



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): L2308151

Final Package Review by:

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

Date Reviewed: 17-Oct-19



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SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FLS100

Contact: Breanne Dusureault
Submission ID(s): L2308151

Analytical Method: PCB Congeners by TO10A/EPA 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
L2308151-1	HEISER-25745103	Puf	05-Jul-19	11-Jul-19	12-Jul-19	18-Jul-19
L2308151-2	RES-25745100	Puf	05-Jul-19	11-Jul-19	12-Jul-19	18-Jul-19
L2308151-3	CITY-25745101	Puf	05-Jul-19	11-Jul-19	12-Jul-19	18-Jul-19
WG3081836-1	Method Blank	QC	n/a	n/a	12-Jul-19	17-Jul-19
WG3081836-2	Laboratory Control Sample	QC	n/a	n/a	12-Jul-19	17-Jul-19

Comments and Notes:

a) Sample Integrity:

The samples were received at 24.2 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.

For the sample RES-25745100, the cleanup standard appears to have been omitted. No bias to reported native target data is expected.

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

17-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#:	L2308151		Seattle, WA, 98101
Date of Report	18-Oct-19		USA
Date of Sample Receipt	11-Jul-19	Client Contact:	Emily Jones
		Client Project ID:	

COMMENTS: PCB Congeners by TO10A/EPA 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 24.2 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-25745103	RES-25745100	CITY-25745101
ALS Sample ID	L2308151-1	L2308151-2	L2308151-3
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	5-Jul-19	5-Jul-19	5-Jul-19
Extraction Date	12-Jul-19	12-Jul-19	12-Jul-19
Target Analytes	pg	pg	pg
PCB-001	<31	12.6	59.1
PCB-002	<17	<3.8	18.0
PCB-003	<22	8.39	<28
PCB-004	55.8	<12	146
PCB-010	<2.4	<3.1	<3.4
PCB-009	<8.1	<3.1	16.6
PCB-007	<4.7	<3.0	10.8
PCB-006	<20	<5.3	<44
PCB-005	<2.8	<3.6	<4.0
PCB-008	66.1	21.8	159
PCB-014	<2.7	<2.9	<3.7
PCB-011	208	90.3	296
PCB-012/013	<6.6	<3.0	<12
PCB-015	<18	<7.4	<38
PCB-019	13.2	<5.0	28.2
PCB-018/030	72.4	22.0	147
PCB-017	33.3	<11	62.8
PCB-027	5.30	2.68	9.63
PCB-024	<1.7	<2.2	<2.3
PCB-016	32.8	<10	54.9
PCB-032	<16	6.61	<31
PCB-034	<2.2	<2.2	<3.0
PCB-023	<2.1	<2.2	<2.9
PCB-026/029	15.4	<5.4	<26
PCB-025	6.19	<2.1	9.89
PCB-031	55.8	<21	90.9
PCB-020/028	58.7	22.9	98.8
PCB-021/033	<31	17.1	<57
PCB-022	19.7	11.6	38.9
PCB-036	<1.9	<2.0	<2.6
PCB-039	<2.0	<2.1	<2.8
PCB-038	<2.2	<2.2	<3.0
PCB-035	<4.8	<2.2	<4.4
PCB-037	13.0	<4.1	<18
PCB-054	<0.94	<0.98	<1.3
PCB-050/053	<7.3	3.05	<15
PCB-045/051	12.6	<5.5	<22
PCB-046	2.72	<2.2	<4.2
PCB-052	85.1	<20	168
PCB-073	<1.2	<1.5	<1.5
PCB-043	3.78	<2.3	<3.3
PCB-049/069	29.5	<11	49.1
PCB-048	<6.1	<2.5	<11
PCB-044/047/065	54.1	<27	91.2
PCB-059/062/075	<4.0	<1.5	4.02
PCB-042	<8.0	4.20	15.1
PCB-040/041/071	21.2	10.1	31.9
PCB-064	17.9	<6.7	28.7
PCB-072	<1.7	<1.6	<2.2
PCB-068	<1.7	<1.5	<2.6
PCB-057	<1.8	<1.6	<2.2
PCB-058	<1.8	<1.6	<2.2
PCB-067	<1.6	<1.4	<2.0
PCB-063	<1.7	<1.5	<2.1
PCB-061/070/074/076	52.0	18.4	77.1
PCB-066	21.2	8.67	25.2
PCB-055	<1.9	<1.7	<2.4
PCB-056	<10	<3.4	<9.9
PCB-060	<3.9	<1.7	<5.0
PCB-080	<1.5	<1.4	<2.0
PCB-079	<1.6	<1.4	<2.0
PCB-078	<1.9	<1.7	<2.4
PCB-081	<1.9	<1.7	<2.4
PCB-077	<2.8	<1.9	<4.5
PCB-104	<0.63	<0.81	<0.90
PCB-096	<0.66	<0.86	<0.90
PCB-103	<1.2	<1.6	<2.4
PCB-094	<1.5	<1.9	<2.9
PCB-095	52.3	<11	91.6
PCB-093/098/100/102	<1.4	<1.8	<2.7

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Sample Analysis Summary Report

Sample Name	HEISER-25745103	RES-25745100	CITY-25745101
ALS Sample ID	L2308151-1	L2308151-2	L2308151-3
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	5-Jul-19	5-Jul-19	5-Jul-19
Extraction Date	12-Jul-19	12-Jul-19	12-Jul-19
Target Analytes	pg	pg	pg
PCB-088/091	<7.1	<2.0	14.6
PCB-084	<11	<3.9	27.7
PCB-089	<1.5	<1.9	<2.9
PCB-121	<1.0	<1.3	<2.0
PCB-092	<7.7	2.36	<12
PCB-090/101/113	56.1	13.6	76.2
PCB-083/099	23.8	<6.3	36.9
PCB-112	<0.99	<1.3	<1.9
PCB-086/087/097/109/119/125	31.6	12.3	<47
PCB-085/110/115/116/117	54.9	<17	87.3
PCB-082	<4.2	<2.1	<7.7
PCB-111	<1.0	<1.3	<2.0
PCB-120	<0.95	<1.2	<1.8
PCB-108/124	<1.6	<1.8	<2.5
PCB-107	2.67	<1.7	<4.3
PCB-123	<1.7	<2.0	<1.5
PCB-106	<1.6	<1.8	<1.4
PCB-118	23.2	11.4	35.3
PCB-122	<1.6	<1.9	<1.5
PCB-114	<1.6	<1.9	<1.5
PCB-105	9.26	<3.1	<11
PCB-127	<1.5	<1.7	<1.4
PCB-126	<1.9	<2.2	<1.8
PCB-155	<1.6	<0.85	<3.3
PCB-152	<0.94	<0.57	<0.77
PCB-150	<0.91	<0.56	<0.75
PCB-136	<15	<1.7	<11
PCB-145	<0.95	<0.58	<0.78
PCB-148	<1.2	<0.76	<1.0
PCB-135/151	46.9	4.61	<21
PCB-154	<0.97	<0.60	<0.80
PCB-144	<5.7	<0.77	3.85
PCB-147/149	83.3	<12	55.5
PCB-134/143	<4.7	<1.8	4.27
PCB-139/140	<2.0	<1.5	<2.0
PCB-131	<2.5	<1.9	<2.5
PCB-142	<2.3	<1.7	<2.3
PCB-132	16.9	<3.6	<20
PCB-133	<2.1	<1.6	<2.1
PCB-165	<1.7	<1.3	<1.7
PCB-146	<7.1	<1.4	3.82
PCB-161	<1.5	<1.1	<1.5
PCB-153/168	45.8	<7.5	<16
PCB-141	12.2	<1.5	<8.2
PCB-130	<2.4	2.04	<3.6
PCB-137/164	4.13	<1.3	<3.6
PCB-129/138/163	<38	12.9	53.3
PCB-160	<1.4	<1.1	<1.5
PCB-158	<1.6	<1.5	<4.6
PCB-128/166	4.03	<1.4	4.80
PCB-159	<1.5	<1.2	<1.5
PCB-162	<1.6	<1.2	<1.6
PCB-167	<1.3	<0.95	<1.5
PCB-156/157	<1.8	<1.4	<2.6
PCB-169	<1.4	<1.1	<1.2
PCB-188	<1.0	<1.1	<3.8
PCB-179	<17	<1.0	<5.1
PCB-184	<0.81	<1.0	<1.8
PCB-176	<4.9	<1.0	<1.9
PCB-186	<0.89	<1.1	<2.0
PCB-178	<3.7	<1.5	<2.7
PCB-175	<1.1	<1.4	<2.6
PCB-187	<27	5.33	<7.1
PCB-182	<1.1	<1.3	<2.5
PCB-183	10.8	<1.3	<3.0
PCB-185	<2.8	<1.6	<2.9
PCB-174	<14	<1.3	<6.6
PCB-177	<7.3	<1.5	<3.8
PCB-181	<1.2	<1.5	<2.7
PCB-171/173	<1.2	<1.5	<2.8
PCB-172	<1.2	<1.5	<2.7

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Sample Analysis Summary Report

Sample Name	HEISER-25745103	RES-25745100	CITY-25745101
ALS Sample ID	L2308151-1	L2308151-2	L2308151-3
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	5-Jul-19	5-Jul-19	5-Jul-19
Extraction Date	12-Jul-19	12-Jul-19	12-Jul-19

Target Analytes	p9	p9	p9
PCB-192	<0.97	<1.2	<2.2
PCB-180/193	21.0	4.45	<13
PCB-191	<0.89	<1.1	<2.0
PCB-170	<3.9	<1.5	6.57
PCB-190	<0.80	<1.0	<1.8
PCB-189	<0.57	<0.65	<0.93
PCB-202	<3.0	<0.61	<1.5
PCB-201	1.94	<0.58	<1.0
PCB-204	<0.52	<0.58	<1.1
PCB-197	<0.52	<0.58	<1.0
PCB-200	1.70	<0.58	<2.5
PCB-198/199	<5.9	<0.78	6.84
PCB-196	<1.2	<0.76	<1.4
PCB-203	2.14	<0.73	<1.3
PCB-195	<1.2	<0.95	<1.4
PCB-194	<2.5	<3.1	7.00
PCB-205	<0.87	<0.73	<0.84
PCB-208	<3.5	<2.0	<6.9
PCB-207	<2.5	<1.7	<4.7
PCB-206	<3.3	<2.6	<6.0
PCB-209	<1.7	<1.3	<3.0
Extraction Standards	% Rec	% Rec	% Rec
13C12-PCB-001	43	35	34
13C12-PCB-003	46	36	36
13C12-PCB-004	60	47	47
13C12-PCB-015	50	39	38
13C12-PCB-019	71	57	55
13C12-PCB-037	61	48	47
13C12-PCB-054	83	64	64
13C12-PCB-081	64	51	52
13C12-PCB-077	65	52	52
13C12-PCB-104	85	70	63
13C12-PCB-123	71	55	55
13C12-PCB-118	70	57	56
13C12-PCB-114	71	57	56
13C12-PCB-105	70	56	56
13C12-PCB-126	70	54	56
13C12-PCB-155	36	34	11
13C12-PCB-167	77	65	54
13C12-PCB-156/157	78	64	70
13C12-PCB-169	86	70	80
13C12-PCB-188	51	53	20
13C12-PCB-189	75	62	62
13C12-PCB-202	69	67	31
13C12-PCB-205	89	75	54
13C12-PCB-208	47	52	20
13C12-PCB-206	87	76	43
13C12-PCB-209	32	34	13
Field Spike Standards			
13C12-PCB-031	88	86	87
13C12-PCB-095	90	88	93
13C12-PCB-153	92	95	59
4-chloro-4'-fluorobiphenyl	72	69	61
13C12-PCB-11	77	75	71
Cleanup Standards			
13C12-PCB-028	58	NS	45
13C12-PCB-111	59	NS	21
13C12-PCB-178	73	NS	37

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Sample Analysis Summary Report

Sample Name	HEISER-25745103	RES-25745100	CITY-25745101
ALS Sample ID	L2308151-1	L2308151-2	L2308151-3
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	5-Jul-19	5-Jul-19	5-Jul-19
Extraction Date	12-Jul-19	12-Jul-19	12-Jul-19
Target Analytes	pg	pg	pg
Homologue Group Totals			
Total MonoCB	70.0	24.8	105
Total DiCB	387	137	726
Total TriCB	378	139	677
Total TetraCB	342	121	568
Total PentaCB	284	83.0	456
Total HexaCB	285	45.9	216
Total HeptaCB	112	9.78	45.2
Total OctaCB	18.4	3.10	16.3
Total NonaCB	<2.5	<1.7	<4.7
DecaCB	<1.7	<1.3	<3.0
Total PCB	1880	563	2810
Toxic Equivalency - (WHO 2005)			
Lower Bound PCB TEQ	0.000974	0.000342	0.00106
Mid Point PCB TEQ	0.118	0.127	0.200
Upper Bound PCB TEQ	0.234	0.254	0.219

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3081836-1
Sample Size	1
Sample size units	Puf
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	12-Jul-19
Target Analytes	P9
PCB-001	<2.8
PCB-002	<2.7
PCB-003	<2.9
PCB-004	<12
PCB-010	<7.2
PCB-009	<7.2
PCB-007	<7.1
PCB-006	<7.2
PCB-005	<8.3
PCB-008	<6.3
PCB-014	<6.3
PCB-011	<58
PCB-012/013	<6.5
PCB-015	<6.6
PCB-019	<3.5
PCB-018/030	9.54
PCB-017	<6.7
PCB-027	<4.8
PCB-024	<5.0
PCB-016	<8.0
PCB-032	<4.4
PCB-034	<4.3
PCB-023	<4.2
PCB-026/029	<4.0
PCB-025	<4.0
PCB-031	<7.6
PCB-020/028	<9.0
PCB-021/033	<6.8
PCB-022	7.55
PCB-036	<3.8
PCB-039	<4.0
PCB-038	<4.3
PCB-035	<4.3
PCB-037	<4.7
PCB-054	<1.5
PCB-050/053	<2.7
PCB-045/051	<3.7
PCB-046	<3.1
PCB-052	<8.2
PCB-073	<2.0
PCB-043	<3.2
PCB-049/069	<4.0
PCB-048	<2.7
PCB-044/047/065	<12
PCB-059/062/075	<2.0
PCB-042	<3.2
PCB-040/041/071	<2.7
PCB-064	<2.2
PCB-072	<2.5
PCB-068	<2.4
PCB-057	<2.6
PCB-058	<2.6
PCB-067	<2.3
PCB-063	<2.4
PCB-061/070/074/076	<9.3
PCB-066	<4.2
PCB-055	<2.7
PCB-056	<2.7
PCB-060	<2.7
PCB-080	<2.2
PCB-079	<2.3
PCB-078	<2.7
PCB-081	<2.6
PCB-077	<2.8
PCB-104	<1.4
PCB-096	<1.4
PCB-103	<2.0
PCB-094	<2.5
PCB-095	<5.0
PCB-093/098/100/102	<2.3

