NotFnd	<4.8	4.8	U		50
PCB-183		NotFnd	<4.6	4.6	U		50
PCB-185		NotFnd	<5.1	5.1	U		50
PCB-174		NotFnd	<4.8	4.8	U		50
PCB-177		NotFnd	<5.1	5.1	U		50
PCB-181		NotFnd	<4.8	4.8	U		50
PCB-171/173		NotFnd	<5.1	5.1	U		50
PCB-172		NotFnd	<4.8	4.8	U		50

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-4	Extraction Date	12-Aug-19		
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	REAGENT	Split Ratio	2		
					Approved: E. Sabljic --e-signature-- 16-Aug-2019

Run Information	Run 1
Filename	5-190815A03
Run Date	15-Aug-19 17:20
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPB0CTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<3.9	3.9	U		50
PCB-180/193		NotFnd	<4.1	4.1	U		50
PCB-191		NotFnd	<3.5	3.5	U		50
PCB-170		NotFnd	<4.9	4.9	U		50
PCB-190		NotFnd	<3.0	3.0	U		50
PCB-189	0.00003	NotFnd	<4.0	4.0	U		50
PCB-202		NotFnd	<4.0	4.0	U		50
PCB-201		NotFnd	<4.2	4.2	U		50
PCB-204		NotFnd	<4.3	4.3	U		50
PCB-197		NotFnd	<4.1	4.1	U		50
PCB-200		NotFnd	<4.2	4.2	U		50
PCB-198/199		NotFnd	<5.3	5.3	U		50
PCB-196		NotFnd	<5.1	5.1	U		50
PCB-203		NotFnd	<4.8	4.8	U		50
PCB-195		NotFnd	<4.2	4.2	U		50
PCB-194		NotFnd	<3.8	3.8	U		50
PCB-205		NotFnd	<3.7	3.7	U		50
PCB-208		29.74	<34	9.0	J,R	34	50
PCB-207		30.21	<25	8.8	J,R	25	50
PCB-206		NotFnd	<15	15	U		50
PCB-209		33.63	25.7	5.2	J		50

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.87	43	5-145
13C12-PCB-003	4000	10.41	40	5-145
13C12-PCB-004	4000	10.56	46	5-145
13C12-PCB-015	4000	14.25	44	5-145
13C12-PCB-019	4000	12.57	47	5-145
13C12-PCB-037	4000	18.21	50	5-145
13C12-PCB-054	4000	14.43	51	5-145
13C12-PCB-081	4000	21.79	60	10-145
13C12-PCB-077	4000	22.09	59	10-145
13C12-PCB-104	4000	17.49	60	10-145
13C12-PCB-123	4000	23.09	64	10-145
13C12-PCB-118	4000	23.26	67	10-145
13C12-PCB-114	4000	23.56	66	10-145
13C12-PCB-105	4000	23.91	67	10-145
13C12-PCB-126	4000	25.49	68	10-145
13C12-PCB-155	4000	20.51	65	10-145
13C12-PCB-167	4000	26.41	71	10-145
13C12-PCB-156/157	8000	27.04	69	10-145
13C12-PCB-169	4000	28.70	78	10-145
13C12-PCB-188	4000	23.50	65	10-145
13C12-PCB-189	4000	29.99	75	10-145
13C12-PCB-202	4000	26.28	68	10-145
13C12-PCB-205	4000	31.38	79	10-145
13C12-PCB-208	4000	29.71	68	10-145
13C12-PCB-206	4000	32.46	75	10-145
13C12-PCB-209	4000	33.60	85	10-145

Field Spike Standards

13C12-PCB-031	0	NS
13C12-PCB-095	0	NS
13C12-PCB-153	0	NS

Cleanup Standards

13C12-PCB-028	4000	15.97	51	5-145
13C12-PCB-111	4000	22.03	56	10-145
13C12-PCB-178	4000	25.08	62	10-145

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3116369-4	Extraction Date	12-Aug-19		Approved: <i>E. Sabljic</i> --e-signature-- 16-Aug-2019
Analysis Method	EPA 1668C	Sample Size	1	Blank	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	REAGENT	Split Ratio	2		

