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

SVOC DATA PACKAGE

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
Project Description:
Contact: Amber Bailey

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2479138

Final Package Review by: _____

Date Reviewed: 13-Aug-20

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

SVOC DATA PACKAGE

SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2479138

Client Project Information

Project ID: 1466-004 SEATTLE IRON & METALS
Project Description:
Contact: Amber Bailey

Analytical Method: PCDD/F by TO9A via EPA M23/8290A

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Temp/degrees C. on receipt	Date Extracted	Date Analyzed
L2468702-1	L2453819-8-062920-1	PUF	29-Jun-20	2-Jul-20	25.0	n/a	n/a
L2472393-1	L2453819-16-070720-1	PUF	7-Jul-20	9-Jul-20	23.5	n/a	n/a
L2475162-1	L2453819-1-071420-1	PUF	14-Jul-20	15-Jul-20	4.9	n/a	n/a
L2479135-1	L2453819-6-072120-1	PUF	21-Jul-20	23-Jul-20	6.5	n/a	n/a
L2479138-1	**SITE 1 - COMPOSITE 1 (JULY)**	**PUF**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**09-Aug-20**
L2468702-2	L2453819-23-062920-2	PUF	29-Jun-20	02-Jul-20	25.0	n/a	n/a
L2472393-2	L2453819-24-070720-2	PUF	7-Jul-20	9-Jul-20	23.5	n/a	n/a
L2475162-2	L2453819-14-071420-2	PUF	14-Jul-20	15-Jul-20	4.9	n/a	n/a
L2479135-2	L2453819-7-072120-2	PUF	21-Jul-20	23-Jul-20	6.5	n/a	n/a
L2479138-2	**SITE 2 - COMPOSITE 1 (JULY)**	**PUF**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**09-Aug-20**
L2468702-3	L2453819-10-062920-3	PUF	29-Jun-20	02-Jul-20	25.0	n/a	n/a
L2472393-3	L2453819-11-070720-3	PUF	7-Jul-20	9-Jul-20	23.5	n/a	n/a
L2475162-3	L2453819-4-071420-3	PUF	14-Jul-20	15-Jul-20	4.9	n/a	n/a
L2479135-3	L2453819-5-072120-3	PUF	21-Jul-20	23-Jul-20	6.5	n/a	n/a
L2479138-3	**SITE 3 - COMPOSITE 1 (JULY)**	**PUF**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**10-Aug-20**
L2468702-4	L2453819-21-062920-4	PUF	29-Jun-20	02-Jul-20	25.0	n/a	n/a
L2472393-4	L2453819-20-070720-4	PUF	7-Jul-20	9-Jul-20	23.5	n/a	n/a
L2475162-4	L2453819-12-071420-4	PUF	14-Jul-20	15-Jul-20	4.9	n/a	n/a
L2479135-4	L2453819-19-072120-4	PUF	21-Jul-20	23-Jul-20	6.5	n/a	n/a
L2479138-4	**SITE 4 - COMPOSITE 1 (JULY)**	**PUF**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**10-Aug-20**
L2468702-5	L2453819-22-062920-5	PUF	29-Jun-20	02-Jul-20	25.0	n/a	n/a
L2472393-5	L2453819-13-070720-5	PUF	7-Jul-20	9-Jul-20	23.5	n/a	n/a
L2475162-5	L2453819-3-071420-5	PUF	14-Jul-20	15-Jul-20	4.9	n/a	n/a
L2479135-5	L2453819-2-072120-5	PUF	21-Jul-20	23-Jul-20	6.5	n/a	n/a
L2479138-5	**SITE 5 - COMPOSITE 1 (JULY)**	**PUF**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**10-Aug-20**
WG3369876-1	**Method Blank**	**MEDIA**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**09-Aug-20**
WG3369876-4	**Method Blank**	**REAGENT**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**09-Aug-20**
WG3369876-2	**Laboratory Control Sample**	**QC**	**n/a**	**n/a**	**n/a**	**30-Jul-20**	**09-Aug-20**

Comments and Notes:
a) Sample Integrity:

The samples were received on 4 different dates as noted above. The four samples for each site were extracted together for a total of 5 composites. Some of the samples were received at above the recommended transportation and storage temperature. However, the brief period at above the recommended temperature is not expected to have a negative impact on reported native target results.

b) Instrumental Analysis:

Due to an operational issue, the pre-run mass resolution printout is not available for the initial calibration. The post-run mass resolution printout has been included in the appendix and meets method requirements. The mass 380.9760 is marginally below 10,000 for the first time segment. However, this mass is outside the range of the analytical targets. No negative impact to overall data quality is expected as a result.

Since each PUF was spiked with field sampling standards, and four PUFs were composited for each sample, the level of the field standard exceeds the level of the labelled extraction standard added. As a result, for the field standard 13C12-1,2,3,4,7,8-HxCDF and the closely-eluting labelled extraction standard 1,2,3,6,7,8-HxCDF, the tail of the field standard elevates the response of the extraction standard. As a result, the HxCDF field standard and the two low level native target results are likely biased low. TEQ values are not expected to be significantly biased.