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3081836-1
Sample Size	1
Sample size units	Puf
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	12-Jul-19
Target Analytes	P9
PCB-088/091	<2.3
PCB-084	<2.6
PCB-089	<2.5
PCB-121	<1.7
PCB-092	<2.3
PCB-090/101/113	5.52
PCB-083/099	<2.4
PCB-112	<1.6
PCB-086/087/097/109/119/125	<2.0
PCB-085/110/115/116/117	<4.2
PCB-082	<2.8
PCB-111	<1.7
PCB-120	<1.6
PCB-108/124	<2.1
PCB-107	<2.0
PCB-123	<2.2
PCB-106	<2.1
PCB-118	3.52
PCB-122	<2.2
PCB-114	<2.2
PCB-105	<2.1
PCB-127	<2.0
PCB-126	<2.1
PCB-155	<0.78
PCB-152	<0.75
PCB-150	<0.72
PCB-136	<0.74
PCB-145	<0.76
PCB-148	<0.99
PCB-135/151	<1.1
PCB-154	<0.77
PCB-144	<1.0
PCB-147/149	3.04
PCB-134/143	<1.8
PCB-139/140	<1.5
PCB-131	<2.0
PCB-142	<1.8
PCB-132	<1.8
PCB-133	<1.6
PCB-165	<1.3
PCB-146	<1.5
PCB-161	<1.2
PCB-153/168	<2.1
PCB-141	<1.6
PCB-130	<1.9
PCB-137/164	<1.4
PCB-129/138/163	<3.7
PCB-160	<1.1
PCB-158	<1.1
PCB-128/166	<1.4
PCB-159	<1.2
PCB-162	<1.3
PCB-167	<1.1
PCB-156/157	<1.5
PCB-169	<1.2
PCB-188	<0.91
PCB-179	<0.89
PCB-184	<0.86
PCB-176	<0.90
PCB-186	<0.95
PCB-178	<1.3
PCB-175	<1.2
PCB-187	<1.2
PCB-182	<1.2
PCB-183	<1.1
PCB-185	<1.4
PCB-174	<1.2
PCB-177	<1.3
PCB-181	<1.3
PCB-171/173	<1.3
PCB-172	<1.3

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3081836-1
Sample Size	1
Sample size units	Puf
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	12-Jul-19
Target Analytes	P9
PCB-192	<1.0
PCB-180/193	<1.7
PCB-191	<0.95
PCB-170	<1.3
PCB-190	<0.86
PCB-189	<0.87
PCB-202	<0.65
PCB-201	<0.65
PCB-204	<0.66
PCB-197	<0.66
PCB-200	<0.65
PCB-198/199	<0.87
PCB-196	<0.85
PCB-203	<0.82
PCB-195	<0.87
PCB-194	1.96
PCB-205	<0.72
PCB-208	<1.5
PCB-207	<1.4
PCB-206	<2.3
PCB-209	<0.73
Extraction Standards	% Rec
13C12-PCB-001	27
13C12-PCB-003	30
13C12-PCB-004	38
13C12-PCB-015	33
13C12-PCB-019	44
13C12-PCB-037	46
13C12-PCB-054	51
13C12-PCB-081	50
13C12-PCB-077	54
13C12-PCB-104	63
13C12-PCB-123	58
13C12-PCB-118	59
13C12-PCB-114	58
13C12-PCB-105	62
13C12-PCB-126	63
13C12-PCB-155	61
13C12-PCB-167	74
13C12-PCB-156/157	73
13C12-PCB-169	80
13C12-PCB-188	70
13C12-PCB-189	70
13C12-PCB-202	90
13C12-PCB-205	86
13C12-PCB-208	81
13C12-PCB-206	91
13C12-PCB-209	76
Field Spike Standards	
13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
4-chloro-4'-fluorobiphenyl	NS
13C12-PCB-11	NS
Cleanup Standards	
13C12-PCB-028	41
13C12-PCB-111	53
13C12-PCB-178	69

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Quality Control Summary Report

Sample Name	Method Blank
ALS Sample ID	WG3081836-1
Sample Size	1
Sample size units	Puf
Percent Moisture	n/a
Sample Matrix	QC
Sampling Date	n/a
Extraction Date	12-Jul-19
Target Analytes	p9
Homologue Group Totals	
Total MonoCB	<2.7
Total DiCB	58.0
Total TriCB	40.5
Total TetraCB	41.4
Total PentaCB	18.2
Total HexaCB	8.84
Total HeptaCB	1.70
Total OctaCB	1.96
Total NonaCB	<1.4
DecaCB	<0.73
Total PCB	171
Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000106
Mid Point PCB TEQ	0.124
Upper Bound PCB TEQ	0.247

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Sample Analysis Summary Report

Sample Name **Laboratory Control Sample**

ALS Sample ID WG3081836-2

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

Target Analytes **% Rec**

PCB-001	100
PCB-003	100
PCB-004	99
PCB-015	99
PCB-019	104
PCB-037	101
PCB-054	102
PCB-081	94
PCB-077	96
PCB-104	90
PCB-123	93
PCB-118	90
PCB-114	93
PCB-105	90
PCB-126	91
PCB-155	91
PCB-167	90
PCB-156/157	91
PCB-169	94
PCB-188	93
PCB-189	102
PCB-202	100
PCB-205	87
PCB-208	101
PCB-206	100
PCB-209	113

Extraction Standards **% Rec**

13C12-PCB-001	31
13C12-PCB-003	33
13C12-PCB-004	42
13C12-PCB-015	37
13C12-PCB-019	49
13C12-PCB-037	47
13C12-PCB-054	55
13C12-PCB-081	51
13C12-PCB-077	54
13C12-PCB-104	68
13C12-PCB-123	57
13C12-PCB-118	59
13C12-PCB-114	57
13C12-PCB-105	58
13C12-PCB-126	58
13C12-PCB-155	46
13C12-PCB-167	69
13C12-PCB-156/157	67
13C12-PCB-169	75
13C12-PCB-188	60
13C12-PCB-189	65
13C12-PCB-202	76
13C12-PCB-205	78
13C12-PCB-208	56
13C12-PCB-206	82
13C12-PCB-209	32

Field Spike Standards

13C12-PCB-031	NS
13C12-PCB-095	NS
13C12-PCB-153	NS
4-chloro-4'-fluorobiphenyl	NS
13C12-PCB-11	NS

Cleanup Standards

13C12-PCB-028	43
13C12-PCB-111	54
13C12-PCB-178	63

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Sample Analysis Summary Report

Sample Name	CCV	CCV
ALS Sample ID	H5-19-CCV-594	H5-19-CCV-596
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	92	93
PCB-003	91	94
PCB-004	87	88
PCB-015	90	91
PCB-019	92	92
PCB-037	88	92
PCB-054	89	90
PCB-081	88	90
PCB-077	91	93
PCB-104	89	89
PCB-123	86	87
PCB-118	86	88
PCB-114	88	88
PCB-105	87	88
PCB-126	87	88
PCB-155	88	89
PCB-167	84	88
PCB-156/157	86	89
PCB-169	88	90
PCB-188	89	89
PCB-189	94	93
PCB-202	90	91
PCB-205	86	83
PCB-208	98	97
PCB-206	97	96
PCB-209	94	92
Extraction Standards	% Rec	% Rec
13C12-PCB-001	75	75
13C12-PCB-003	75	74
13C12-PCB-004	96	96
13C12-PCB-015	72	72
13C12-PCB-019	109	109
13C12-PCB-037	83	80
13C12-PCB-054	122	123
13C12-PCB-081	82	80
13C12-PCB-077	80	80
13C12-PCB-104	119	121
13C12-PCB-123	89	84
13C12-PCB-118	89	86
13C12-PCB-114	87	85
13C12-PCB-105	87	82
13C12-PCB-126	88	79
13C12-PCB-155	119	118
13C12-PCB-167	109	95
13C12-PCB-156/157	112	95
13C12-PCB-169	110	102
13C12-PCB-188	107	109
13C12-PCB-189	98	95
13C12-PCB-202	127	118
13C12-PCB-205	100	100
13C12-PCB-208	98	95
13C12-PCB-206	109	108
13C12-PCB-209	107	105
Field Spike Standards		
13C12-PCB-031	82	84
13C12-PCB-095	91	95
13C12-PCB-153	80	85
4-chloro-4'-fluorobiphenyl	NS	NS
13C12-PCB-11	NS	NS
Cleanup Standards		
13C12-PCB-028	83	85
13C12-PCB-111	88	87
13C12-PCB-178	98	97

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-25745103
 ALS Sample ID L2308151-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information **Run 1**
 Filename 5-190717A24
 Run Date 18-Jul-19 03:08
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.98	<31	5.6	M,J,R	31	100
PCB-002		10.45	<17	2.3	J,R	17	100
PCB-003		10.56	<22	1.5	J,R	22	100
PCB-004		10.72	55.8	3.9	J		100
PCB-010		NotFnd	<2.4	2.4	U		100
PCB-009		11.94	<8.1	2.4	J,R	8.1	100
PCB-007		12.05	<4.7	2.3	J,R	4.7	100
PCB-006		12.20	<20	2.4	J,R	20	100
PCB-005		NotFnd	<2.8	2.8	U		100
PCB-008		12.47	66.1	2.1	M,J		100
PCB-014		NotFnd	<2.7	2.7	U		100
PCB-011		13.93	208	2.8			100
PCB-012/013		14.12	<6.6	2.8	M,J,R	6.6	100
PCB-015		14.31	<18	2.9	J,R	18	100
PCB-019		12.67	13.2	1.7	J		100
PCB-018/030		13.75	72.4	1.9	J,B		100
PCB-017		13.99	33.3	2.3	J		100
PCB-027		14.11	5.30	1.6	J		100
PCB-024		14.23	<1.7	1.7	M,U	1.1	100
PCB-016		14.28	32.8	2.7	M,J		100
PCB-032		14.56	<16	1.5	J,R	16	100
PCB-034		NotFnd	<2.2	2.2	U		100
PCB-023		NotFnd	<2.1	2.1	U		100
PCB-026/029		15.51	15.4	2.0	J		100
PCB-025		15.65	6.19	2.0	J		100
PCB-031		15.83	55.8	1.9	J		100
PCB-020/028		16.00	58.7	2.1	J		100
PCB-021/033		16.14	<31	2.1	J,R	31	100
PCB-022		16.37	19.7	2.2	J,B		100
PCB-036		NotFnd	<1.9	1.9	U		100
PCB-039		NotFnd	<2.0	2.0	U		100
PCB-038		NotFnd	<2.2	2.2	U		100
PCB-035		17.99	<4.8	2.2	M,J,R	4.8	100
PCB-037		18.24	13.0	2.5	M,J		100
PCB-054		NotFnd	<0.94	0.94	U		100
PCB-050/053		15.67	<7.3	1.6	J,R	7.3	100
PCB-045/051		16.08	12.6	1.6	J		100
PCB-046		16.27	2.72	1.8	J		100
PCB-052		16.99	85.1	1.6	J		100
PCB-073		NotFnd	<1.2	1.2	U		100
PCB-043		17.13	3.78	1.9	J		100
PCB-049/069		17.25	29.5	1.4	J		100
PCB-048		17.43	<6.1	1.6	J,R	6.1	100
PCB-044/047/065		17.55	54.1	1.5	J		100
PCB-059/062/075		17.73	<4.0	1.2	J,R	4.0	100
PCB-042		17.85	<8.0	1.9	J,R	8.0	100
PCB-040/041/071		18.11	21.2	1.6	M,J		100
PCB-064		18.23	17.9	1.3	J		100
PCB-072		NotFnd	<1.7	1.7	U		100
PCB-068		NotFnd	<1.7	1.7	U		100
PCB-057		NotFnd	<1.8	1.8	U		100
PCB-058		NotFnd	<1.8	1.8	U		100
PCB-067		NotFnd	<1.6	1.6	U		100
PCB-063		NotFnd	<1.7	1.7	U		100
PCB-061/070/074/076		19.58	52.0	1.8	J		100
PCB-066		19.75	21.2	1.7	J		100
PCB-055		NotFnd	<1.9	1.9	U		100
PCB-056		20.13	<10	1.8	J,R	10	100
PCB-060		20.25	<3.9	1.8	J,R	3.9	100
PCB-080		NotFnd	<1.5	1.5	U		100
PCB-079		NotFnd	<1.6	1.6	U		100
PCB-078		NotFnd	<1.9	1.9	U		100
PCB-081		NotFnd	<1.9	1.9	U		100
PCB-077	0.0001	22.10	<2.8	2.1	J,R	2.8	100
PCB-104		NotFnd	<0.63	0.63	U		100
PCB-096		NotFnd	<0.66	0.66	U		100
PCB-103		NotFnd	<1.2	1.2	U		100
PCB-094		NotFnd	<1.5	1.5	U		100
PCB-095		19.12	52.3	1.3	J		100
PCB-093/098/100/102		NotFnd	<1.4	1.4	U		100

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-25745103
ALS Sample ID L2308151-1
Analysis Method EPA 1668C
Analysis Type Sample
Sample Matrix PUF