Run Information	Run 1
Filename	5-190815A03
Run Date	15-Aug-19 17:20
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL65972-01A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			<3.4	3.4	U		200
Total DiCB			35.0	17	J		400
Total TriCB			19.6	6.6	J		400
Total TetraCB			28.5	4.9	J		800
Total PentaCB			<6.0	6.0	U		800
Total HexaCB			10.9	2.5	J		800
Total HeptaCB			<3.0	3.0	U		400
Total OctaCB			<3.7	3.7	U		400
Total NonaCB			59.0	8.8	J		200
Total DecaCB			25.7	5.2	J		200
Total PCB			179		J		1600
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.00				
Mid Point PCB TEQ			0.528				
Upper Bound PCB TEQ			1.06				

EDL Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.

TEF Indicates the Toxic Equivalency Factor

LQL Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.

M Indicates that a peak has been manually integrated.

U Indicates that this compound was not detected above the EDL.

J indicates that the analyte was positively identified. The associated numerical result is an estimate.

R Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

EMPC Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

NS Indicates that this standard has not been added

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	Laboratory Control Sample	Sampling Date	n/a	
ALS Sample ID	WG3116369-2	Extraction Date	12-Aug-19	
Analysis Method	EPA 1668C	Sample Size	1	n/a
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Approved:
E. Sabljic
--e-signature--
16-Aug-2019

Run Information		Run 1
Filename	5-190814A25	
Run Date	15-Aug-19 04:59	
Final Volume	25 ul	
Dilution Factor	1	
Analysis Units	% Rec	
Instrument - Column	HRMSS SPBOCTYL65972-01A	

Target Analytes	pg	Ret. Time	% Rec	Limits	Flags
PCB-001	2000	8.85	107	60-135	
PCB-003	2000	10.40	104	60-135	
PCB-004	2000	10.55	99	60-135	
PCB-015	2000	14.23	104	60-135	
PCB-019	2000	12.55	108	60-135	
PCB-037	2000	18.19	101	60-135	
PCB-054	2000	14.42	101	60-135	
PCB-081	2000	21.77	98	60-135	
PCB-077	2000	22.07	100	60-135	
PCB-104	2000	17.48	88	60-135	
PCB-123	2000	23.07	96	60-135	
PCB-118	2000	23.25	96	60-135	
PCB-114	2000	23.54	96	60-135	
PCB-105	2000	23.89	95	60-135	
PCB-126	2000	25.48	93	60-135	
PCB-155	2000	20.49	92	60-135	
PCB-167	2000	26.39	93	60-135	
PCB-156/157	4000	27.02	93	60-135	
PCB-169	2000	28.68	95	60-135	
PCB-188	2000	23.49	93	60-135	
PCB-189	2000	29.96	102	60-135	
PCB-202	2000	26.27	98	60-135	
PCB-205	2000	31.37	89	60-135	
PCB-208	2000	29.70	104	60-135	
PCB-206	2000	32.45	100	60-135	
PCB-209	2000	33.59	112	60-135	

Extraction Standards	pg	Time	% Rec	Limits	Flags
13C12-PCB-001	4000	8.84	32	15-145	
13C12-PCB-003	4000	10.38	31	15-145	
13C12-PCB-004	4000	10.54	34	15-145	
13C12-PCB-015	4000	14.22	36	15-145	
13C12-PCB-019	4000	12.54	35	15-145	
13C12-PCB-037	4000	18.17	54	15-145	
13C12-PCB-054	4000	14.40	43	15-145	
13C12-PCB-081	4000	21.76	63	40-145	
13C12-PCB-077	4000	22.06	64	40-145	
13C12-PCB-104	4000	17.47	54	40-145	
13C12-PCB-123	4000	23.05	66	40-145	
13C12-PCB-118	4000	23.23	69	40-145	
13C12-PCB-114	4000	23.52	69	40-145	
13C12-PCB-105	4000	23.88	69	40-145	
13C12-PCB-126	4000	25.47	76	40-145	
13C12-PCB-155	4000	20.48	63	40-145	
13C12-PCB-167	4000	26.38	73	40-145	
13C12-PCB-156/157	8000	27.01	73	40-145	
13C12-PCB-169	4000	28.67	86	40-145	R
13C12-PCB-188	4000	23.48	62	40-145	
13C12-PCB-189	4000	29.95	86	40-145	
13C12-PCB-202	4000	26.26	70	40-145	
13C12-PCB-205	4000	31.35	78	40-145	
13C12-PCB-208	4000	29.69	66	40-145	
13C12-PCB-206	4000	32.43	74	40-145	
13C12-PCB-209	4000	33.58	84	40-145	