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

13-Aug-20
Date

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

SVOC DATA PACKAGE

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:	Claire Kocharakkal	**Client Name:**	Farallon Consulting, L.L.C
ALS Project ID:	FAR100	**Client Address:**	975 5th Avenue Northwest
ALS WO#:	L2479138		Issaquah, WA 98027
Date of Report	14-Aug-20		USA
Date of Sample Receipt	23-Jul-20	**Client Contact:**	Amber Bailey
		Client Project ID:	1466-004 SEATTLE IRON & METALS

COMMENTS: **PCDD/F by TO9A via EPA M23/8290A**

Since each PUF was spiked with field sampling standards, and four PUFs were composited for each sample, the level of the field standard exceeds the level of the labelled extraction standard added. As a result, for the field standard 13C12-1,2,3,4,7,8-HxCDF and the closely-eluting labelled extraction standard 1,2,3,6,7,8-HxCDF. The tail of the field standard elevates the response of the extraction standard. As a result, the HxCDF field standard and the two low level native target results are likely biased low. TEQ values are not expected to be significantly biased.

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	SITE 1 - COMPOSITE 1 (JULY)	SITE 2 - COMPOSITE 1 (JULY)	SITE 3 - COMPOSITE 1 (JULY)	SITE 4 - COMPOSITE 1 (JULY)	SITE 5 - COMPOSITE 1 (JULY)
ALS Sample ID	L2479138-1	L2479138-2	L2479138-3	L2479138-4	L2479138-5
Sample Size	1	1	1	1	1
Sample size units	sample	sample	sample	sample	sample
Percent Moisture	n/a	n/a	n/a	n/a	n/a
Sample Matrix	PUF	PUF	PUF	PUF	PUF
Sampling Date	n/a	n/a	n/a	n/a	n/a
Extraction Date	30-Jul-20	30-Jul-20	30-Jul-20	30-Jul-20	30-Jul-20
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<1.2	<1.5	<0.94	<1.6	<1.2
1,2,3,7,8-PeCDD	<0.83	<0.91	<0.98	<0.68	<1.2
1,2,3,4,7,8-HxCDD	<1.3	<0.97	<1.4	<2.8	<0.57
1,2,3,6,7,8-HxCDD	<1.2	<0.93	<1.4	<2.7	<0.55
1,2,3,7,8,9-HxCDD	<1.2	<0.94	<1.4	<2.7	<0.55
1,2,3,4,6,7,8-HpCDD	<6.7	15.3	16.6	<20	21.2
OCDD	47.0	87.7	110	173	189
2,3,7,8-TCDF	<1.0	<1.6	<0.76	<1.3	<0.91
1,2,3,7,8-PeCDF	<0.86	<1.4	0.820	<1.1	<0.86
2,3,4,7,8-PeCDF	<0.79	1.84	<0.73	1.09	1.37
1,2,3,4,7,8-HxCDF	<0.57	<0.95	<0.45	<0.58	<0.65
1,2,3,6,7,8-HxCDF	<0.56	1.27	<0.44	<0.57	0.630
2,3,4,6,7,8-HxCDF	<0.59	<0.99	<0.47	<0.73	<0.63
1,2,3,7,8,9-HxCDF	<0.71	<1.2	<0.56	<0.86	<0.75
1,2,3,4,6,7,8-HpCDF	<1.7	<5.3	5.92	8.87	<4.0
1,2,3,4,7,8,9-HpCDF	<0.84	<0.58	<1.2	<0.66	<0.54
OCDF	<2.6	<5.7	10.2	<5.8	7.44
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	102	102	104	99	98
13C12-1,2,3,4,7,8-HxCDD	73	78	79	71	75
13C12-2,3,4,7,8-PeCDF	97	98	101	100	85
13C12-1,2,3,4,7,8-HxCDF	54	65	61	59	55
13C12-1,2,3,4,7,8,9-HpCDF	75	83	82	82	72
Extraction Standards					
13C12-2,3,7,8-TCDD	68	61	81	67	79
13C12-1,2,3,7,8-PeCDD	74	65	86	70	84
13C12-1,2,3,6,7,8-HxCDD	93	82	103	95	100
13C12-1,2,3,4,6,7,8-HpCDD	63	57	72	65	71
13C12-OCDD	54	48	60	57	61
13C12-2,3,7,8-TCDF	74	62	90	69	85
13C12-1,2,3,7,8-PeCDF	69	60	81	64	80
13C12-1,2,3,6,7,8-HxCDF	112	90	117	102	115
13C12-1,2,3,4,6,7,8-HpCDF	62	57	69	62	70
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	62	56	65	64	61
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**	**pg**
Total-TCDD	<1.2	<1.5	<0.94	1.67	<1.2
Total-PeCDD	<0.83	<0.91	<0.98	<0.68	<1.2
Total-HxCDD	<1.3	2.73	3.14	4.79	3.17
Total-HpCDD	12.9	31.1	34.6	<2.0	48.2
Total-TCDF	<1.0	5.50	4.01	5.48	2.14
Total-PeCDF	<0.69	6.85	2.48	<1.1	2.55
Total-HxCDF	1.22	2.16	0.710	<0.72	2.24
Total-HpCDF	2.28	<0.58	5.92	14.0	<0.54
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	0.0141	0.858	0.286	0.468	0.745
Mid Point PCDD/F TEQ (WHO 2005)	1.74	2.52	1.73	2.54	2.28
Upper Bound PCDD/F TEQ (WHO 2005)	3.11	4.13	3.12	4.21	3.68