Sampling Date 5-Jul-19
Extraction Date 12-Jul-19
Sample Size 1 Puf
Percent Moisture n/a
Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A24
Run Date 18-Jul-19 03:08
Final Volume 25 ul
Dilution Factor 1
Analysis Units pg
Instrument - Column HRMS5 SPBCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.59	<7.1	1.4	J,R	7.1	100
PCB-084		19.72	<11	1.5	J,R	11	100
PCB-089		NotFnd	<1.5	1.5	U		100
PCB-121		NotFnd	<1.0	1.0	U		100
PCB-092		20.33	<7.7	1.4	J,R	7.7	100
PCB-090/101/113		20.63	56.1	1.2	J		100
PCB-083/099		20.95	23.8	1.4	J		100
PCB-112		NotFnd	<0.99	0.99	U		100
PCB-086/087/097/109/119/125		21.29	31.6	1.2	M,J		100
PCB-085/110/115/116/117		21.70	54.9	1.1	M,J		100
PCB-082		21.92	<4.2	1.7	J,R	4.2	100
PCB-111		NotFnd	<1.0	1.0	U		100
PCB-120		NotFnd	<0.95	0.95	U		100
PCB-108/124		22.88	<1.6	1.6	U	1.5	100
PCB-107		23.01	2.67	1.5	J		100
PCB-123	0.00003	NotFnd	<1.7	1.7	U		100
PCB-106		NotFnd	<1.6	1.6	U		100
PCB-118	0.00003	23.25	23.2	1.6	M,J,B		100
PCB-122		NotFnd	<1.6	1.6	U		100
PCB-114	0.00003	NotFnd	<1.6	1.6	U		100
PCB-105	0.00003	23.91	9.26	1.7	J		100
PCB-127		NotFnd	<1.5	1.5	U		100
PCB-126	0.1	25.53	<1.9	1.9	M,U	1.7	100
PCB-155		NotFnd	<1.6	1.6	U		100
PCB-152		NotFnd	<0.94	0.94	U		100
PCB-150		NotFnd	<0.91	0.91	U		100
PCB-136		20.96	<15	0.93	J,R	15	100
PCB-145		NotFnd	<0.95	0.95	U		100
PCB-148		NotFnd	<1.2	1.2	U		100
PCB-135/151		22.17	46.9	1.3	J		100
PCB-154		NotFnd	<0.97	0.97	U		100
PCB-144		22.46	<5.7	1.3	J,R	5.7	100
PCB-147/149		22.64	83.3	1.9	J		100
PCB-134/143		22.79	<4.7	2.3	J,R	4.7	100
PCB-139/140		NotFnd	<2.0	2.0	U		100
PCB-131		NotFnd	<2.5	2.5	U		100
PCB-142		NotFnd	<2.3	2.3	U		100
PCB-132		23.36	16.9	2.3	J		100
PCB-133		NotFnd	<2.1	2.1	U		100
PCB-165		NotFnd	<1.7	1.7	U		100
PCB-146		23.86	<7.1	1.9	J,R	7.1	100
PCB-161		NotFnd	<1.5	1.5	U		100
PCB-153/168		24.18	45.8	1.6	J		100
PCB-141		24.31	12.2	2.0	J		100
PCB-130		24.54	<2.4	2.4	U	1.9	100
PCB-137/164		24.70	4.13	1.8	M,J		100
PCB-129/138/163		24.87	<38	2.1	J,R	38	100
PCB-160		NotFnd	<1.4	1.4	U		100
PCB-158		25.08	<1.6	1.4	J,R	1.6	100
PCB-128/166		25.56	4.03	1.8	J		100
PCB-159		NotFnd	<1.5	1.5	U		100
PCB-162		NotFnd	<1.6	1.6	U		100
PCB-167	0.00003	NotFnd	<1.3	1.3	U		100
PCB-156/157	0.00003	26.99	<1.8	1.8	U	1.0	200
PCB-169	0.03	28.71	<1.4	1.4	M,U	0.84	100
PCB-188		NotFnd	<1.0	1.0	U		100
PCB-179		23.71	<17	0.83	J,R	17	100
PCB-184		NotFnd	<0.81	0.81	U		100
PCB-176		24.17	<4.9	0.84	J,R	4.9	100
PCB-186		NotFnd	<0.89	0.89	U		100
PCB-178		25.05	<3.7	1.2	J,R	3.7	100
PCB-175		NotFnd	<1.1	1.1	U		100
PCB-187		25.53	<27	1.1	J,R	27	100
PCB-182		NotFnd	<1.1	1.1	U		100
PCB-183		25.83	10.8	1.1	J		100
PCB-185		25.92	<2.8	1.3	J,R	2.8	100
PCB-174		26.00	<14	1.1	J,R	14	100
PCB-177		26.23	<7.3	1.2	J,R	7.3	100
PCB-181		NotFnd	<1.2	1.2	U		100
PCB-171/173		NotFnd	<1.2	1.2	U		100
PCB-172		NotFnd	<1.2	1.2	U		100

ALS Life Sciences

Sample Analysis Report

Sample Name HEISER-25745103
 ALS Sample ID L2308151-1
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A24
 Run Date 18-Jul-19 03:08
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<0.97	0.97		U	100
PCB-180/193		27.68	21.0	1.0	M,J		100
PCB-191		NotFnd	<0.89	0.89		U	100
PCB-170		28.37	<3.9	1.2	J,R	3.9	100
PCB-190		NotFnd	<0.80	0.80		U	100
PCB-189	0.00003	NotFnd	<0.57	0.57		U	100
PCB-202		26.24	<3.0	0.58	J,R	3.0	100
PCB-201		26.73	1.94	0.51	M,J		100
PCB-204		NotFnd	<0.52	0.52		U	100
PCB-197		NotFnd	<0.52	0.52		U	100
PCB-200		27.31	1.70	0.51	J		100
PCB-198/199		28.68	<5.9	0.69	J,R	5.9	100
PCB-196		29.05	<1.2	0.67	J,R	1.2	100
PCB-203		29.13	2.14	0.64	J		100
PCB-195		NotFnd	<1.2	1.2		U	100
PCB-194		31.06	<2.5	1.1	J,R	2.5	100
PCB-205		NotFnd	<0.87	0.87		U	100
PCB-208		NotFnd	<3.5	3.5		U	100
PCB-207		NotFnd	<2.5	2.5		U	100
PCB-206		NotFnd	<3.3	3.3		U	100
PCB-209		NotFnd	<1.7	1.7		U	100

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.97	43	5-145 R
13C12-PCB-003	4000	10.56	46	5-145
13C12-PCB-004	4000	10.70	60	5-145
13C12-PCB-015	4000	14.30	50	5-145
13C12-PCB-019	4000	12.65	71	5-145
13C12-PCB-037	4000	18.22	61	5-145
13C12-PCB-054	4000	14.48	83	5-145
13C12-PCB-081	4000	21.78	64	10-145
13C12-PCB-077	4000	22.08	65	10-145
13C12-PCB-104	4000	17.50	85	10-145
13C12-PCB-123	4000	23.07	71	10-145
13C12-PCB-118	4000	23.23	70	10-145
13C12-PCB-114	4000	23.54	71	10-145
13C12-PCB-105	4000	23.89	70	10-145
13C12-PCB-126	4000	25.48	70	10-145
13C12-PCB-155	4000	20.48	36	10-145
13C12-PCB-167	4000	26.38	77	10-145
13C12-PCB-156/157	8000	27.01	78	10-145
13C12-PCB-169	4000	28.66	86	10-145
13C12-PCB-188	4000	23.48	51	10-145
13C12-PCB-189	4000	29.94	75	10-145
13C12-PCB-202	4000	26.26	69	10-145
13C12-PCB-205	4000	31.33	89	10-145
13C12-PCB-208	4000	29.67	47	10-145
13C12-PCB-206	4000	32.39	87	10-145
13C12-PCB-209	4000	33.52	32	10-145

Field Spike Standards

	pg	Time	% Rec	Limits
13C12-PCB-031	6000	15.81	88	70-130
13C12-PCB-095	6000	19.10	90	70-130
13C12-PCB-153	6000	24.17	92	70-130
4-chloro-4'-fluorobiphenyl	6000	10.27	72	70-130
13C12-PCB-11	6000	13.92	77	70-130

Cleanup Standards

	pg	Time	% Rec	Limits
13C12-PCB-028	4000	15.99	58	5-145
13C12-PCB-111	4000	22.00	59	10-145
13C12-PCB-178	4000	25.05	73	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name	HEISER-25745103	Sampling Date	5-Jul-19	
ALS Sample ID	L2308151-1	Extraction Date	12-Jul-19	Approved: E. Sabljic --e-signature-- 18-Jul-2019
Analysis Method	EPA 1668C	Sample Size	1 Puf	
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Run Information	Run 1
Filename	5-190717A24
Run Date	18-Jul-19 03:08
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			70.0	1.5	J		400
Total DiCB			387	2.1	J		800
Total TriCB			378	1.5	J		800
Total TetraCB			342	0.94	J		1600
Total PentaCB			284	0.63	J		1600
Total HexaCB			285	0.91	J		1600
Total HeptaCB			112	0.57	J		800
Total OctaCB			18.4	0.51	J		800
Total NonaCB			<2.5	2.5	U		400
DecaCB			<1.7	1.7	U		400
Total PCB			1880		J		3200

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000974
Mid Point PCB TEQ	0.118
Upper Bound PCB TEQ	0.234

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 RES-25745100
 ALS Sample ID L2308151-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information **Run 1**
 Filename 5-190717A25
 Run Date 18-Jul-19 03:50
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.99	12.6	3.8	M,J		100
PCB-002		10.41	<3.8	2.2	J,R	3.8	100
PCB-003		10.54	8.39	1.6	J		100
PCB-004		10.69	<12	5.1	J,R	12	100
PCB-010		NotFnd	<3.1	3.1	U		100
PCB-009		NotFnd	<3.1	3.1	U		100
PCB-007		NotFnd	<3.0	3.0	U		100
PCB-006		12.19	<5.3	3.1	J,R	5.3	100
PCB-005		NotFnd	<3.6	3.6	U		100
PCB-008		12.46	21.8	2.7	M,J		100
PCB-014		NotFnd	<2.9	2.9	U		100
PCB-011		13.93	90.3	3.1	J		100
PCB-012/013		NotFnd	<3.0	3.0	U		100
PCB-015		14.31	<7.4	3.2	J,R	7.4	100
PCB-019		12.65	<5.0	2.1	M,J,R	5.0	100
PCB-018/030		13.74	22.0	2.5	J,B		100
PCB-017		13.97	<11	3.0	J,R	11	100
PCB-027		14.11	2.68	2.1	J		100
PCB-024		NotFnd	<2.2	2.2	U		100
PCB-016		14.27	<10	3.6	J,R	10	100
PCB-032		14.55	6.61	2.0	J		100
PCB-034		NotFnd	<2.2	2.2	U		100
PCB-023		NotFnd	<2.2	2.2	U		100
PCB-026/029		15.52	<5.4	2.1	J,R	5.4	100
PCB-025		15.64	<2.1	2.1	U	2.0	100
PCB-031		15.82	<21	2.0	J,R	21	100
PCB-020/028		16.00	22.9	2.2	J		100
PCB-021/033		16.13	17.1	2.2	J		100
PCB-022		16.38	11.6	2.3	J,B		100
PCB-036		NotFnd	<2.0	2.0	U		100
PCB-039		NotFnd	<2.1	2.1	U		100
PCB-038		NotFnd	<2.2	2.2	U		100
PCB-035		NotFnd	<2.2	2.2	U		100
PCB-037		18.22	<4.1	2.6	M,J,R	4.1	100
PCB-054		NotFnd	<0.98	0.98	U		100
PCB-050/053		15.69	3.05	1.9	M,J		100
PCB-045/051		16.09	<5.5	2.0	J,R	5.5	100
PCB-046		NotFnd	<2.2	2.2	U		100
PCB-052		16.99	<20	2.0	J,R	20	100
PCB-073		NotFnd	<1.5	1.5	U		100
PCB-043		NotFnd	<2.3	2.3	U		100
PCB-049/069		17.26	<11	1.8	J,R	11	100
PCB-048		17.41	<2.5	2.0	J,R	2.5	100
PCB-044/047/065		17.55	<27	1.8	J,R	27	100
PCB-059/062/075		17.73	<1.5	1.5	U	0.82	100
PCB-042		17.86	4.20	2.3	J		100
PCB-040/041/071		18.10	10.1	2.0	J		100
PCB-064		18.23	<6.7	1.6	J,R	6.7	100
PCB-072		NotFnd	<1.6	1.6	U		100
PCB-068		NotFnd	<1.5	1.5	U		100
PCB-057		NotFnd	<1.6	1.6	U		100
PCB-058		NotFnd	<1.6	1.6	U		100
PCB-067		NotFnd	<1.4	1.4	U		100
PCB-063		NotFnd	<1.5	1.5	U		100
PCB-061/070/074/076		19.58	18.4	1.6	M,J		100
PCB-066		19.76	8.67	1.5	J		100
PCB-055		NotFnd	<1.7	1.7	U		100
PCB-056		20.13	<3.4	1.7	J,R	3.4	100
PCB-060		NotFnd	<1.7	1.7	U		100
PCB-080		NotFnd	<1.4	1.4	U		100
PCB-079		NotFnd	<1.4	1.4	U		100
PCB-078		NotFnd	<1.7	1.7	U		100
PCB-081	0.0003	NotFnd	<1.7	1.7	U		100
PCB-077	0.0001	NotFnd	<1.9	1.9	U		100
PCB-104		NotFnd	<0.81	0.81	U		100
PCB-096		NotFnd	<0.86	0.86	U		100
PCB-103		NotFnd	<1.6	1.6	U		100
PCB-094		NotFnd	<1.9	1.9	U		100
PCB-095		19.12	<11	1.7	J,R	11	100
PCB-093/098/100/102		NotFnd	<1.8	1.8	U		100