Field Spike Standards	pg	Time	% Rec	Limits	Flags
13C12-PCB-031	0			NS	
13C12-PCB-095	0			NS	
13C12-PCB-153	0			NS	

Cleanup Standards	pg	Time	% Rec	Limits	Flags
13C12-PCB-028	4000	15.94	46	15-145	
13C12-PCB-111	4000	22.00	53	40-145	
13C12-PCB-178	4000	25.05	57	40-145	

R Indicates that the ion abundance ratio for this analyte did not meet the control limit. The reported value represents an estimated concentration.

NS Indicates that this standard has not been added



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SVOC DATA PACKAGE

SECTION 6: INTERNAL RECORDS

Including:

- Prep Logs
- Independent calculation checks
- Others as listed below:

14

Extraction Workup Sheet

Batch ID: WG3116369

Analysis: PUF5 - M23/1668A (HR)

WG3116369

Prep Procedure: BU-TM-1110 Overall HR Prep, BU-TP-1101 8270D Prep, BU-TP-2100 PAH Prep Method

Analyst: Jackson Peagy

Date: 12-Aug-19

SUBSAMPLING

Sample I.D.	Client I.D.	Media Prep L#
WG3116369-1	Method Blank	L2294735-7
WG3116369-2	Laboratory Control Sample	L2294735-8
WG3116369-3	Extraction and Injection STD.	—
WG3116369-4	Method Blank(Reagent)	Empty Phial
L2320141-1	HEISER-20190719-0725	L2294008-1
L2320141-2	CITY-20190719-0725	L2309008-2
L2320141-3	RESIDENTIAL-20190719-0725	L2309008-9

BATCH TRACKING

	Date/Time/Initials
Client Labels Checked:	12-Aug-19 2:00 PM JP
Media transfer to soxhlet:	JP
	—
	—
	—
Soxhlet Start Time:	JAZ 12-AUG-19 2:45 PM
Soxhlets Reflux Properly:	JAZ
Soxhlet End Time:	13-Aug-19 9:30 AM EF
	—
	—
	—
Rotovap Reduction + verify temp:	13-Aug-19 AR

JP 12-Aug-19 Extract split:	13-Aug-19 AR
Acid Silica Column:	13-AUG-2019 C111
Solvent exchange:	14-AUG-2019 1600 BS
Alumina Column:	14-AUG-2019 1630 BS
CONDOR COLUMN	15-AUG-19 1500 BS
DX MICRO VIAL	15-AUG-19 1930 BS
Micro/Robo Vial:	14-AUG-2019 1930 BS
Update to LIMS:	14-AUG-19 2:00 BS

* see comments
13-Aug-19 AR

Batch ID:	WG3116369
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Batch ID: WG3116369

DX Native Standard:

(Checkmark) Spiked

Sample I.D.	Volume (ul)	Spiked
WG3116369-2	40	✓
WG3116369-3	40	✓

PCB Native Standard:

(Checkmark) Spiked

Sample I.D.	Volume (ul)	Spiked
WG3116369-2	40	✓
WG3116369-3	40	✓

DX Cleanup Standard:

(Checkmark) Spiked

Sample I.D.	Volume (ul)	Spiked
WG3116369-1	20	✓
WG3116369-2	20	✓
WG3116369-3	N/A	N/A
WG3116369-4	20	✓
L2310263-1	20	✓
L2310263-2	20	✓
L2310263-3	20	✓
L2316030-1	20	✓
L2316030-2	20	✓
L2316030-3	20	✓
L2320141-1	20	✓
L2320141-2	20	✓
L2320141-3	20	✓
L2322808-1	20	✓
L2322808-2	20	✓
L2322808-3	20	✓