ALS Life Sciences

Quality Control Summary Report

Sample Name	Method Blank	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3369876-1	WG3369876-4	WG3369876-2
Sample Size	1	1	1
Sample size units	sample	sample	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	MEDIA	REAGENT	QC
Sampling Date	n/a	n/a	n/a
Extraction Date	30-Jul-20	30-Jul-20	30-Jul-20
Target Analytes	**pg**	**pg**	**% Rec**
2,3,7,8-TCDD	<1.6	<1.0	91
1,2,3,7,8-PeCDD	<0.93	<0.76	100
1,2,3,4,7,8-HxCDD	<1.2	<0.66	93
1,2,3,6,7,8-HxCDD	<1.1	<0.64	107
1,2,3,7,8,9-HxCDD	<1.1	<0.64	109
1,2,3,4,6,7,8-HpCDD	<1.1	<0.86	96
OCDD	<3.8	<1.8	91
2,3,7,8-TCDF	<0.83	<0.67	94
1,2,3,7,8-PeCDF	<0.73	0.900	96
2,3,4,7,8-PeCDF	<0.69	<0.53	89
1,2,3,4,7,8-HxCDF	<0.78	<0.50	85
1,2,3,6,7,8-HxCDF	<0.76	<0.49	103
2,3,4,6,7,8-HxCDF	<0.81	<0.52	91
1,2,3,7,8,9-HxCDF	<0.96	<0.62	85
1,2,3,4,6,7,8-HpCDF	<0.63	<0.63	99
1,2,3,4,7,8,9-HpCDF	<0.78	<0.79	82
OCDF	<1.4	<0.91	76
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDD	NS	NS	NS
13C12-2,3,4,7,8-PeCDF	NS	NS	NS
13C12-1,2,3,4,7,8-HxCDF	NS	NS	NS
13C12-1,2,3,4,7,8,9-HpCDF	NS	NS	NS
Extraction Standards			
13C12-2,3,7,8-TCDD	57	68	76
13C12-1,2,3,7,8-PeCDD	57	70	82
13C12-1,2,3,6,7,8-HxCDD	61	73	80
13C12-1,2,3,4,6,7,8-HpCDD	53	72	82
13C12-OCDD	44	62	72
13C12-2,3,7,8-TCDF	56	68	76
13C12-1,2,3,7,8-PeCDF	52	66	74
13C12-1,2,3,6,7,8-HxCDF	57	73	81
13C12-1,2,3,4,6,7,8-HpCDF	53	72	79
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	55	59	75
Homologue Group Totals	**pg**	**pg**	
Total-TCDD	<1.6	<1.0	
Total-PeCDD	<0.93	<0.76	
Total-HxCDD	<1.2	<0.66	
Total-HpCDD	<1.1	<0.69	
Total-TCDF	<0.83	<0.67	
Total-PeCDF	<0.73	0.900	
Total-HxCDF	<0.96	<0.62	
Total-HpCDF	<0.78	<0.79	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.00	0.0270	
Mid Point PCDD/F TEQ (WHO 2005)	1.77	1.24	
Upper Bound PCDD/F TEQ (WHO 2005)	3.54	2.44	

ALS Life Sciences

Continuing Calibration Summary Report

Sample Name	CCV	CCV	CVS
ALS Sample ID	H7-19-CCV-1130	H7-19-CCV-1131	1613B-RS1-012
Sample Size	1	1	1
Sample size units	n/a	n/a	n/a
Percent Moisture	n/a	n/a	n/a
Sample Matrix	QC	QC	QC
Sampling Date	n/a	n/a	n/a
Extraction Date	n/a	n/a	n/a
Target Analytes	**% Rec**	**% Rec**	**% Rec**
2,3,7,8-TCDD	97	96	96
1,2,3,7,8-PeCDD	95	96	106
1,2,3,4,7,8-HxCDD	84	84	100
1,2,3,6,7,8-HxCDD	98	98	99
1,2,3,7,8,9-HxCDD	93	93	102
1,2,3,4,6,7,8-HpCDD	98	97	98
OCDD	97	96	97
2,3,7,8-TCDF	103	98	100
1,2,3,7,8-PeCDF	90	91	104
2,3,4,7,8-PeCDF	92	89	96
1,2,3,4,7,8-HxCDF	83	87	100
1,2,3,6,7,8-HxCDF	91	95	100
2,3,4,6,7,8-HxCDF	83	90	99
1,2,3,7,8,9-HxCDF	82	85	105
1,2,3,4,6,7,8-HpCDF	95	95	98
1,2,3,4,7,8,9-HpCDF	88	90	101
OCDF	88	88	100
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	90	90	113
13C12-1,2,3,4,7,8-HxCDD	89	87	101
13C12-2,3,4,7,8-PeCDF	101	97	101
13C12-1,2,3,4,7,8-HxCDF	88	96	100
13C12-1,2,3,4,7,8,9-HpCDF	93	97	102
Extraction Standards			
13C12-2,3,7,8-TCDD	96	98	100
13C12-1,2,3,7,8-PeCDD	87	86	98
13C12-1,2,3,6,7,8-HxCDD	102	104	100
13C12-1,2,3,4,6,7,8-HpCDD	88	88	102
13C12-OCDD	78	78	99
13C12-2,3,7,8-TCDF	93	94	101
13C12-1,2,3,7,8-PeCDF	86	87	98
13C12-1,2,3,6,7,8-HxCDF	102	97	102
13C12-1,2,3,4,6,7,8-HpCDF	87	86	102
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	88	88	101