ALS Life Sciences

Sample Analysis Report

Sample Name RES-25745100
 ALS Sample ID L2308151-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A25
 Run Date 18-Jul-19 03:50
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.58	<2.0	1.8	J,R	2.0	100
PCB-084		19.72	<3.9	2.0	J,R	3.9	100
PCB-089		NotFnd	<1.9	1.9	U		100
PCB-121		NotFnd	<1.3	1.3	U		100
PCB-092		20.34	2.36	1.8	M,J		100
PCB-090/101/113		20.64	13.6	1.5	J,B		100
PCB-083/099		20.95	<6.3	1.8	J,R	6.3	100
PCB-112		NotFnd	<1.3	1.3	U		100
PCB-086/087/097/109/119/125		21.32	12.3	1.5	M,J		100
PCB-085/110/115/116/117		21.71	<17	1.4	M,J,R	17	100
PCB-082		NotFnd	<2.1	2.1	U		100
PCB-111		NotFnd	<1.3	1.3	U		100
PCB-120		NotFnd	<1.2	1.2	U		100
PCB-108/124		NotFnd	<1.8	1.8	U		100
PCB-107		NotFnd	<1.7	1.7	U		100
PCB-123	0.00003	NotFnd	<2.0	2.0	U		100
PCB-106		NotFnd	<1.8	1.8	U		100
PCB-118	0.00003	23.25	11.4	1.8	J,B		100
PCB-122		NotFnd	<1.9	1.9	U		100
PCB-114	0.00003	NotFnd	<1.9	1.9	U		100
PCB-105	0.00003	23.90	<3.1	1.9	J,R	3.1	100
PCB-127		NotFnd	<1.7	1.7	U		100
PCB-126	0.1	25.47	<2.2	2.2	M,U	0.86	100
PCB-155		NotFnd	<0.85	0.85	U		100
PCB-152		NotFnd	<0.57	0.57	U		100
PCB-150		NotFnd	<0.56	0.56	U		100
PCB-136		20.97	<1.7	0.57	J,R	1.7	100
PCB-145		NotFnd	<0.58	0.58	U		100
PCB-148		NotFnd	<0.76	0.76	U		100
PCB-135/151		22.18	4.61	0.81	M,J		100
PCB-154		NotFnd	<0.60	0.60	U		100
PCB-144		NotFnd	<0.77	0.77	U		100
PCB-147/149		22.65	<12	1.5	J,R	12	100
PCB-134/143		NotFnd	<1.8	1.8	U		100
PCB-139/140		NotFnd	<1.5	1.5	U		100
PCB-131		NotFnd	<1.9	1.9	U		100
PCB-142		NotFnd	<1.7	1.7	U		100
PCB-132		23.36	<3.6	1.7	J,R	3.6	100
PCB-133		NotFnd	<1.6	1.6	U		100
PCB-165		NotFnd	<1.3	1.3	U		100
PCB-146		NotFnd	<1.4	1.4	U		100
PCB-161		NotFnd	<1.1	1.1	U		100
PCB-153/168		24.19	<7.5	1.2	J,R	7.5	100
PCB-141		NotFnd	<1.5	1.5	U		100
PCB-130		24.55	2.04	1.8	J		100
PCB-137/164		NotFnd	<1.3	1.3	U		100
PCB-129/138/163		24.88	12.9	1.6	J		100
PCB-160		NotFnd	<1.1	1.1	U		100
PCB-158		25.07	<1.5	1.0	J,R	1.5	100
PCB-128/166		NotFnd	<1.4	1.4	U		100
PCB-159		NotFnd	<1.2	1.2	U		100
PCB-162		NotFnd	<1.2	1.2	U		100
PCB-167	0.00003	NotFnd	<0.95	0.95	U		100
PCB-156/157	0.00003	NotFnd	<1.4	1.4	U		200
PCB-169	0.03	28.70	<1.1	1.1	M,U	0.67	100
PCB-188		NotFnd	<1.1	1.1	U		100
PCB-179		NotFnd	<1.0	1.0	U		100
PCB-184		NotFnd	<1.0	1.0	U		100
PCB-176		NotFnd	<1.0	1.0	U		100
PCB-186		NotFnd	<1.1	1.1	U		100
PCB-178		NotFnd	<1.5	1.5	U		100
PCB-175		NotFnd	<1.4	1.4	U		100
PCB-187		25.53	5.33	1.3	J		100
PCB-182		NotFnd	<1.3	1.3	U		100
PCB-183		25.83	<1.3	1.3	M,U	0.88	100
PCB-185		NotFnd	<1.6	1.6	U		100
PCB-174		26.00	<1.3	1.3	M,U	1.2	100
PCB-177		NotFnd	<1.5	1.5	U		100
PCB-181		NotFnd	<1.5	1.5	U		100
PCB-171/173		NotFnd	<1.5	1.5	U		100
PCB-172		NotFnd	<1.5	1.5	U		100

ALS Life Sciences

Sample Analysis Report

Sample Name RES-25745100
 ALS Sample ID L2308151-2
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A25
 Run Date 18-Jul-19 03:50
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		27.50	<1.2	1.2	M,U	1.0	100
PCB-180/193		27.69	4.45	1.3	J		100
PCB-191		NotFnd	<1.1	1.1	U		100
PCB-170		NotFnd	<1.5	1.5	U		100
PCB-190		NotFnd	<1.0	1.0	U		100
PCB-189	0.00003	NotFnd	<0.65	0.65	U		100
PCB-202		26.26	<0.61	0.61	M,U	0.49	100
PCB-201		NotFnd	<0.58	0.58	U		100
PCB-204		NotFnd	<0.58	0.58	U		100
PCB-197		NotFnd	<0.58	0.58	U		100
PCB-200		NotFnd	<0.58	0.58	U		100
PCB-198/199		NotFnd	<0.78	0.78	U		100
PCB-196		NotFnd	<0.76	0.76	U		100
PCB-203		NotFnd	<0.73	0.73	U		100
PCB-195		NotFnd	<0.95	0.95	U		100
PCB-194		31.08	<3.1	0.87	J,R	3.1	100
PCB-205		NotFnd	<0.73	0.73	U		100
PCB-208		NotFnd	<2.0	2.0	U		100
PCB-207		NotFnd	<1.7	1.7	U		100
PCB-206		NotFnd	<2.6	2.6	U		100
PCB-209		NotFnd	<1.3	1.3	U		100

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.98	35	5-145 R
13C12-PCB-003	4000	10.54	36	5-145
13C12-PCB-004	4000	10.69	47	5-145
13C12-PCB-015	4000	14.30	39	5-145
13C12-PCB-019	4000	12.64	57	5-145
13C12-PCB-037	4000	18.22	48	5-145
13C12-PCB-054	4000	14.47	64	5-145
13C12-PCB-081	4000	21.79	51	10-145
13C12-PCB-077	4000	22.09	52	10-145
13C12-PCB-104	4000	17.50	70	10-145
13C12-PCB-123	4000	23.08	55	10-145
13C12-PCB-118	4000	23.25	57	10-145
13C12-PCB-114	4000	23.55	57	10-145
13C12-PCB-105	4000	23.90	56	10-145
13C12-PCB-126	4000	25.49	54	10-145
13C12-PCB-155	4000	20.48	34	10-145
13C12-PCB-167	4000	26.38	65	10-145
13C12-PCB-156/157	8000	27.02	64	10-145
13C12-PCB-169	4000	28.67	70	10-145
13C12-PCB-188	4000	23.48	53	10-145
13C12-PCB-189	4000	29.94	62	10-145
13C12-PCB-202	4000	26.26	67	10-145
13C12-PCB-205	4000	31.33	75	10-145
13C12-PCB-208	4000	29.68	52	10-145
13C12-PCB-206	4000	32.40	76	10-145
13C12-PCB-209	4000	33.52	34	10-145

Field Spike Standards

13C12-PCB-031	6000	15.81	86	70-130
13C12-PCB-095	6000	19.11	88	70-130
13C12-PCB-153	6000	24.17	95	70-130
4-chloro-4'-fluorobiphenyl	6000	10.24	69	70-130
13C12-PCB-11	6000	13.91	75	70-130

Cleanup Standards

13C12-PCB-028	4000	16.02	0	5-145 R
13C12-PCB-111	4000	NotFnd	0	10-145
13C12-PCB-178	4000	25.07	0	10-145

ALS Life Sciences

Sample Analysis Report

Sample Name RES-25745100	Sampling Date	5-Jul-19	
ALS Sample ID L2308151-2	Extraction Date	12-Jul-19	
Analysis Method EPA 1668C	Sample Size	1	Puf
Analysis Type Sample	Percent Moisture	n/a	
Sample Matrix PUF	Split Ratio	4	

Approved:
E. Sabljic
--e-signature--
18-Jul-2019

Run Information	Run 1
Filename	5-190717A25
Run Date	18-Jul-19 03:50
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			24.8	1.6	J		400
Total DiCB			137	2.7	J		800
Total TriCB			139	2.0	J		800
Total TetraCB			121	0.98	J		1600
Total PentaCB			83.0	0.81	J		1600
Total HexaCB			45.9	0.56	J		1600
Total HeptaCB			9.78	0.65	J		800
Total OctaCB			3.10	0.58	J		800
Total NonaCB			<1.7	1.7	U		400
DecaCB			<1.3	1.3	U		400
Total PCB			563		J		3200

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.000342
Mid Point PCB TEQ	0.127
Upper Bound PCB TEQ	0.254

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	Indicates the Toxic Equivalency 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-25745101
 ALS Sample ID L2308151-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A26
 Run Date 18-Jul-19 04:32
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.97	59.1	2.6	J		100
PCB-002		10.37	18.0	2.1	J		100
PCB-003		10.49	<28	2.0	J,R	28	100
PCB-004		10.65	146	5.3			100
PCB-010		10.76	<3.4	3.4	J,R	3.4	100
PCB-009		11.90	16.6	3.3	J		100
PCB-007		12.01	10.8	3.3	J		100
PCB-006		12.16	<44	3.3	J,R	44	100
PCB-005		12.37	<4.0	3.9	M,J,R	4.0	100
PCB-008		12.43	159	2.9	M		100
PCB-014		NotFnd	<3.7	3.7	U		100
PCB-011		13.90	296	3.9			100
PCB-012/013		14.10	<12	3.8	M,J,R	12	100
PCB-015		14.30	<38	4.1	J,R	38	100
PCB-019		12.62	28.2	2.2	J		100
PCB-018/030		13.73	147	2.6			100
PCB-017		13.97	62.8	3.1	J		100
PCB-027		14.09	9.63	2.2	J		100
PCB-024		NotFnd	<2.3	2.3	U		100
PCB-016		14.26	54.9	3.7	J		100
PCB-032		14.54	<31	2.0	J,R	31	100
PCB-034		NotFnd	<3.0	3.0	U		100
PCB-023		NotFnd	<2.9	2.9	U		100
PCB-026/029		15.49	<26	2.8	J,R	26	100
PCB-025		15.64	9.89	2.8	J		100
PCB-031		15.81	90.9	2.6	J		100
PCB-020/028		15.99	98.8	2.9	J		100
PCB-021/033		16.12	<57	2.9	J,R	57	100
PCB-022		16.36	38.9	3.0	J,B		100
PCB-036		NotFnd	<2.6	2.6	U		100
PCB-039		NotFnd	<2.8	2.8	U		100
PCB-038		NotFnd	<3.0	3.0	U		100
PCB-035		17.98	<4.4	3.0	J,R	4.4	100
PCB-037		18.22	<18	3.5	J,R	18	100
PCB-054		NotFnd	<1.3	1.3	U		100
PCB-050/053		15.66	<15	1.9	J,R	15	100
PCB-045/051		16.08	<22	2.0	J,R	22	100
PCB-046		16.26	<4.2	2.3	J,R	4.2	100
PCB-052		16.98	168	2.0			100
PCB-073		NotFnd	<1.5	1.5	U		100
PCB-043		17.12	<3.3	2.3	J,R	3.3	100
PCB-049/069		17.24	49.1	1.8	J		100
PCB-048		17.41	<11	2.0	J,R	11	100
PCB-044/047/065		17.54	91.2	1.8	J		100
PCB-059/062/075		17.72	4.02	1.5	J		100
PCB-042		17.85	15.1	2.3	J		100
PCB-040/041/071		18.11	31.9	2.0	J		100
PCB-064		18.23	28.7	1.6	J		100
PCB-072		NotFnd	<2.2	2.2	U		100
PCB-068		18.77	<2.6	2.1	J,R	2.6	100
PCB-057		NotFnd	<2.2	2.2	U		100
PCB-058		NotFnd	<2.2	2.2	U		100
PCB-067		NotFnd	<2.0	2.0	U		100
PCB-063		19.40	<2.1	2.1	U	1.4	100
PCB-061/070/074/076		19.58	77.1	2.2	J		100
PCB-066		19.75	25.2	2.1	J		100
PCB-055		NotFnd	<2.4	2.4	U		100
PCB-056		20.14	<9.9	2.3	M,J,R	9.9	100
PCB-060		20.25	<5.0	2.3	M,J,R	5.0	100
PCB-080		NotFnd	<2.0	2.0	U		100
PCB-079		NotFnd	<2.0	2.0	U		100
PCB-078		NotFnd	<2.4	2.4	U		100
PCB-081	0.0003	21.79	<2.4	2.4	U	0.88	100
PCB-077	0.0001	22.09	<4.5	2.6	J,R	4.5	100
PCB-104		NotFnd	<0.90	0.90	U		100
PCB-096		NotFnd	<0.90	0.90	U		100
PCB-103		NotFnd	<2.4	2.4	U		100
PCB-094		NotFnd	<2.9	2.9	U		100
PCB-095		19.11	91.6	2.6	J		100
PCB-093/098/100/102		NotFnd	<2.7	2.7	U		100

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Sample Analysis Report

Sample Name CITY-25745101	Sampling Date	5-Jul-19	
ALS Sample ID L2308151-3	Extraction Date	12-Jul-19	
Analysis Method EPA 1668C	Sample Size	1	Puf
Analysis Type Sample	Percent Moisture	n/a	
Sample Matrix PUF	Split Ratio	4	