PCB Cleanup Standard:

(Checkmark) Spiked

Sample I.D.	Volume (ul)	Spiked
WG3116369-1	20	✓
WG3116369-2	20	✓
WG3116369-3	N/A	N/A
WG3116369-4	20	✓
L2310263-1	20	✓
L2310263-2	20	✓
L2310263-3	20	✓
L2316030-1	20	✓
L2316030-2	20	✓
L2316030-3	20	✓
L2320141-1	20	✓
L2320141-2	20	✓
L2320141-3	20	✓
L2322808-1	20	✓
L2322808-2	20	✓
L2322808-3	20	✓

Syringe ID: 322

Standard: 1613B-NS#3-023E

Date & Initials: 12-Aug-2019 JAZ

Syringe ID: 323

Standard: 1668A-NS#1-36C

Date & Initials: 12-Aug-2019 JAZ

Syringe ID: 357

Standard: M23-CL#1-033B

Date & Initials: 13-AUG-2019 CM

Correct Syringe Obtained: CM

Correct Standard Obtained: CM

Correct Technique Followed: CM

JP 12-Aug-19

Syringe ID: 378

Standard: 1668A-CL#2-32J

Date & Initials: 13-AUG-2019 CM

Correct Syringe Obtained: CM

Correct Standard Obtained: CM

Correct Technique Followed: CM

JP 12-Aug-19

Batch ID: WG3116369

DX Injection Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3116369-1	10	✓
WG3116369-2	10	✓
WG3116369-3	10	✓
WG3116369-4	10	✓
L2310263-1	10	✓
L2310263-2	10	✓
L2310263-3	10	✓
L2316030-1	10	✓
L2316030-2	10	✓
L2316030-3	10	✓
L2320141-1	10	✓
L2320141-2	10	✓
L2320141-3	10	✓
L2322808-1	10	✓
L2322808-2	10	✓
L2322808-3	10	✓

Syringe ID:

335

Standard:

1613B-IS#1- 0765

Date & Initials:

15-AUG-2019 JB

Correct Syringe Obtained:

JB
Chemist's Initials

Correct Standard Obtained:

JB
Chemist's Initials

Correct Technique Followed:

JB
Chemist's Initials

JP
12-Aug-19

PCB Injection Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3116369-1	5	✓
WG3116369-2	5	✓
WG3116369-3	5	✓
WG3116369-4	5	✓
L2310263-1	5	✓
L2310263-2	5	✓
L2310263-3	5	✓
L2316030-1	5	✓
L2316030-2	5	✓
L2316030-3	5	✓
L2320141-1	5	✓
L2320141-2	5	✓
L2320141-3	5	✓
L2322808-1	5	✓
L2322808-2	5	✓
L2322808-3	5	✓

Syringe ID:

260

Standard:

1668A-IS#2- 0114

Date & Initials:

14-AUG-2019 JB

Correct Syringe Obtained:

JB
Chemist's Initials

Correct Standard Obtained:

JB
Chemist's Initials

Correct Technique Followed:

JB
Chemist's Initials

JP
12-Aug-19

Batch ID:	WG3116369
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Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	104436	
Hexane	104314	
DCM	104596	
Toluene	104369	
Nonane	ORG-WAKONON- 648	
1:1 DCM:HEX	ORG-DH2- 229	
Sodium Sulphate	ORG-SSU- 2116	
Acid Silica	ORG-ASI- 8760	
Neutral Silica	ORG-NSI- 1039	
Alumina	ORG-ALU- 437	
1% Deactivated Silica	ORG-2%DAS- -	
Chromacarb	ORG-CC- 241	

Batch ID: WG3116369

Procedure:

This batchsheet is a guideline only. Please see test procedure for complete set of instructions.