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 1 - COMPOSITE 1 (JULY)**	Sampling Date	n/a		
ALS Sample ID	L2479138-1	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A21
Run Date	09-Aug-20 23:10
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.2	1.2	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.83	0.83	U		100
1,2,3,4,7,8-HxCDD	0.1	34.14	<1.3	1.3	M,U	0.25	100
1,2,3,6,7,8-HxCDD	0.1	34.20	<1.2	1.2	M,U	0.79	100
1,2,3,7,8,9-HxCDD	0.1	34.31	<1.2	1.2	M,U	0.51	100
1,2,3,4,6,7,8-HpCDD	0.01	35.80	<6.7	1.1	M,J,R	6.7	100
OCDD	0.0003	37.29	47.0	1.5	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<1.0	1.0	U		20
1,2,3,7,8-PeCDF	0.03	31.16	<0.86	0.69	M,J,R	0.86	100
2,3,4,7,8-PeCDF	0.3	31.89	<0.79	0.65	M,J,R	0.79	100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.57	0.57	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.56	0.56	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.59	0.59	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.71	0.71	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.24	<1.7	0.68	M,J,R	1.7	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.84	0.84	U		100
OCDF	0.0003	37.38	<2.6	1.1	M,J,R	2.6	200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	28.05	102	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.13	73	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.88	97	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.64	54	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.04	75	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.02	68	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.09	74	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.18	93	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.79	63	25-130
13C12-OCDD	8000	37.28	54	25-130
13C12-2,3,7,8-TCDF	4000	27.11	74	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.16	69	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.71	112	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.23	62	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	62	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	0	<1.2	1.2	U	20
Total-PeCDD	0	<0.83	0.83	U	100
Total-HxCDD	0	<1.3	1.3	U	100
Total-HpCDD	1	12.9	1.1		100
Total-TCDF	0	<1.0	1.0	U	20
Total-PeCDF	0	<0.69	0.69	U	100
Total-HxCDF	1	1.22	0.71		100
Total-HpCDF	1	2.28	0.84		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0141
Mid Point PCDD/F TEQ (WHO 2005)	1.74
Upper Bound PCDD/F TEQ (WHO 2005)	3.11

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
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 2 - COMPOSITE 1 (JULY)**	Sampling Date	n/a		
ALS Sample ID	L2479138-2	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A22
Run Date	09-Aug-20 23:52
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.5	1.5	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.91	0.91	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.97	0.97	U		100
1,2,3,6,7,8-HxCDD	0.1	34.20	<0.93	0.93	M,U	0.74	100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.94	0.94	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.81	15.3	2.3	M,J		100
OCDD	0.0003	37.30	87.7	1.4	M,J		200
2,3,7,8-TCDF	0.1	NotFnd	<1.6	1.6	U		20
1,2,3,7,8-PeCDF	0.03	NotFnd	<1.4	1.4	U		100
2,3,4,7,8-PeCDF	0.3	31.92	1.84	1.3	M,J		100
1,2,3,4,7,8-HxCDF	0.1	33.66	<0.95	0.95	M,U		100
1,2,3,6,7,8-HxCDF	0.1	33.72	1.27	0.93	M,J		100
2,3,4,6,7,8-HxCDF	0.1	34.06	<0.99	0.99	M,U	0.91	100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<1.2	1.2	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.26	<5.3	0.46	M,J,R	5.3	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.58	0.58	U		100
OCDF	0.0003	37.39	<5.7	1.6	M,J,R	5.7	200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	28.06	102	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.14	78	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.89	98	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.65	65	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.05	83	70-130

Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.03	61	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.10	65	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.19	82	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.80	57	25-130
13C12-OCDD	8000	37.29	48	25-130
13C12-2,3,7,8-TCDF	4000	27.13	62	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	60	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.72	90	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.24	57	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	56	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.5	1.5	U	20
Total-PeCDD	0	<0.91	0.91	U	100
Total-HxCDD	1	2.73	0.97		100
Total-HpCDD	2	31.1	2.3		100
Total-TCDF	1	5.50	1.6		20
Total-PeCDF	3	6.85	1.4		100
Total-HxCDF	2	2.16	1.2		100
Total-HpCDF	0	<0.58	0.58	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.858
Mid Point PCDD/F TEQ (WHO 2005)	2.52
Upper Bound PCDD/F TEQ (WHO 2005)	4.13

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 Equivalenc
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 3 - COMPOSITE 1 (JULY)**	Sampling Date	n/a		
ALS Sample ID	L2479138-3	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A23
Run Date	10-Aug-20 00:34
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.94	0.94	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.98	0.98	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.4	1.4	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.4	1.4	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<1.4	1.4	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.81	16.6	0.94	J		100
OCDD	0.0003	37.30	110	1.3	J		200
2,3,7,8-TCDF	0.1	NotFnd	<0.76	0.76	U		20
1,2,3,7,8-PeCDF	0.03	31.18	0.820	0.77	M,J		100
2,3,4,7,8-PeCDF	0.3	31.90	<0.73	0.73	U	0.69	100
1,2,3,4,7,8-HxCDF	0.1	33.66	<0.45	0.45	M,U		100
1,2,3,6,7,8-HxCDF	0.1	33.72	<0.44	0.44	M,U	0.20	100
2,3,4,6,7,8-HxCDF	0.1	34.07	<0.47	0.47	M,U		100
1,2,3,7,8,9-HxCDF	0.1	34.48	<0.56	0.56	M,J,R	0.56	100
1,2,3,4,6,7,8-HpCDF	0.01	35.26	5.92	0.99	M,J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<1.2	1.2	U		100
OCDF	0.0003	37.40	10.2	0.72	J		200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	28.06	104	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.14	79	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.89	101	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.65	61	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.05	82	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.03	81	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.10	86	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.19	103	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.80	72	25-130
13C12-OCDD	8000	37.29	60	25-130
13C12-2,3,7,8-TCDF	4000	27.13	90	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	81	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.72	117	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.24	69	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	65	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.94	0.94	U	20
Total-PeCDD	0	<0.98	0.98	U	100
Total-HxCDD	1	3.14	1.4		100
Total-HpCDD	2	34.6	0.94		100
Total-TCDF	3	4.01	0.76		20
Total-PeCDF	2	2.48	0.77		100
Total-HxCDF	2	0.710	0.56		100
Total-HpCDF	1	5.92	1.2		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.286
Mid Point PCDD/F TEQ (WHO 2005)	1.73
Upper Bound PCDD/F TEQ (WHO 2005)	3.12