Approved:
E. Sabljic
--e-signature--
18-Jul-2019

Run Information	Run 1
Filename	5-190717A26
Run Date	18-Jul-19 04:32
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		19.58	14.6	2.7	J		100
PCB-084		19.72	27.7	3.0	J		100
PCB-089		NotFnd	<2.9	2.9	U		100
PCB-121		NotFnd	<2.0	2.0	U		100
PCB-092		20.33	<12	2.7	J,R	12	100
PCB-090/101/113		20.63	76.2	2.3	J		100
PCB-083/099		20.95	36.9	2.8	J		100
PCB-112		NotFnd	<1.9	1.9	U		100
PCB-086/087/097/109/119/125		21.29	<47	2.4	M,J,R	47	100
PCB-085/110/115/116/117		21.70	87.3	2.2	M,J		100
PCB-082		21.90	<7.7	3.3	J,R	7.7	100
PCB-111		NotFnd	<2.0	2.0	U		100
PCB-120		NotFnd	<1.8	1.8	U		100
PCB-108/124		22.88	<2.5	1.4	J,R	2.5	100
PCB-107		23.01	<4.3	1.3	J,R	4.3	100
PCB-123	0.00003	NotFnd	<1.5	1.5	U		100
PCB-106		NotFnd	<1.4	1.4	U		100
PCB-118	0.00003	23.25	35.3	1.4	J		100
PCB-122		NotFnd	<1.5	1.5	U		100
PCB-114	0.00003	NotFnd	<1.5	1.5	U		100
PCB-105	0.00003	23.90	<11	1.5	J,R	11	100
PCB-127		NotFnd	<1.4	1.4	U		100
PCB-126	0.1	25.48	<1.8	1.6	J,R	1.8	100
PCB-155		NotFnd	<3.3	3.3	U		100
PCB-152		NotFnd	<0.77	0.77	U		100
PCB-150		NotFnd	<0.75	0.75	U		100
PCB-136		20.96	<11	0.77	J,R	11	100
PCB-145		NotFnd	<0.78	0.78	U		100
PCB-148		NotFnd	<1.0	1.0	U		100
PCB-135/151		22.17	<21	1.1	J,R	21	100
PCB-154		NotFnd	<0.80	0.80	U		100
PCB-144		22.45	3.85	1.0	J		100
PCB-147/149		22.64	55.5	2.0	J		100
PCB-134/143		22.80	4.27	2.4	J		100
PCB-139/140		NotFnd	<2.0	2.0	U		100
PCB-131		NotFnd	<2.5	2.5	U		100
PCB-142		NotFnd	<2.3	2.3	U		100
PCB-132		23.36	<20	2.3	J,R	20	100
PCB-133		NotFnd	<2.1	2.1	U		100
PCB-165		NotFnd	<1.7	1.7	U		100
PCB-146		23.85	3.82	1.9	J		100
PCB-161		NotFnd	<1.5	1.5	U		100
PCB-153/168		24.18	<16	1.7	J,R	16	100
PCB-141		24.32	<8.2	2.0	J,R	8.2	100
PCB-130		24.53	<3.6	2.4	J,R	3.6	100
PCB-137/164		24.68	<3.6	1.8	M,J,R	3.6	100
PCB-129/138/163		24.87	53.3	2.2	J		100
PCB-160		NotFnd	<1.5	1.5	U		100
PCB-158		25.07	<4.6	1.4	J,R	4.6	100
PCB-128/166		25.56	4.80	1.8	J		100
PCB-159		NotFnd	<1.5	1.5	U		100
PCB-162		NotFnd	<1.6	1.6	U		100
PCB-167	0.00003	NotFnd	<1.5	1.5	U		100
PCB-156/157	0.00003	27.00	<2.6	1.6	M,J,R	2.6	200
PCB-169	0.03	NotFnd	<1.2	1.2	U		100
PCB-188		NotFnd	<3.8	3.8	U		100
PCB-179		23.72	<5.1	1.9	J,R	5.1	100
PCB-184		NotFnd	<1.8	1.8	U		100
PCB-176		NotFnd	<1.9	1.9	U		100
PCB-186		NotFnd	<2.0	2.0	U		100
PCB-178		NotFnd	<2.7	2.7	U		100
PCB-175		NotFnd	<2.6	2.6	U		100
PCB-187		25.52	<7.1	2.5	J,R	7.1	100
PCB-182		NotFnd	<2.5	2.5	U		100
PCB-183		25.84	<3.0	2.5	J,R	3.0	100
PCB-185		NotFnd	<2.9	2.9	U		100
PCB-174		26.00	<6.6	2.5	M,J,R	6.6	100
PCB-177		26.23	<3.8	2.7	J,R	3.8	100
PCB-181		NotFnd	<2.7	2.7	U		100
PCB-171/173		NotFnd	<2.8	2.8	U		100
PCB-172		NotFnd	<2.7	2.7	U		100

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Sample Analysis Report

Sample Name CITY-25745101
 ALS Sample ID L2308151-3
 Analysis Method EPA 1668C
 Analysis Type Sample
 Sample Matrix PUF

Sampling Date 5-Jul-19
 Extraction Date 12-Jul-19
 Sample Size 1 Puf
 Percent Moisture n/a
 Split Ratio 4

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A26
 Run Date 18-Jul-19 04:32
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		27.49	<2.2	2.2	U	2.1	100
PCB-180/193		27.67	<13	2.3	J,R	13	100
PCB-191		NotFnd	<2.0	2.0	U		100
PCB-170		28.38	6.57	2.8	J		100
PCB-190		NotFnd	<1.8	1.8	U		100
PCB-189	0.00003	NotFnd	<0.93	0.93	U		100
PCB-202		NotFnd	<1.5	1.5	U		100
PCB-201		NotFnd	<1.0	1.0	U		100
PCB-204		NotFnd	<1.1	1.1	U		100
PCB-197		NotFnd	<1.0	1.0	U		100
PCB-200		27.30	<2.5	1.0	M,J,R	2.5	100
PCB-198/199		28.67	6.84	1.4	J		100
PCB-196		NotFnd	<1.4	1.4	U		100
PCB-203		NotFnd	<1.3	1.3	U		100
PCB-195		NotFnd	<1.4	1.4	U		100
PCB-194		31.06	7.00	1.3	J,B		100
PCB-205		NotFnd	<0.84	0.84	U		100
PCB-208		NotFnd	<6.9	6.9	U		100
PCB-207		NotFnd	<4.7	4.7	U		100
PCB-206		NotFnd	<6.0	6.0	U		100
PCB-209		NotFnd	<3.0	3.0	U		100

Extraction Standards

	pg	Time	% Rec	Limits
13C12-PCB-001	4000	8.95	34	5-145
13C12-PCB-003	4000	10.48	36	5-145
13C12-PCB-004	4000	10.65	47	5-145
13C12-PCB-015	4000	14.28	38	5-145
13C12-PCB-019	4000	12.61	55	5-145
13C12-PCB-037	4000	18.21	47	5-145
13C12-PCB-054	4000	14.45	64	5-145
13C12-PCB-081	4000	21.78	52	10-145
13C12-PCB-077	4000	22.08	52	10-145
13C12-PCB-104	4000	17.49	63	10-145
13C12-PCB-123	4000	23.07	55	10-145
13C12-PCB-118	4000	23.23	56	10-145
13C12-PCB-114	4000	23.54	56	10-145
13C12-PCB-105	4000	23.89	56	10-145
13C12-PCB-126	4000	25.48	56	10-145
13C12-PCB-155	4000	20.47	11	10-145
13C12-PCB-167	4000	26.36	54	10-145
13C12-PCB-156/157	8000	27.00	70	10-145
13C12-PCB-169	4000	28.66	80	10-145
13C12-PCB-188	4000	23.48	20	10-145
13C12-PCB-189	4000	29.94	62	10-145
13C12-PCB-202	4000	26.26	31	10-145
13C12-PCB-205	4000	31.32	54	10-145
13C12-PCB-208	4000	29.67	20	10-145
13C12-PCB-206	4000	32.39	43	10-145
13C12-PCB-209	4000	33.52	13	10-145

Field Spike Standards

	pg	Time	% Rec	Limits
13C12-PCB-031	6000	15.80	87	70-130
13C12-PCB-095	6000	19.10	93	70-130
13C12-PCB-153	6000	24.17	59	70-130
4-chloro-4'-fluorobiphenyl	6000	10.19	61	70-130
13C12-PCB-11	6000	13.89	71	70-130

Cleanup Standards

	pg	Time	% Rec	Limits
13C12-PCB-028	4000	15.97	45	5-145
13C12-PCB-111	4000	22.00	21	10-145
13C12-PCB-178	4000	25.05	37	10-145

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Sample Analysis Report

Sample Name	CITY-25745101	Sampling Date	5-Jul-19	
ALS Sample ID	L2308151-3	Extraction Date	12-Jul-19	Approved: E. Sabljic --e-signature-- 18-Jul-2019
Analysis Method	EPA 1668C	Sample Size	1 Puf	
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	PUF	Split Ratio	4	

Run Information	Run 1
Filename	5-190717A26
Run Date	18-Jul-19 04:32
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			105	2.0	J	400	
Total DiCB			726	2.9	J	800	
Total TriCB			677	2.0	J	800	
Total TetraCB			568	1.3	J	1600	
Total PentaCB			456	0.90	J	1600	
Total HexaCB			216	0.75	J	1600	
Total HeptaCB			45.2	0.93	J	800	
Total OctaCB			16.3	0.84	J	800	
Total NonaCB			<4.7	4.7	U	400	
Total DecaCB			<3.0	3.0	U	400	
Total PCB			2810		J	3200	

Toxic Equivalency - (WHO 2005)	
Lower Bound PCB TEQ	0.00106
Mid Point PCB TEQ	0.200
Upper Bound PCB TEQ	0.219

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	Indicates the Toxic Equivalency 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',3,3',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	-

Table with columns: Target Analyte, #HOM, Resp, R1a, R1b, RT, Conc., H/A, Ical, RRF, URF, %Rec, Mod Date, Mod Comment, Code Comments, Noise 1, Noise 2, Ion1 H, Ion2 H, Ion1 L, Ion2 L, Ion1 A, Ion2 A, Ion1 E, Ion2 E, RRT, RT, LCL, UCL, Acc Date, Acc Time, Acc ID, Sol Size. The table contains multiple rows of data for various PCB congeners and other analytes.