Extraction:

- For MB and LCS you **must** use blank media - if not available see your Team Lead
- Place the PUF in to a pre-cleaned thimble and transfer to the Soxhlet body.
- Spike with Extraction Standard (plus Native for LCS and ENI).
- Soxhlet extract in DCM for 16 hours (check with team lead or supervisor)

Rotovap:

- Rotovap and reduce to ~5mL.
- Transfer to a calibrated c-tube (marked at 1ml, 2ml) with 3x2ml hexane
- Mix well then quantitatively spilt the extract **1/2 DX/PCB 1/2 Archive**

Batch ID: WG3116369

DX/PCB:

- Perform Acid Silica column
- Solvent Exchange (reduce to **~50ul**, bulk back up to 1ml Hexane, vortex well.
- Perform Alumina Column:
 - Pre-elute the Alumina Column with 7ml Hexane
 - Place F1 c-tube under the column, then load the sample with 3x1ml Hexane rinses
 - F1 (Archive) 1mL Hexane
 - F2 (DX/PCB) 14mL 1:1 DCM:Hexane
- Split Alumina F2 **1/2 PCB 1/2 DX**

Micro-Vial:

PCB:

- Blow down to ~1/2ml
- Vortex **very** well.
- Transfer every last drop to a micro-vial (Marked at 20uL with nonane).
- Blow down to the line
- Spike PCB Injection Standard. cap and vortex. **FV=25ul**

DX:

- Solvent Exchange to Hexane (Reduce to Just Dry then bulk back up to 1ml Hexane)

- ChromaCarb: - 4cm of well-packed chroma-carb.

- Pre-elute Carbon with 5ml Hexane

- Transfer with 3x1ml Hexane

- F1 = **10ml** 1:1 DCM:Hexane (Archive)

- After dripping has stopped Invert Column.

- F2 = 14ml Toluene (DX and PCB)

- After the column has stopped dripping reduce the **F2** portion down to ~1/2ml.

- Vortex well, then transfer to a micro-vial without rinses.

- Blow the micro-vial down to just-dry.

- Spike with Injection Standard, Cap the micro-vial, and Vortex. **FV=10ul**

Batch ID: WG3116369

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns

LZ322808-2 sample has not arrived yet JP 12-Aug-19
* flask contained ~5ml water after extraction, water was removed with
pipette. 13-Aug-19 BR

Approval of Deviation from Standard Method

Procedure does deviate from Standard Method.

(Batch Writer): _____

Approved (Supervisor/Manager): _____

. made new W3 revid not locate original. W3 b
spike only w DX IS. KB 15-Aug-19

WG3116369		Prep Analyst:			
PUFS - M23/1668A (HR)		Date:			
	Very Good	Meets Method Req	Some Outliers	Very Poor	Comments / Was spl/batch sent for rework? Why?
MB					
LCS					
DUP					
ES rec					

ALS Life Sciences

Sample Calculation Report

CS3 RRF Check

Approved:	<i>E. Sabljic</i> --e-signature-- 16-Aug-2019
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$$\text{RRF} = \frac{\text{Response of PCB-118}}{\text{Response of 13C12-PCB-118}} \times \frac{\text{Concentration of 13C12-PCB-118}}{\text{Concentration of PCB-118}}$$

$$\text{RRF} = \frac{1330559.20}{2340165.90} \times \frac{100}{50} = 1.14$$

Calculated Value	Value from TargetLynx
------------------	-----------------------

1.14	1.14
------	------

Calculation of PCB-118 amount in L2316030-1

$$\text{pg} = \frac{\text{Response of PCB-118}}{\text{Response of 13C12-PCB-118}} \times \frac{\text{pg of 13C12-PCB-118 spiked}}{\text{Mean RRF} * \text{Sample Size}}$$

$$\text{pg} = \frac{6452}{759194.3} \times \frac{4000}{1.15 * 1.00} = 29.5$$

Calculation of 13C12-PCB-118 Recovery in L2316030-1

$$\% \text{ Recovery} = \frac{\text{Response of 13C12-PCB-118}}{\text{Response of 13C12-PCB-101}} \times \frac{\text{pg of 13C12-PCB-101 spiked} * 100}{\text{Mean RRF} * \text{pg 13C12-PCB-118 Spiked}}$$

$$\% \text{ Recovery} = \frac{759194.3}{1240330.1} \times \frac{8000 * 100}{1.41 * 4000} = 87$$