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 Equivalenc
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 4 - COMPOSITE 1 (JULY)**	Sampling Date	n/a		
ALS Sample ID	L2479138-4	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A24
Run Date	10-Aug-20 01:17
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.6	1.6	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.68	0.68	U		100
1,2,3,4,7,8-HxCDD	0.1	34.15	<2.8	2.8	M,U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<2.7	2.7	U		100
1,2,3,7,8,9-HxCDD	0.1	34.34	<2.7	2.7	M,U	0.84	100
1,2,3,4,6,7,8-HpCDD	0.01	35.81	<20	2.0	M,J,R	20	100
OCDD	0.0003	37.30	173	2.1	J		200
2,3,7,8-TCDF	0.1	NotFnd	<1.3	1.3	U		20
1,2,3,7,8-PeCDF	0.03	31.18	<1.1	1.1	M,J,R	1.1	100
2,3,4,7,8-PeCDF	0.3	31.90	1.09	1.1	M,J		100
1,2,3,4,7,8-HxCDF	0.1	33.67	<0.58	0.58	M,U	0.54	100
1,2,3,6,7,8-HxCDF	0.1	33.73	<0.57	0.57	M,U		100
2,3,4,6,7,8-HxCDF	0.1	34.06	<0.73	0.60	M,J,R	0.73	100
1,2,3,7,8,9-HxCDF	0.1	34.49	<0.86	0.72	M,J,R	0.86	100
1,2,3,4,6,7,8-HpCDF	0.01	35.24	8.87	0.53	M,J		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.66	0.66	U		100
OCDF	0.0003	37.39	<5.8	1.3	M,J,R	5.8	200

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	28.06	99	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.15	71	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.89	100	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.66	59	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.05	82	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.04	67	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.10	70	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.20	95	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.80	65	25-130
13C12-OCDD	8000	37.29	57	25-130
13C12-2,3,7,8-TCDF	4000	27.13	69	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	64	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.72	102	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.24	62	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.47	64	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		**LQL**
Total-TCDD	1	1.67	1.6		20
Total-PeCDD	0	<0.68	0.68	U	100
Total-HxCDD	2	4.79	2.8		100
Total-HpCDD	0	<2.0	2.0	U	100
Total-TCDF	2	5.48	1.3		20
Total-PeCDF	0	<1.1	1.1	U	100
Total-HxCDF	0	<0.72	0.72	U	100
Total-HpCDF	2	14.0	0.66		100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.468
Mid Point PCDD/F TEQ (WHO 2005)	2.54
Upper Bound PCDD/F TEQ (WHO 2005)	4.21

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 Equivalenc
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

ALS Life Sciences

Sample Analysis Report

Sample Name	**SITE 5 - COMPOSITE 1 (JULY)**	Sampling Date	n/a		
ALS Sample ID	L2479138-5	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A25
Run Date	10-Aug-20 01:59
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.2	1.2	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<1.2	1.2	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.57	0.57	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.55	0.55	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.55	0.55	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.80	21.2	1.3	M,J		100
OCDD	0.0003	37.29	189	1.9	J		200
2,3,7,8-TCDF	0.1	NotFnd	<0.91	0.91	U		20
1,2,3,7,8-PeCDF	0.03	31.17	<0.86	0.68	M,J,R	0.86	100
2,3,4,7,8-PeCDF	0.3	31.89	1.37	0.64	M,J		100
1,2,3,4,7,8-HxCDF	0.1	33.64	<0.65	0.60	M,J,R	0.65	100
1,2,3,6,7,8-HxCDF	0.1	33.71	0.630	0.59	M,J		100
2,3,4,6,7,8-HxCDF	0.1	34.06	<0.63	0.63	M,U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.75	0.75	U		100
1,2,3,4,6,7,8-HpCDF	0.01	35.23	<4.0	0.43	M,J,R	4.0	100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.54	0.54	U		100
OCDF	0.0003	37.38	7.44	0.99	M,J		200
Field Spike Standards	**pg**		**% Rec**	**Limits**			
37Cl4-2,3,7,8-TCDD	2400	28.05	98	70-130			
13C12-1,2,3,4,7,8-HxCDD	24000	34.13	75	70-130			
13C12-2,3,4,7,8-PeCDF	24000	31.87	85	70-130			
13C12-1,2,3,4,7,8-HxCDF	24000	33.64	55	70-130			
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.04	72	70-130			
Extraction Standards							
13C12-2,3,7,8-TCDD	4000	28.02	79	40-130			
13C12-1,2,3,7,8-PeCDD	4000	32.09	84	40-130			
13C12-1,2,3,6,7,8-HxCDD	4000	34.18	100	40-130			
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.79	71	25-130			
13C12-OCDD	8000	37.28	61	25-130			
13C12-2,3,7,8-TCDF	4000	27.11	85	40-130			
13C12-1,2,3,7,8-PeCDF	4000	31.16	80	40-130			
13C12-1,2,3,6,7,8-HxCDF	4000	33.71	115	40-130			
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.23	70	25-130			
Cleanup Standard	**pg**						
13C12-1,2,3,7,8,9-HxCDF	4000	34.45	61	40-130			