172	13C-PCB-15	1916598 1.634 NO	14.3	75.15681	19.62	0.930	75.2	6998	5841	23327076	14257257	3333.5	2440.9	1189862.6	727635.4	1.2018	14.26	14.33	17-Jul-19	19:26:59	HS-19-WDM-595	1	
173	13C-PCB-19	1485724.6 0.996 NO	12.82	111.6465	19.545	0.49	111.6	27856	12492	14488994	14581442	520.1	1167.3	741332.3	744392.3	1.0813	12.59	12.86	17-Jul-19	19:26:59	HS-19-WDM-595	1	
174	13C-PCB-37	1633765.9 1.042 NO	18.23	89.2994	18.252	1.594	89.3	23410	10020	15217200	14601128	650	1341.5	833795.4	800026.5	1.0732	18.2	18.26	17-Jul-19	19:26:59	HS-19-WDM-595	1	
175	13C-PCB-54	2007451.8 0.782 NO	14.47	125.57667	22.034	1.346	125.6	5175	3928	19408996	24716376	3749.8	6293.1	880761.3	1126960.5	0.852	14.44	14.51	17-Jul-19	19:26:59	HS-19-WDM-595	1	
176	13C-PCB-81	1357962.5 0.816 NO	21.8	83.86033	18.907	1.6	83.9	4613	2688	11535362	14749469	2500.4	5264.2	810125.3	747857.2	1.056	21.76	21.83	17-Jul-19	19:26:59	HS-19-WDM-595	1	
177	13C-PCB-87	1370147.8 0.833 NO	22.1	83.81981	19.721	1.619	83.6	4613	2688	11545463	13739905	2526.3	5111.8	822549.9	747569.9	1.0708	22.07	22.13	17-Jul-19	19:26:59	HS-19-WDM-595	1	
178	13C-PCB-104	1703517.3 1.557 NO	17.51	120.14087	21.013	1.401	120.1	1379	1145	21797456	14212897	15804.2	12416.9	1037324.9	666192.4	1.0311	17.48	17.55	17-Jul-19	19:26:59	HS-19-WDM-595	1	
179	13C-PCB-123	1277708.1 1.608 NO	23.09	87.73103	18.701	1.439	87.7	3442	2797	14735320	9111057	4278.9	3257.2	787833.6	488874.5	1.1187	23.06	23.12	17-Jul-19	19:26:59	HS-19-WDM-595	1	
180	13C-PCB-118	1250328.7 1.594 NO	23.26	86.29938	18.885	1.409	86.3	3442	2797	14454451	9084708	4198.9	3247.8	773506	485422.7	1.1269	23.23	23.29	17-Jul-19	19:26:59	HS-19-WDM-595	1	
181	13C-PCB-114	1200694.3 1.623 NO	23.56	88.00856	18.877	1.348	88	3442	2797	14025054	8585933	4074.1	3069.5	742959.8	457734.5	0.9475	23.53	23.59	17-Jul-19	19:26:59	HS-19-WDM-595	1	
182	13C-PCB-105	1181182.8 1.606 NO	23.91	85.37505	18.574	1.367	85.4	3442	2797	13521539	8359856	3927.9	2988.6	727994.4	453188.4	0.9816	23.88	23.94	17-Jul-19	19:26:59	HS-19-WDM-595	1	
183	13C-PCB-126	1370147.8 0.833 NO	22.1	83.81981	19.721	1.619	83.6	4613	2688	11545463	13739905	2526.3	5111.8	822549.9	747569.9	1.0708	22.07	22.13	17-Jul-19	19:26:59	HS-19-WDM-595	1	
184	13C-PCB-155	1825768.4 1.244 NO	20.5	118.37039	20.976	1.524	118.4	824	1393	21225664	17009428	25767.1	12214.6	1102066.9	813701.5	0.9933	20.47	20.53	17-Jul-19	19:26:59	HS-19-WDM-595	1	
185	13C-PCB-167	1327877 1.331 NO	26.39	99.96905	18.708	1.189	100	3300	2466	14780699	10760692	4296.7	4363.6	757991.4	569985.6	1.0812	26.36	26.42	17-Jul-19	19:26:59	HS-19-WDM-595	1	
186	13C-PCB-161/157	2524300.1 1.3 NO	27.03	197.58166	13.15	1.144	88.8	3530	2466	18759780	14472071	5884.1	5868.6	1426286.1	628794.1	1.0253	25.46	25.53	17-Jul-19	19:26:59	HS-19-WDM-595	1	
187	13C-PCB-169	1283848.4 1.312 NO	28.68	106.43334	17.78	1.08	106.4	3300	2466	12951721	8945925	3924.3	3992.7	728458.2	555390.2	1.1536	28.65	28.72	17-Jul-19	19:26:59	HS-19-WDM-595	1	
188	13C-PCB-188	1570087.7 1.033 NO	23.5	107.88652	19.047	1.303	107.9	1394	1534	15193237	14683602	10902.1	9569.5	797671.8	772415.9	0.9451	23.47	23.53	17-Jul-19	19:26:59	HS-19-WDM-595	1	
189	13C-PCB-189	1223213.9 1.049 NO	28.95	100.2051	18.603	1.093	100.2	1734	1229	11652143	10982088	8718.2	8947.4	626351.8	598682.1	0.9639	29.92	29.98	17-Jul-19	19:26:59	HS-19-WDM-595	1	
190	13C-PCB-202	1464051.2 0.895 NO	28.27	119.27413	19.3	1.099	119.3	964	1061	13347720	14842551	13849.6	13995.8	691597.3	774259.9	1.0564	28.23	28.3	17-Jul-19	19:26:59	HS-19-WDM-595	1	
191	13C-PCB-205	1229823.8 0.878 NO	31.34	101.83918	17.028	1.245	101.8	1720	1813	9792283	11128231	5694	6138	575084.6	654739.2	1.0087	31.31	31.38	17-Jul-19	19:26:59	HS-19-WDM-595	1	
192	13C-PCB-208	1010126 0.776 NO	25.69	85.45537	19.318	1.091	85.5	750	976	8523725	10919003	11369.4	11168.3	441223.5	568896.6	0.9556	25.66	25.72	17-Jul-19	19:26:59	HS-19-WDM-595	1	
193	13C-PCB-206	747073.9 0.786 NO	32.41	109.95084	15.748	0.706	109.1	291	976	8179404	6556209	6907.2	6717.9	328827.3	418246.6	1.0433	32.38	32.45	17-Jul-19	19:26:59	HS-19-WDM-595	1	
194	13C-PCB-209	1072025.4 1.188 NO	33.53	104.85903	13.787	1.054	104.9	791	269	8023628	6820423	27613.8	25329.9	581980.7	490044.8	1.0792	33.5	33.57	17-Jul-19	19:26:59	HS-19-WDM-595	1	
195	13C-PCB-9	2715795.9 1.528 NO	11.9	100	18.734	27157.959	100	4853	1717	30755520	20037470	6337.1	11669.9	841883.9	1074112	0.4784	11.86	11.93	17-Jul-19	19:26:59	HS-19-WDM-595	1	
196	13C-PCB-82	1161657.2 0.829 NO	16.89	100	20.775	11878.572	100	4432	2917	11185269	13447783	3504	4609.8	538322.1	649335.1	0.8831	16.85	17.02	17-Jul-19	19:26:59	HS-19-WDM-595	1	
197	13C-PCB-101	1012088.5 1.579 NO	20.64	100	21.137	10120.865	100	2073	2263	13096364	8244832	6318.4	3643.1	619598.7	392487.8	0.83	20.61	20.67	17-Jul-19	19:26:59	HS-19-WDM-595	1	
198	13C-PCB-138	1116984.9 1.311 NO	24.87	100	18.861	11168.949	100	3300	2466	11948239	9232291	3620.6	3743.8	633550.4	483344.4	0	24.83	24.9	17-Jul-19	19:26:59	HS-19-WDM-595	1	
199	13C-PCB-194	969970.8 0.865 NO	31.07	100	16.856	9699.708	100	1720	1813	7580396	8774046	4408.1	4839.5	448885.7	520112.1	1.2495	31.04	31.1	17-Jul-19	19:26:59	HS-19-WDM-595	1	
200	Total McCB-F1	89782 61701	10	20.225	20.225			1120		26464327										17-Jul-19	19:26:59	HS-19-WDM-595	1
201	Total DCB-F1	16663 84299	8	4.561	4.561			1197		46627492				2452101.1						17-Jul-19	0.810405093	HS-19-WDM-595	1
202	Total DCB-F2	16547 32224	6	8.283	8.283			2716		28132591				1942294.2						17-Jul-19	0.810405093	HS-19-WDM-595	1
203	Total TC8-F1	27 02485	1					1447		4688724				237078.9						17-Jul-19	0.810405093	HS-19-WDM-595	1
204	Total TC8-F2	4012 89883	8	1.242	1.242			1567		34048768				1783171.1						17-Jul-19	0.810405093	HS-19-WDM-595	1
205	Total TC8-F3	149365 7005	19	3.381	3.381			3555		74311005				4170397.2						17-Jul-19	19:26:59	HS-19-WDM-595	1
206	Total TC8-F4	54 16949	1					730		11215103				502630.1						17-Jul-19	19:26:59	HS-19-WDM-595	1
207	Total TC8-F5	1100	13	1.041	1.041			1219		145526991				8029179.9						17-Jul-19	19:26:59	HS-19-WDM-595	1
208	Total TC8-F6	26394 39866	26	8.602	8.602			2869		133212904				1451795.8						17-Jul-19	19:26:59	HS-19-WDM-595	1
209	Total PC8-F3	4627 1457	4	29.254	29.254			592		24093902				1170534.8						17-Jul-19	19:26:59	HS-19-WDM-595	1
210	Total PC8-F4	54808 88799	21	1.044	1.044			5033		196522801				14611522.7						17-Jul-19	19:26:59	HS-19-WDM-595	1
211	Total PC8-F5	1161757.2 0.829 NO	16.89	100	20.775	11878.572	100	4432	2917	11185269	13447783	3504	4609.8	538322.1	649335.1	0.8831	16.85	17.02	17-Jul-19	19:26:59	HS-19-WDM-595	1	
212	Total HC8-F4	958 10303	12	5.041	5.041			574		89446119				4586026.3						17-Jul-19	19:26:59	HS-19-WDM-595	1
213	Total HC8-F5	425154 5161	38	11.828	11.828			2074		206493679				13327820.3						17-Jul-19	19:26:59	HS-19-WDM-595	1
214	Total HC8-F6	169928 7213	25	3.299	3.299			1549		14480691				7643801.2						17-Jul-19	19:26:59	HS-19-WDM-595	1
215	Total HC8-F6	55 8877	1					1453		7139045				392858.8						17-Jul-19	19:26:59	HS-19-WDM-595	1
216	Total Oc8-F5	1070 41294	10	11.103	11.103			573		89228820				4829647.8						17-Jul-19	19:26:59	HS-19-WDM-595	1
217	Total Oc8-F6	169928 7213	25	3.299	3.299			1549		14480691				7643801.2						17-Jul-19	19:26:59	HS-19-WDM-595	1
218	Total Nc8-F6	2345 10575	5	62.373	62.373			702		21003385				1166324						17-Jul-19	19:26:59	HS-19-WDM-595	1
219	Total Dc8-F7	10 82786	1					214		6520116				474289.2						17-Jul-19	19:26:59	HS-19-WDM-595	1
220	Total 13C-McCB-F1	155 44594	2					2370		60250308				3059710.6						17-Jul-19	19:26:59	HS-19-WDM-595	1
221	Total 13C-DCB-F1	198 14376	4	13609.948	13609.948			4853		51036398				2874553.6						17-Jul-19	19:26:59	HS-19-WDM-595	1
222	Total 13C-DCB-F2	75 15681	1					6998		23327076				1189862.6						17-Jul-19	19:26:59	HS-19-WDM-595	1
223	Total 13C-TCB-F1	111 8465	1					27856		15091537				798256.3						17-Jul-19	19:26:59	HS-19-WDM-595	1
224	Total 13C-TCB-F3	249 94053	3					23410		59155252				2683511.5						17-Jul-19	19:26:59	HS-19-WDM-595	1
225	Total 13C-TCB-F2	125 57667	1					5175		19432326				881609.5									

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a	
ALS Sample ID	HS-19-CCV-594	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	

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information		Run 1
Filename	5-190717A12	
Run Date	17-Jul-19 18:33	
Final Volume	25 ul	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRM55 SPB0CTYL64948-04A	

Target Analytes	pg/uL	Ret.		Limits	
		Time	% Rec		Flags
PCB-001	50	8.95	92	75-125	
PCB-003	50	10.47	91	75-125	
PCB-004	50	10.63	87	75-125	
PCB-015	50	14.29	90	75-125	
PCB-019	50	12.62	92	75-125	
PCB-037	50	18.23	88	75-125	
PCB-054	50	14.47	89	75-125	
PCB-081	50	21.81	88	75-125	
PCB-077	50	22.10	91	75-125	
PCB-104	50	17.51	89	75-125	
PCB-123	50	23.09	86	75-125	
PCB-118	50	23.26	86	75-125	
PCB-114	50	23.56	88	75-125	
PCB-105	50	23.91	87	75-125	
PCB-126	50	25.51	87	75-125	
PCB-155	50	20.50	88	75-125	
PCB-167	50	26.39	84	75-125	
PCB-156/157	100	27.03	86	75-125	
PCB-169	50	28.68	88	75-125	
PCB-188	50	23.50	89	75-125	
PCB-189	50	29.96	94	75-125	
PCB-202	50	26.27	90	75-125	
PCB-205	50	31.34	86	75-125	
PCB-208	50	29.69	98	75-125	
PCB-206	50	32.41	97	75-125	
PCB-209	50	33.55	94	75-125	

Extraction Standards		Time	% Rec	Limits
13C12-PCB-001	100	8.95	75	50-145
13C12-PCB-003	100	10.47	75	50-145
13C12-PCB-004	100	10.62	96	50-145
13C12-PCB-015	100	14.28	72	50-145
13C12-PCB-019	100	12.61	109	50-145
13C12-PCB-037	100	18.22	83	50-145
13C12-PCB-054	100	14.46	122	50-145
13C12-PCB-081	100	21.79	82	50-145
13C12-PCB-077	100	22.09	80	50-145
13C12-PCB-104	100	17.50	119	50-145
13C12-PCB-123	100	23.08	89	50-145
13C12-PCB-118	100	23.25	89	50-145
13C12-PCB-114	100	23.55	87	50-145
13C12-PCB-105	100	23.90	87	50-145
13C12-PCB-126	100	25.49	88	50-145
13C12-PCB-155	100	20.48	119	50-145
13C12-PCB-167	100	26.38	109	50-145
13C12-PCB-156/157	200	27.02	112	50-145
13C12-PCB-169	100	28.67	110	50-145
13C12-PCB-188	100	23.48	107	50-145
13C12-PCB-189	100	29.95	98	50-145
13C12-PCB-202	100	26.26	127	50-145
13C12-PCB-205	100	31.33	100	50-145
13C12-PCB-208	100	29.68	98	50-145
13C12-PCB-206	100	32.40	109	50-145
13C12-PCB-209	100	33.52	107	50-145

Field Spike Standards		Time	% Rec	Limits
13C12-PCB-031	100	15.80	82	70-130
13C12-PCB-095	100	19.10	91	70-130
13C12-PCB-153	100	24.17	80	70-130
4-chloro-4'-fluorobiphenyl			NS	
13C12-PCB-11			NS	

Cleanup Standards		Time	% Rec	Limits
13C12-PCB-028	100	15.98	83	65-135
13C12-PCB-111	100	22.01	88	75-125
13C12-PCB-178	100	25.06	98	75-125

ALS Life Sciences

Continuing Calibration Report

Sample Name	CCV	Sampling Date	n/a		
ALS Sample ID	HS-19-CCV-596	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		

Approved:
E. Sabljic
--e-signature--
18-Jul-2019

Run Information		Run 1
Filename	5-190717A27	
Run Date	18-Jul-19 05:14	
Final Volume	25 ul	
Dilution Factor	1	
Analysis Units	%	
Instrument - Column	HRM55 SPBOCTYL64948-04A	

Target Analytes	pg/uL	Ret. Time	% Rec	Limits	Flags
PCB-001	50	8.95	93	75-125	
PCB-003	50	10.47	94	75-125	
PCB-004	50	10.63	88	75-125	
PCB-015	50	14.28	91	75-125	
PCB-019	50	12.61	92	75-125	
PCB-037	50	18.22	92	75-125	
PCB-054	50	14.46	90	75-125	
PCB-081	50	21.80	90	75-125	
PCB-077	50	22.09	93	75-125	
PCB-104	50	17.50	89	75-125	
PCB-123	50	23.08	87	75-125	
PCB-118	50	23.25	88	75-125	
PCB-114	50	23.55	88	75-125	
PCB-105	50	23.90	88	75-125	
PCB-126	50	25.49	88	75-125	
PCB-155	50	20.48	89	75-125	
PCB-167	50	26.38	88	75-125	
PCB-156/157	100	27.02	89	75-125	
PCB-169	50	28.67	90	75-125	
PCB-188	50	23.49	89	75-125	
PCB-189	50	29.95	93	75-125	
PCB-202	50	26.26	91	75-125	
PCB-205	50	31.33	83	75-125	
PCB-208	50	29.68	97	75-125	
PCB-206	50	32.40	96	75-125	
PCB-209	50	33.53	92	75-125	

Extraction Standards	pg/uL	Time	% Rec	Limits
13C12-PCB-001	100	8.94	75	50-145
13C12-PCB-003	100	10.45	74	50-145
13C12-PCB-004	100	10.62	96	50-145
13C12-PCB-015	100	14.27	72	50-145
13C12-PCB-019	100	12.60	109	50-145
13C12-PCB-037	100	18.21	80	50-145
13C12-PCB-054	100	14.45	123	50-145
13C12-PCB-081	100	21.78	80	50-145
13C12-PCB-077	100	22.08	80	50-145
13C12-PCB-104	100	17.49	121	50-145
13C12-PCB-123	100	23.07	84	50-145
13C12-PCB-118	100	23.23	86	50-145
13C12-PCB-114	100	23.54	85	50-145
13C12-PCB-105	100	23.89	82	50-145
13C12-PCB-126	100	25.48	79	50-145
13C12-PCB-155	100	20.47	118	50-145
13C12-PCB-167	100	26.36	95	50-145
13C12-PCB-156/157	200	27.00	95	50-145
13C12-PCB-169	100	28.66	102	50-145
13C12-PCB-188	100	23.48	109	50-145
13C12-PCB-189	100	29.94	95	50-145
13C12-PCB-202	100	26.24	118	50-145
13C12-PCB-205	100	31.32	100	50-145
13C12-PCB-208	100	29.67	95	50-145
13C12-PCB-206	100	32.39	108	50-145
13C12-PCB-209	100	33.50	105	50-145

Field Spike Standards	pg/uL	Time	% Rec	Limits
13C12-PCB-031	100	15.80	84	70-130
13C12-PCB-095	100	19.10	95	70-130
13C12-PCB-153	100	24.17	85	70-130
4-chloro-4'-fluorobiphenyl			NS	
13C12-PCB-11			NS	

Cleanup Standards	pg/uL	Time	% Rec	Limits
13C12-PCB-028	100	15.97	85	65-135
13C12-PCB-111	100	22.00	87	75-125
13C12-PCB-178	100	25.05	97	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
ALS Sample ID
Analysis Method
Analysis Type
Sample Matrix