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SVOC DATA PACKAGE

SECTION 7: SHIPPING/RECEIVING DOCUMENTS

Including:

- Airbills
- Chain-of-Custody Records
- Sample Log-in Sheet(s) - where applicable
- Others as listed below:

L2320141

For lab use only

ANALYTICAL REQUEST FORM



1. REGULAR Status

RUSH Status Requested - ADDITIONAL CHARGE
RESULTS REQUIRED BY _____ DATE _____
CONTACT ALS PRIOR TO SENDING SAMPLES

2. Date 7/25/19 Purchase Order No. _____

4. Quote No. _____ Email quote _____

3. Company Name : Floyd|Snider

ALS Project Manager: Ron McLeod

Address: 601 Union St Suite 600

5. Sample Collection

Seattle WA 98101

Sampling Site Heisee; City; Residential

Person to Contact: Emily Jones

Industrial Process: background industries

Telephone (719) 292-2078

Date of Collection 7/25/19

Fax Telephone () _____

Time Collected see doc below

E-mail Address: emily.jones@floydsnider.com

Date of Shipment 7/29/19

Billing Address (if different from above) _____

Chain of Custody No.: _____

6. How did you first learn about ALS?

Referred to by SKC / T&B Systems

7. REQUEST FOR ANALYSES

Client Sample Number	Matrix*	Sample/Area Volume	ANALYSES REQUESTED - Use method number if known	Units**	Lab Comments
<u>Heisee-20190719-0725</u>	Lo-Vol PUF tube		PCBs by Method 1668; Dioxins by Method 8290A	1	
<u>City-20190719-0725</u>	Lo-Vol PUF tube		PCBs by Method 1668; Dioxins by Method 8290A	1	
<u>Residential-20190719-0725</u>	Lo-Vol PUF tube		PCBs by Method 1668; Dioxins by Method 8290A	1	
<u>SAMPLE PERIOD:</u>			<u>PUF ID:</u>	<u>MINUTES</u>	<u>FLOW RATE</u>
<u>Heisee</u>	<u>7/19/19 0855</u>	<u>7/25/19 1209</u>	<u>25984640</u>	<u>8833</u>	<u>~1.1 LPM</u>
<u>CITY</u>	<u>7/19/19 1003</u>	<u>7/25/19 1316</u>	<u>25984649</u>	<u>8838</u>	<u>~1.0 LPM</u>
<u>Residential</u>	<u>7/19/19 0940</u>	<u>7/25/19 1350</u>	<u>25984656</u>	<u>8895</u>	<u>~1.0 LPM</u>

* Specify: Solid sorbent tube, e.g. Charcoal; Filter type; Impinger solution; Bulk sample; Blood; Urine; Tissue; Soil; Water; Other

** 1. µg/sample 2. mg/m³ 3. ppm 4. % 5. µg/m³ 6. _____ (other) Please indicate one or more units in the column entitled Units**

Comments _____

Possible Contamination and/or Chemical Hazards _____

7. Chain of Custody (Optional)

Relinquished by	<u>[Signature]</u>	Date/Time	<u>7/29/19 10:15</u>
Received by	<u>ARRON BURTON</u>	Date/Time	<u>31-July-2019 11:30 12.7C</u>
Relinquished by	_____	Date/Time	_____
Received by	_____	Date/Time	_____

1435 Norjohn Court #1 / Burlington, ON Canada, L7L 0E6

800-356-9135 or 801-266-7700 / FAX: 801-268-9992

ALS Environmental

Sample Receiving Log

Date/Time Received	Client ID	Number/Description of Containers	Temp. on Receipt*	Condition of Samples, Courier & Tracking Information	Receiver's Initials	Date/Time Login Completed	Submission ID	Sample ID Range
31-Jul-2019 11:30	Floyd Snider	3 x air samples	12.7°C	Good FLEET 7887 6758 7949	MS	31-Jul-2019 12:45	L2320141	-1-3

*Temperatures were recorded using : VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)
 Other (specify): _____