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.2	1.2	U	20
Total-PeCDD	0	<1.2	1.2	U	100
Total-HxCDD	1	3.17	0.57		100
Total-HpCDD	2	48.2	1.3		100
Total-TCDF	2	2.14	0.91		20
Total-PeCDF	2	2.55	0.68		100
Total-HxCDF	4	2.24	0.75		100
Total-HpCDF	0	<0.54	0.54	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.745
Mid Point PCDD/F TEQ (WHO 2005)	2.28
Upper Bound PCDD/F TEQ (WHO 2005)	3.68

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 Equivalenc
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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

SVOC DATA PACKAGE

SECTION 3: METHOD SUMMARY

PCDD/F METHOD SUMMARY
Methods 23/0023A/1613B/8290/TO-9A

Introduction:

This summary is to provide ALSE Burlington PCDD/F 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 PCDD/F via the following reference methods:

US EPA Office of Water, Method 1613B
US EPA Office of Solid Waste, SW846 Methods 8290A and 0023/8290A
US EPA Office of Research & Development Method TO-9A.
US EPA Office of Air Quality Planning & Standards Method 23.

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: Calibration Standards

		CS0	CS1	CS2	CS3	CS4	CS5
Natives	2,3,7,8-TCDD	0.1	0.5	2	10	40	200
	2,3,7,8-TCDF	0.1	0.5	2	10	40	200
	1,2,3,7,8-PeCDD	0.5	2.5	10	50	200	1000
	1,2,3,7,8-PeCDF	0.5	2.5	10	50	200	1000
	2,3,4,7,8-PeCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,6,7,8-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,7,8,9-HxCDD	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,6,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,7,8,9-HxCDF	0.5	2.5	10	50	200	1000
	2,3,4,6,7,8-HxCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,6,7,8-HpCDD	0.5	2.5	10	50	200	1000
	1,2,3,4,6,7,8-HpCDF	0.5	2.5	10	50	200	1000
	1,2,3,4,7,8,9-HpCDF	0.5	2.5	10	50	200	1000
	OCDD	1	5	20	100	400	2000
	OCDF	1	5	20	100	400	2000
Labeled	2,3,7,8-TCDD-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,7,8-TCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8-PeCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,4,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	100	100	100	100	100	100
	OCDD-$^{13}C_{12}$	200	200	200	200	200	200
	2,3,7,8-TCDD-$^{37}Cl_4$	0.1	0.5	2	10	40	200
Injection	1,2,3,4-TCDD-$^{13}C_{12}$	100	100	100	100	100	100
	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	100	100	100	100	100	100

Calibration Control Limits

The initial and continuing calibration control limits for all 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 2: Calibration Control Limits

	1613B		M23 & TO-9A		8290A	
	Initial Cal.	Cal. Ver.	Initial Cal.	Cal. Ver.	Initial Cal.	Cal. Ver.
	%RSD	ng/mL	%RSD	% Diff	%RSD	% Diff
Natives						
2,3,7,8-TCDD	20	7.8-12.9	25	25	20	20*
2,3,7,8-TCDF	20	8.4-12.0	25	25	20	20*
1,2,3,7,8-PeCDD	20	39-65	25	25	20	20*
1,2,3,7,8-PeCDF	20	41-60	25	25	20	20*
2,3,4,7,8-PeCDF	20	41-61	25	25	20	20*
1,2,3,4,7,8-HxCDD	20	39-64	25	25	20	20*
1,2,3,6,7,8-HxCDD	20	39-64	25	25	20	20*
1,2,3,7,8,9-HxCDD	35	41-61	25	25	20	20*
1,2,3,4,7,8-HxCDF	20	45-56	25	25	20	20*
1,2,3,6,7,8-HxCDF	20	44-57	25	25	20	20*
1,2,3,7,8,9-HxCDF	20	45-56	25	25	20	20*
2,3,4,6,7,8-HxCDF	20	44-57	25	25	20	20*
1,2,3,4,6,7,8-HpCDD	20	43-58	25	25	20	20*
1,2,3,4,6,7,8-HpCDF	20	45-55	25	25	20	20*
1,2,3,4,7,8,9-HpCDF	20	43-58	25	25	20	20*
OCDD	20	79-126	25	25	20	20*
OCDF	35	63-159	30	30	20	20*
Labels						
2,3,7,8-TCDD-$^{13}C_{12}$	35	82-121	25	25	30	30**
2,3,7,8-TCDF-$^{13}C_{12}$	35	71-140	30	30	30	30**
1,2,3,7,8-PeCDD-$^{13}C_{12}$	35	62-160	30	30	30	30**
1,2,3,7,8-PeCDF-$^{13}C_{12}$	35	76-130	30	30	30	30**
2,3,4,7,8-PeCDF-$^{13}C_{12}$	35	77-130	25	25	30	30**
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	35	85-117	25	25	30	30**
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	35	85-118	25	25	30	30**
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	35	76-131	25	25	30	30**
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	35	70-143	30	30	30	30**
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	35	74-135	-	-	-	-
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	35	73-137	30	30	30	30**
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	35	72-138	30	30	30	30**
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	35	78-129	30	30	30	30**
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	35	77-129	25	25	30	30**
OCDD-$^{13}C_{12}$	35	96-415	30	30	30	30**
2,3,7,8-TCDD-$^{37}Cl_4$	35	7.9-12.7	25	25	30	30**