Method Blank
WG3081836-1
EPA 1668C
Blank
QC

Sampling Date
Extraction Date
Sample Size
Percent Moisture
Split Ratio

n/a
12-Jul-19
1
n/a
1
Puf

Approved:
E. Sabljic
--e-signature--
18-Jul-2019

Run Information

Run 1

Filename: 5-190717A17
Run Date: 17-Jul-19 22:13
Final Volume: 25 ul
Dilution Factor: 1
Analysis Units: pg
Instrument - Column: HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-001		8.87	<2.8	2.8	U	1.7	25
PCB-002		NotFnd	<2.7	2.7	U		25
PCB-003		NotFnd	<2.9	2.9	U		25
PCB-004		NotFnd	<12	12	U		25
PCB-010		NotFnd	<7.2	7.2	U		25
PCB-009		NotFnd	<7.2	7.2	U		25
PCB-007		NotFnd	<7.1	7.1	U		25
PCB-006		NotFnd	<7.2	7.2	U		25
PCB-005		NotFnd	<8.3	8.3	U		25
PCB-008		NotFnd	<6.3	6.3	U		25
PCB-014		NotFnd	<6.3	6.3	U		25
PCB-011		13.90	<58	6.6	R	58	25
PCB-012/013		NotFnd	<6.5	6.5	U		25
PCB-015		NotFnd	<6.6	6.6	U		25
PCB-019		NotFnd	<3.5	3.5	U		25
PCB-018/030		13.73	9.54	5.6	J		25
PCB-017		13.96	<6.7	6.7	M,U		25
PCB-027		NotFnd	<4.8	4.8	U		25
PCB-024		NotFnd	<5.0	5.0	U		25
PCB-016		14.25	<8.0	8.0	M,U	4.5	25
PCB-032		NotFnd	<4.4	4.4	U		25
PCB-034		NotFnd	<4.3	4.3	U		25
PCB-023		NotFnd	<4.2	4.2	U		25
PCB-026/029		NotFnd	<4.0	4.0	U		25
PCB-025		NotFnd	<4.0	4.0	U		25
PCB-031		15.82	<7.6	3.8	M,J,R	7.6	25
PCB-020/028		15.99	<9.0	4.1	M,J,R	9.0	25
PCB-021/033		16.12	<6.8	4.2	J,R	6.8	25
PCB-022		16.36	7.55	4.4	M,J		25
PCB-036		NotFnd	<3.8	3.8	U		25
PCB-039		NotFnd	<4.0	4.0	U		25
PCB-038		NotFnd	<4.3	4.3	U		25
PCB-035		NotFnd	<4.3	4.3	U		25
PCB-037		NotFnd	<4.7	4.7	U		25
PCB-054		NotFnd	<1.5	1.5	U		25
PCB-050/053		NotFnd	<2.7	2.7	U		25
PCB-045/051		16.07	<3.7	2.8	M,J,R	3.7	25
PCB-046		NotFnd	<3.1	3.1	U		25
PCB-052		16.97	<8.2	2.8	J,R	8.2	25
PCB-073		NotFnd	<2.0	2.0	U		25
PCB-043		NotFnd	<3.2	3.2	U		25
PCB-049/069		17.24	<4.0	2.5	J,R	4.0	25
PCB-048		NotFnd	<2.7	2.7	U		25
PCB-044/047/065		17.55	<12	2.5	J,R	12	25
PCB-059/062/075		NotFnd	<2.0	2.0	U		25
PCB-042		17.83	<3.2	3.2	U		25
PCB-040/041/071		NotFnd	<2.7	2.7	U		25
PCB-064		NotFnd	<2.2	2.2	U		25
PCB-072		NotFnd	<2.5	2.5	U		25
PCB-068		NotFnd	<2.4	2.4	U		25
PCB-057		NotFnd	<2.6	2.6	U		25
PCB-058		NotFnd	<2.6	2.6	U		25
PCB-067		NotFnd	<2.3	2.3	U		25
PCB-063		NotFnd	<2.4	2.4	U		25
PCB-061/070/074/076		19.58	<9.3	2.6	J,R	9.3	25
PCB-066		19.73	<4.2	2.5	J,R	4.2	25
PCB-055		NotFnd	<2.7	2.7	U		25
PCB-056		NotFnd	<2.7	2.7	U		25
PCB-060		NotFnd	<2.7	2.7	U		25
PCB-080		NotFnd	<2.2	2.2	U		25
PCB-079		NotFnd	<2.3	2.3	U		25
PCB-078		NotFnd	<2.7	2.7	U		25
PCB-081	0.0003	NotFnd	<2.6	2.6	U		25
PCB-077	0.0001	NotFnd	<2.8	2.8	U		25
PCB-104		NotFnd	<1.4	1.4	U		25
PCB-096		NotFnd	<1.4	1.4	U		25
PCB-103		NotFnd	<2.0	2.0	U		25
PCB-094		NotFnd	<2.5	2.5	U		25
PCB-095		19.11	<5.0	2.2	J,R	5.0	25
PCB-093/098/100/102		NotFnd	<2.3	2.3	U		25

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3081836-1	Extraction Date	12-Jul-19		
Analysis Method	EPA 1668C	Sample Size	1	Puf	
Analysis Type	Blank	Percent Moisture	n/a		Approved: E. Sabljic --e-signature-- 18-Jul-2019
Sample Matrix	QC	Split Ratio	1		

Run Information	Run 1
Filename	5-190717A17
Run Date	17-Jul-19 22:13
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-088/091		NotFnd	<2.3	2.3	U		25
PCB-084		NotFnd	<2.6	2.6	U		25
PCB-089		NotFnd	<2.5	2.5	U		25
PCB-121		NotFnd	<1.7	1.7	U		25
PCB-092		NotFnd	<2.3	2.3	U		25
PCB-090/101/113			20.63	5.52	2.0	J	25
PCB-083/099		NotFnd	<2.4	2.4	U		25
PCB-112		NotFnd	<1.6	1.6	U		25
PCB-086/087/097/109/119/125		NotFnd	<2.0	2.0	U		25
PCB-085/110/115/116/117			21.71	<4.2	1.9	M,J,R	4.2
PCB-082		NotFnd	<2.8	2.8	U		25
PCB-111		NotFnd	<1.7	1.7	U		25
PCB-120		NotFnd	<1.6	1.6	U		25
PCB-108/124		NotFnd	<2.1	2.1	U		25
PCB-107		NotFnd	<2.0	2.0	U		25
PCB-123	0.00003	NotFnd	<2.2	2.2	U		25
PCB-106		NotFnd	<2.1	2.1	U		25
PCB-118	0.00003		23.26	3.52	2.1	J	25
PCB-122		NotFnd	<2.2	2.2	U		25
PCB-114	0.00003	NotFnd	<2.2	2.2	U		25
PCB-105	0.00003	NotFnd	<2.1	2.1	U		25
PCB-127		NotFnd	<2.0	2.0	U		25
PCB-126	0.1		25.49	<2.1	2.1	U	2.0
PCB-155		NotFnd	<0.78	0.78	U		25
PCB-152		NotFnd	<0.75	0.75	U		25
PCB-150		NotFnd	<0.72	0.72	U		25
PCB-136		NotFnd	<0.74	0.74	U		25
PCB-145		NotFnd	<0.76	0.76	U		25
PCB-148		NotFnd	<0.99	0.99	U		25
PCB-135/151		NotFnd	<1.1	1.1	U		25
PCB-154		NotFnd	<0.77	0.77	U		25
PCB-144		NotFnd	<1.0	1.0	U		25
PCB-147/149			22.65	3.04	1.5	J	25
PCB-134/143		NotFnd	<1.8	1.8	U		25
PCB-139/140		NotFnd	<1.5	1.5	U		25
PCB-131		NotFnd	<2.0	2.0	U		25
PCB-142		NotFnd	<1.8	1.8	U		25
PCB-132		NotFnd	<1.8	1.8	U		25
PCB-133		NotFnd	<1.6	1.6	U		25
PCB-165		NotFnd	<1.3	1.3	U		25
PCB-146		NotFnd	<1.5	1.5	U		25
PCB-161		NotFnd	<1.2	1.2	U		25
PCB-153/168			24.17	<2.1	1.3	J,R	2.1
PCB-141		NotFnd	<1.6	1.6	U		25
PCB-130		NotFnd	<1.9	1.9	U		25
PCB-137/164		NotFnd	<1.4	1.4	U		25
PCB-129/138/163			24.88	<3.7	1.7	J,R	3.7
PCB-160		NotFnd	<1.1	1.1	U		25
PCB-158		NotFnd	<1.1	1.1	U		25
PCB-128/166		NotFnd	<1.4	1.4	U		25
PCB-159		NotFnd	<1.2	1.2	U		25
PCB-162		NotFnd	<1.3	1.3	U		25
PCB-167	0.00003	NotFnd	<1.1	1.1	U		25
PCB-156/157	0.00003	NotFnd	<1.5	1.5	U		50
PCB-169	0.03	NotFnd	<1.2	1.2	U		25
PCB-188		NotFnd	<0.91	0.91	U		25
PCB-179		NotFnd	<0.89	0.89	U		25
PCB-184		NotFnd	<0.86	0.86	U		25
PCB-176		NotFnd	<0.90	0.90	U		25
PCB-186		NotFnd	<0.95	0.95	U		25
PCB-178		NotFnd	<1.3	1.3	U		25
PCB-175		NotFnd	<1.2	1.2	U		25
PCB-187		NotFnd	<1.2	1.2	U		25
PCB-182		NotFnd	<1.2	1.2	U		25
PCB-183		NotFnd	<1.1	1.1	U		25
PCB-185		NotFnd	<1.4	1.4	U		25
PCB-174		NotFnd	<1.2	1.2	U		25
PCB-177		NotFnd	<1.3	1.3	U		25
PCB-181		NotFnd	<1.3	1.3	U		25
PCB-171/173		NotFnd	<1.3	1.3	U		25
PCB-172		NotFnd	<1.3	1.3	U		25

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name **Method Blank**
 ALS Sample ID WG3081836-1
 Analysis Method EPA 1668C
 Analysis Type Blank
 Sample Matrix QC

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

Approved:
E. Sabljic
 --e-signature--
 18-Jul-2019

Run Information

Run 1

Filename 5-190717A17
 Run Date 17-Jul-19 22:13
 Final Volume 25 ul
 Dilution Factor 1
 Analysis Units pg
 Instrument - Column HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
PCB-192		NotFnd	<1.0	1.0	U		25
PCB-180/193		27.68	<1.7	1.1	J,R	1.7	25
PCB-191		NotFnd	<0.95	0.95	U		25
PCB-170		NotFnd	<1.3	1.3	U		25
PCB-190		NotFnd	<0.86	0.86	U		25
PCB-189	0.00003	NotFnd	<0.87	0.87	U		25
PCB-202		NotFnd	<0.65	0.65	U		25
PCB-201		NotFnd	<0.65	0.65	U		25
PCB-204		NotFnd	<0.66	0.66	U		25
PCB-197		NotFnd	<0.66	0.66	U		25
PCB-200		NotFnd	<0.65	0.65	U		25
PCB-198/199		NotFnd	<0.87	0.87	U		25
PCB-196		NotFnd	<0.85	0.85	U		25
PCB-203		NotFnd	<0.82	0.82	U		25
PCB-195		NotFnd	<0.87	0.87	U		25
PCB-194		31.06	1.96	0.80	J		25
PCB-205		NotFnd	<0.72	0.72	U		25
PCB-208		NotFnd	<1.5	1.5	U		25
PCB-207		NotFnd	<1.4	1.4	U		25
PCB-206		NotFnd	<2.3	2.3	U		25
PCB-209		NotFnd	<0.73	0.73	U		25

Extraction Standards pg Time % Rec Limits

13C12-PCB-001	4000	8.94	27	5-145
13C12-PCB-003	4000	10.47	30	5-145
13C12-PCB-004	4000	10.63	38	5-145
13C12-PCB-015	4000	14.28	33	5-145
13C12-PCB-019	4000	12.61	44	5-145
13C12-PCB-037	4000	18.21	46	5-145
13C12-PCB-054	4000	14.45	51	5-145
13C12-PCB-081	4000	21.79	50	10-145
13C12-PCB-077	4000	22.08	54	10-145
13C12-PCB-104	4000	17.49	63	10-145
13C12-PCB-123	4000	23.07	58	10-145
13C12-PCB-118	4000	23.23	59	10-145
13C12-PCB-114	4000	23.54	58	10-145
13C12-PCB-105	4000	23.90	62	10-145
13C12-PCB-126	4000	25.48	63	10-145
13C12-PCB-155	4000	20.47	61	10-145
13C12-PCB-167	4000	26.38	74	10-145
13C12-PCB-156/157	8000	27.00	73	10-145
13C12-PCB-169	4000	28.67	80	10-145
13C12-PCB-188	4000	23.48	70	10-145
13C12-PCB-189	4000	29.94	70	10-145
13C12-PCB-202	4000	26.26	90	10-145
13C12-PCB-205	4000	31.33	86	10-145
13C12-PCB-208	4000	29.68	81	10-145
13C12-PCB-206	4000	32.39	91	10-145
13C12-PCB-209	4000	33.52	76	10-145

Field Spike Standards

13C12-PCB-031		NS
13C12-PCB-095		NS
13C12-PCB-153		NS
4-chloro-4'-fluorobiphenyl		NS
13C12-PCB-11		NS

Cleanup Standards

13C12-PCB-028	4000	15.97	41	5-145
13C12-PCB-111	4000	22.00	53	10-145
13C12-PCB-178	4000	25.05	69	10-145

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	Method Blank	Sampling Date	n/a		
ALS Sample ID	WG3081836-1	Extraction Date	12-Jul-19		
Analysis Method	EPA 1668C	Sample Size	1	Puf	
Analysis Type	Blank	Percent Moisture	n/a		
Sample Matrix	QC	Split Ratio	1		
					Approved: E. Sabljic --e-signature-- 18-Jul-2019

Run Information	Run 1
Filename	5-190717A17
Run Date	17-Jul-19 22:13
Final Volume	25 ul
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg	EDL pg	Flags	EMPC pg	LQL
Homologue Group Totals							
Total MonoCB			<2.7	2.7	U		100
Total DiCB			58.0	6.3	J		200
Total TriCB			40.5	3.5	J		200
Total TetraCB			41.4	1.5	J		400
Total PentaCB			18.2	1.4	J		400
Total HexaCB			8.84	0.72	J		400
Total HeptaCB			1.70	0.86	J		200
Total OctaCB			1.96	0.65	J		200
Total NonaCB			<1.4	1.4	U		100
DecaCB			<0.73	0.73	U		100
Total PCB			171		J		800
Toxic Equivalency - (WHO 2005)							
Lower Bound PCB TEQ			0.000106				
Mid Point PCB TEQ			0.124				
Upper Bound PCB TEQ			0.247				