* 25% is allowed for a post-run verification but when the value is above 20%, then the analyte quantification must be as per 8290A Section 8.3.2.4 and corrective action is required before more samples can be analyzed.
**35% is allowed for a post-run verification but when the value is above 30%, then the analyte quantification must be as per 8290A Section 8.3.2.4 and corrective action is required before more samples can be analyzed.

LCS Criteria:

The laboratory control sample (LCS) or the On-Going Precision and Accuracy (OPR) recovery criteria are listed in Table 3

Table 3: Acceptance Criteria for IPR and OPR[a]

	Test Conc.	IPR		OPR
		s[b]	X[c]	
	ng/L	ng/L	ng/L	ng/L
Natives				
2,3,7,8-TCDD	10	2.8	8.3-12.9	6.7-15.8
2,3,7,8-TCDF	10	2	8.7-13.7	7.5-15.8
1,2,3,7,8-PeCDD	50	7.5	38-66	35-71
1,2,3,7,8-PeCDF	50	7.5	43-62	40-67
2,3,4,7,8-PeCDF	50	8.6	36-75	34-80
1,2,3,4,7,8-HxCDD	50	9.4	39-76	35-82
1,2,3,6,7,8-HxCDD	50	7.7	42-62	38-67
1,2,3,7,8,9-HxCDD	50	11.1	37-71	32-81
1,2,3,4,7,8-HxCDF	50	8.7	41-59	36-67
1,2,3,6,7,8-HxCDF	50	6.7	46-60	42-65
1,2,3,7,8,9-HxCDF	50	6.4	42-61	39-65
2,3,4,6,7,8-HxCDF	50	7.4	37-74	35-78
1,2,3,4,6,7,8-HpCDD	50	7.7	38-65	35-70
1,2,3,4,6,7,8-HpCDF	50	6.3	45-56	41-61
1,2,3,4,7,8,9-HpCDF	50	8.1	43-63	39-69
OCDD	100	19	89-127	78-144
OCDF	100	27	74-146	63-170
Labels				
2,3,7,8-TCDD-$^{13}C_{12}$	100	37	28-134	20-175
2,3,7,8-TCDF-$^{13}C_{12}$	100	35	31-113	22-152
1,2,3,7,8-PeCDD-$^{13}C_{12}$	100	39	27-184	21-227
1,2,3,7,8-PeCDF-$^{13}C_{12}$	100	34	27-156	21-192
2,3,4,7,8-PeCDF-$^{13}C_{12}$	100	38	16-297	13-328
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	100	41	29-147	21-193
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	100	38	34-122	25-163
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	100	43	27-152	19-202
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	100	35	30-122	21-159
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	100	40	24-157	17-205
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	100	37	29-136	22-176
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	100	35	34-129	26-166
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	100	41	32-110	21-158
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	100	40	28-141	20-186
OCDD-$^{13}C_{12}$	200	95	41-276	26-397
2,3,7,8-TCDD-$^{37}Cl_4$	10	3.6	3.9-15.4	3.1-19.1

[a] Assuming a final volume of 20uL
[b] s = standard deviation
[c] X = Average Concentration

Extraction/Clean-up & Sampling Standard Recovery Limts:

Table 4: Extraction, Clean-up, Injection & Sampling Standard Recovery Limits

	1613B or 8290A (non Stack)		M23 or 0023A/8290A or TO-9A	
	(% Rec.)	Ref.	(% Rec.)	Ref.
Extraction Standard				
2,3,7,8-TCDD-$^{13}C_{12}$	25-164	a	40-130	b
2,3,7,8-TCDF-$^{13}C_{12}$	24-169	a	40-130	b
1,2,3,7,8-PeCDD-$^{13}C_{12}$	25-181	a	40-130	b
1,2,3,7,8-PeCDF-$^{13}C_{12}$	24-185	a	40-130	b
2,3,4,7,8-PeCDF-$^{13}C_{12}$	21-178	a	-	
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	32-141	a	-	
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	28-130	a	40-130	b
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	26-152	a	-	
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	26-123	a	40-130	b
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	29-147	a	-	
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	28-136	a	40-130	c,d
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	23-140	a	25-130	b
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	28-143	a	25-130	b
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	26-138	a	-	
OCDD-$^{13}C_{12}$	17-157	a	25-130	b
Clean-up Standard				
2,3,7,8-TCDD-$^{37}Cl_4$	35-197	a	-	
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	-		40-130	b
Injection Standard				
1,2,3,4-TCDD-$^{13}C_{12}$	30-300	d	30-300	d
1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	30-300	d	30-300	d
Sampling Standard				
2,3,7,8-TCDD-$^{37}Cl_4$	-		70-130	b
2,3,4,7,8-PeCDF-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	-		70-130	b
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	-		70-130	b

References & Notes

[a] from OW method 1613B

[b] from OAQPS method 23

[c] this extraction standard is not required in methods 23 and 0023A/8290A

[d] ALS In-house criteria

Reporting Limits:

Unless indicated in the otherwise, the PCDD/F data is 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 all the HRMS PCDD/F methods applicable to this method summary.