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.
NS	Indicates that this standard was not spiked to sample
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	Laboratory Control Sample	Sampling Date	n/a	Approved: <i>E. Sabljic</i> --e-signature-- 18-Jul-2019
ALS Sample ID	WG3081836-2	Extraction Date	12-Jul-19	
Analysis Method	EPA 1668C	Sample Size	1 n/a	
Analysis Type	LCS	Percent Moisture	n/a	
Sample Matrix	QC	Split Ratio	1	

Run Information	Run 1
Filename	5-190717A15
Run Date	17-Jul-19 20:49
Final Volume	25 ul
Dilution Factor	1
Analysis Units	% Rec
Instrument - Column	HRMS5 SPBOCTYL64948-04A

Target Analytes	pg	Ret. Time	% Rec	Limits	Flags
PCB-001	2000	8.97	100	60-135	
PCB-003	2000	10.51	100	60-135	
PCB-004	2000	10.66	99	60-135	
PCB-015	2000	14.31	99	60-135	
PCB-019	2000	12.64	104	60-135	
PCB-037	2000	18.24	101	60-135	
PCB-054	2000	14.48	102	60-135	
PCB-081	2000	21.81	94	60-135	
PCB-077	2000	22.11	96	60-135	
PCB-104	2000	17.52	90	60-135	
PCB-123	2000	23.09	93	60-135	
PCB-118	2000	23.27	90	60-135	
PCB-114	2000	23.57	93	60-135	
PCB-105	2000	23.92	90	60-135	
PCB-126	2000	25.51	91	60-135	
PCB-155	2000	20.51	91	60-135	
PCB-167	2000	26.40	90	60-135	
PCB-156/157	4000	27.04	91	60-135	
PCB-169	2000	28.70	94	60-135	
PCB-188	2000	23.50	93	60-135	
PCB-189	2000	29.96	102	60-135	
PCB-202	2000	26.28	100	60-135	
PCB-205	2000	31.35	87	60-135	
PCB-208	2000	29.70	101	60-135	
PCB-206	2000	32.43	100	60-135	
PCB-209	2000	33.55	113	60-135	
Extraction Standards					
		Time	% Rec	Limits	
13C12-PCB-001	4000	8.97	31	15-145	
13C12-PCB-003	4000	10.49	33	15-145	
13C12-PCB-004	4000	10.65	42	15-145	
13C12-PCB-015	4000	14.29	37	15-145	
13C12-PCB-019	4000	12.62	49	15-145	
13C12-PCB-037	4000	18.23	47	15-145	
13C12-PCB-054	4000	14.47	55	15-145	
13C12-PCB-081	4000	21.80	51	40-145	
13C12-PCB-077	4000	22.10	54	40-145	
13C12-PCB-104	4000	17.51	68	40-145	
13C12-PCB-123	4000	23.08	57	40-145	
13C12-PCB-118	4000	23.26	59	40-145	
13C12-PCB-114	4000	23.56	57	40-145	
13C12-PCB-105	4000	23.91	58	40-145	
13C12-PCB-126	4000	25.49	58	40-145	
13C12-PCB-155	4000	20.49	46	40-145	
13C12-PCB-167	4000	26.39	69	40-145	
13C12-PCB-156/157	8000	27.03	67	40-145	
13C12-PCB-169	4000	28.68	75	40-145	
13C12-PCB-188	4000	23.49	60	40-145	
13C12-PCB-189	4000	29.95	65	40-145	
13C12-PCB-202	4000	26.27	76	40-145	
13C12-PCB-205	4000	31.34	78	40-145	
13C12-PCB-208	4000	29.69	56	40-145	
13C12-PCB-206	4000	32.41	82	40-145	
13C12-PCB-209	4000	33.53	32	40-145	
Field Spike Standards					
13C12-PCB-031			NS		
13C12-PCB-095			NS		
13C12-PCB-153			NS		
4-chloro-4'-fluorobiphenyl			NS		
13C12-PCB-11			NS		
Cleanup Standards					
13C12-PCB-028	4000	15.99	43	15-145	
13C12-PCB-111	4000	22.02	54	40-145	
13C12-PCB-178	4000	25.07	63	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 was not spiked to sample

SVOC DATA PACKAGE

SECTION 6: INTERNAL RECORDS

Including:

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

Extraction Workup Sheet

11

Batch ID: WG3081836

Analysis: PUF5 - M23/1668A (HR)

WG3081836

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

Analyst: Jackson Peay

Date: 12-Jul-19

SUBSAMPLING		
Sample I.D.	Client I.D.	Media Prep L#
WG3081836-1	Method Blank	L2293145-7
WG3081836-2	Laboratory Control Sample	L2293145-8
WG3081836-3	Extraction and Injection STD.	—
L2308151-1	HEISER-25745103	L2293145-4
L2308151-2	RES-25745100	L2293145-1
L2308151-3	CITY-25745101	L2293145-2

BATCH TRACKING

	Date/Time/Initials
Client Labels Checked:	JP
Media transfer to soxhlet:	12-Jul-19 2:00PM JP
Rotovap Rinses:	—
liquid/liquid extraction:	—
Soxhlet Start Time:	12-Jul-19 3:00PM JP
3 Soxhlets Reflux Properly:	JP
5 Soxhlet End Time:	16:50am
	—
	—
	—
	—
Rotovap Reduction + verify	15-Jul-19 AP
Extract split:	15-Jul-19 AP
Acid Silica Column:	15-Jul-19 AP
Solvent exchange:	16-Jul-19 NA
Alumina Column:	16-Jul-19 NA
Carbon Column:	16-Jul-2019 1500 KS
	—
Micro/Robo Vial:	16-Jul-19 / 16-Jul-19 NA / (KS) (DX)
Update to LIMS:	16-Jul-2019 2100 DS

Batch ID: WG3081836

DX Extraction Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	40	✓
WG3081836-2	40	✓
WG3081836-3	40	✓
L2294320-1	40	✓
L2294320-2	40	✓
L2294320-3	40	✓
L2301798-1	40	✓
L2301798-2	40	✓
L2301798-3	40	✓
L2308151-1	40	✓
L2308151-2	40	✓
L2308151-3	40	✓

Syringe ID: 320

Standard: M23-ES#2-035H

Spike Date: 12-July-2019

Spike Witnessing

Chemist's Initials

Chemist: JP

Witness's Initials

Witness: SA

Witness's Initials

Correct Syringe Obtained: SA

Witness's Initials

Correct Standard Obtained: SA

Witness's Initials

Correct Technique Followed: SA

PCB Extraction Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	40	✓
WG3081836-2	40	✓
WG3081836-3	40	✓
L2294320-1	40	✓
L2294320-2	40	✓
L2294320-3	40	✓
L2301798-1	40	✓
L2301798-2	40	✓
L2301798-3	40	✓
L2308151-1	40	✓
L2308151-2	40	✓
L2308151-3	40	✓

Syringe ID: 118

Standard: 1668A-ES#2- 055E

Spike Date: 12- July- 2019

Spike Witnessing

Chemist's Initials
Chemist: JP

Witness's Initials
Witness: SA

Correct Syringe Obtained: SA

Correct Standard Obtained: SA

Correct Technique Followed: SA

Batch ID: WG3081836

Batch ID: WG3081836

DX Native Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-2	40	✓
WG3081836-3	40	✓

Syringe ID: 322

Standard: 1613B-NS#3- 022B

Date & Initials: 12- July- 2019 JP

Syringe ID: 323

Standard: 1668A-NS#1- 36F

Date & Initials: 12- July- 2019 JP

PCB Native Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-2	40	✓
WG3081836-3	40	✓

DX Cleanup Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	20	✓
WG3081836-2	20	✓
WG3081836-3	N/A	N/A
L2294320-1	20	✓
L2294320-2	20	✓
L2294320-3	20	✓
L2301798-1	20	✓
L2301798-2	20	✓
L2301798-3	20	✓
L2308151-1	20	✓
L2308151-2	20	✓
L2308151-3	20	✓

Syringe ID:

361

Standard:

1613B-CL#2-064F

Date & Initials:

15-Jul-19 AP

Correct Syringe Obtained:

Chemist's Initials
AP

Correct Standard Obtained:

Chemist's Initials
AP

Correct Technique Followed:

Chemist's Initials
AP

PCB Cleanup Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	20	✓
WG3081836-2	20	✓
WG3081836-3	N/A	N/A
L2294320-1	20	✓
L2294320-2	20	✓
L2294320-3	20	✓
L2301798-1	20	✓
L2301798-2	20	✓
L2301798-3	20	✓
L2308151-1	20	✓
L2308151-2	20	✓
L2308151-3	20	✓

Syringe ID:

360

Standard:

1668A-CL#2-31B

Date & Initials:

15-Jul-19 AP

Correct Syringe Obtained:

Chemist's Initials
AP

Correct Standard Obtained:

Chemist's Initials
AP

Correct Technique Followed:

Chemist's Initials
AP

Batch ID: WG3081836

DX Injection Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	10	✓
WG3081836-2	10	✓
WG3081836-3	10	✓
L2294320-1	10	✓
L2294320-2	10	✓
L2294320-3	10	✓
L2301798-1	10	✓
L2301798-2	10	✓
L2301798-3	10	✓
L2308151-1	10	✓
L2308151-2	10	✓
L2308151-3	10	✓
	10	
	10	
	10	
	10	

Syringe ID:

335

Standard:

1613B-IS#1- 01SD

Date & Initials:

16 July 2019 [Signature]

Correct Syringe Obtained:

Chemist's Initials [Signature]

Correct Standard Obtained:

Chemist's Initials [Signature]

Correct Technique Followed:

Chemist's Initials [Signature]

PCB Injection Standard:

(Checkmark)

Sample I.D.	Volume (ul)	Spiked
WG3081836-1	5	✓
WG3081836-2	5	✓
WG3081836-3	5	✓
L2294320-1	5	✓
L2294320-2	5	✓
L2294320-3	5	✓
L2301798-1	5	✓
L2301798-2	5	✓
L2301798-3	5	✓
L2308151-1	5	✓
L2308151-2	5	✓
L2308151-3	5	
	5	
	5	
	5	
	5	

Syringe ID:

365

Standard:

1668A-IS#2- 011C

Date & Initials:

16 July 2019 NA

Correct Syringe Obtained:

Chemist's Initials NA

Correct Standard Obtained:

Chemist's Initials NA

Correct Technique Followed:

Chemist's Initials NA

Batch ID: WG3081836

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	104291	
Hexane	104312	
DCM	104578	
Toluene	104369	
Nonane	ORG-WAKONON- 068	
1:1 DCM:HEX	ORG-DH2- 558	
Sodium Sulphate	ORG-SSU- 2108-2110	
Acid Silica	ORG-ASI- 8728	
Neutral Silica	ORG-NSI- 1931	
Alumina	ORG-ALU- 429	
1% Deactivated Silica	ORG-2%DAS- -	
Chromacarb	ORG-CC- 249	

Batch ID: WG3081836

Procedure:

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

Extraction:

- PUFs were prepared off site, for MB and LCS use empty thimble
- Place Puf into a pre-cleaned thimble
- Spike with Extraction Standard (plus Native for LCS and ENI).
- Dean-Stark Soxhlet extract in Toluene for 16 hours (check with team lead or supervisor)

Rotovap:

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

Batch ID: WG3081836

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: WG3081836

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns

L2294320-Da-3 both samples were split @ 10ml + 5ml
Samples were very gel-like + were not blowing down further
than 9ml. 5ml put through acid column as per MSM 15-JUL-19 AP

Approval of Deviation from Standard Method

(Batch Writer): _____

Procedure does deviate from Standard Method. Approved (Supervisor/Manager): _____

WG3081836			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:	E. Sabljic --e-signature-- 18-Jul-2019
-----------	--

$$\text{RRF} = \frac{\text{Response of PCB-118}}{\text{Response of 13C12-PCB-118}} \times \frac{\text{Concentration of 13C12-PCB-118}}{\text{Concentration of PCB-118}}$$

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

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

= 1.14	1.14
--------	------

Calculation of PCB-118 amount in L2308151-1

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

$$\text{pg} = \frac{2869}{429542.1} \times \frac{4000}{1.15 * 1.00} = 23.2$$

23.2

Calculation of 13C12-PCB-118 Recovery in L2308151-1

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

$$\% \text{ Recovery} = \frac{429542.1}{871258.9} \times \frac{8000 * 100}{1.41 * 4000} = 70$$

70 %

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:

L2308151

[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 7/5/19 Purchase Order No. _____

3. Company Name: Floyd/Snider ALS Project Manager: Ron McLeod

Address: 601 Union St Suite 600

Seattle WA 98101

Person to Contact: Emily Jones

Telephone (719) 292-2078

Fax Telephone () _____

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

Billing Address (if different from above) _____

4. Quote No. _____ Email quote _____

5. **Sample Collection**

Sampling Site Seattle

Industrial Process: Air Emission

Date of Collection 7/5/19

Time Collected 1119, 1200, 1237

Date of Shipment 7/5/19 7/7/19

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>Heiser-25745103</u>	<u>Lo-Vol PUF tube</u>	<u>1 Filter</u>	<u>PCBs by Method 1668; Dioxins by Method 8290A</u>	<u>1</u>	<u>1</u>
<u>Res-25745100</u>	<u>Lo-Vol PUF tube</u>		<u>PCBs by Method 1668; Dioxins by Method 8290A</u>	<u>1</u>	<u>2</u>
<u>City-25745101</u>	<u>Lo-Vol PUF tube</u>		<u>PCBs by Method 1668; Dioxins by Method 8290A</u>	<u>1</u>	<u>3</u>
<u>City 7/5/19</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>Corey H. Wilson</u>	Date/Time	<u>7/5/19 1300</u>
Received by	<u>BARAN BORTAN</u>	Date/Time	<u>11-July-2019 12:30 24.2°C</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
11-July-2019 12:30	Floyd / Anider	3 x Pufs	24.2°C	>10°C FedEx 7883 3469 3751	Mj	11-July-2019 14:00	L2308151	-1-3

*Temperatures were recorded using: 'Oakton infraPro' dedicated I.R. gun (serial #97800270)
 Other (specify): _____