Method Blank:

The method blank levels must be below the response to the low calibration standard, CS0 or CS1, whichever low calibration point is being applied to the project.

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 25% maximum valley between 2,3,7,8-TCDD and it's neared eluting isomers (DB5) or 2,3,7,8-TCDF and it's nearest eluting isomers (DB225).
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 for each quantification window.
4. For method 1613B, the relative retention times (RRT) of the compounds in the daily CS3 calibration verification must fall into the ranges presented in Table 4.
5. For all calibrations, QC samples and field samples, the absolute retention time (RT) for 1,2,3,4-TCDD-13C12 must be >25.0 min on a DB5 column and >15.0 min on a DB225 column.
6. The RT in the daily CS3 verification standards must be within 15 seconds of the CS3 in the initial calibration run.
7. The maximum time between scans within a descriptor is 1 second.
8. 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 2,3,7,8- substituted native analytes must be within -1 to +3 seconds of the RT of corresponding $^{13}C_{12}$-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 CS3 run.
5. When there is a significant PCDPE interference observed, then a peak in the PCDF channel is not confirmed to be PCDF. [Significant PCDPE interference is identified when there is a PCDPE parent ion peak 10% or more of the response of a peak at the same RT (i.e. within 2 seconds) in the corresponding PCDF channel.]
6. For any peak to be identified as a positive PCDD/F response, that peak must be within the retention time windows defined by the daily analysis of Window Performance Mixture.

Table 4: Quantitation References and Method 1613B RT References and RRT

Analyte	Stack/Ambient Quantitation Reference	Method 1613B RT Reference Solids/ Waters Quantitation Reference	Method 1613B RRT
Compounds using 1,2,3,4-TCDD-$^{13}C_{12}$ as injection standard			
2,3,7,8-TCDF	2,3,7,8-TCDF-$^{13}C_{12}$	2,3,7,8-TCDF-$^{13}C_{12}$	0.999-1.003
2,3,7,8-TCDD	2,3,7,8-TCDD-$^{13}C_{12}$	2,3,7,8-TCDD-$^{13}C_{12}$	0.999-1.002
1,2,3,7,8-PeCDF	1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,7,8-PeCDF-$^{13}C_{12}$	0.999-1.002
2,3,4,7,8-PeCDF	1,2,3,7,8-PeCDF-$^{13}C_{12}$	2,3,4,7,8-PeCDF-$^{13}C_{12}$	0.999-1.002
1,2,3,7,8-PeCDD	1,2,3,7,8-PeCDD-$^{13}C_{12}$	1,2,3,7,8-PeCDD-$^{13}C_{12}$	0.999-1.002
2,3,7,8-TCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.923-1.103
2,3,7,8-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.976-1.043
2,3,7,8-TCDD-$^{37}Cl_4$	2,3,7,8-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	0.989-1.052
1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.000-1.425
2,3,4,7,8-PeCDF-$^{13}C_{12}$	1,2,3,7,8-PeCDF-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.011-1.526
1,2,3,7,8-PeCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1,2,3,4-TCDD-$^{13}C_{12}$	1.000-1.567
Compounds using 1,2,3,7,8,9-HxCDD-$^{13}C_{12}$ as injection standard			
1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,6,7,8-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	0.997-1.005
1,2,3,7,8,9-HxCDF	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	0.999-1.001
2,3,4,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	0.999-1.001
1,2,3,6,7,8-HxCDD	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	0.998-1.004
1,2,3,7,8,9-HxCDD[a]	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	[a]	1.000-1.019
1,2,3,4,6,7,8-HpCDF	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8,9-HpCDF	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	0.999-1.001
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	0.999-1.001
OCDF	OCDD-$^{13}C_{12}$	OCDD-$^{13}C_{12}$	0.999-1.008
OCDD	OCDD-$^{13}C_{12}$	OCDD-$^{13}C_{12}$	0.999-1.001
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.944-0.970
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.949-0.975
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.977-1.047
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.959-1.021
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.977-1.000
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	0.981-1.003
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.043-1.085
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.057-1.151
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.086-1.110
OCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	1.032-1.311

[a] For solids/waters via 1612B, 1,2,3,7,8,9-HXCDD is quantified against the average responses of 1,2,3,4,7,8-HxCDD-$^{13}C_{12}$ and 1,2,3,6,7,8-HxCDD-$^{13}C_{12}$ while 1,2,3,6,7,8-HxCDD-$^{13}C_{12}$ is the RT reference.

Table 5: HRMS Instrumental Descriptor Parameters

Descriptor	Exact M/Z	M/Z Type	Elemental Composition	Substance	Type	Theoretical Ion Ratio	Ion Ratio QC Limits Upper	Lower
1	303.9016	M	$^{12}C_{12}$ $^{1}H_4$ $^{35}Cl_4$ ^{16}O	TCDF	Native	0.77	0.65	0.89
	305.8987	M+2	$^{12}C_{12}$ $^{1}H_4$ $^{35}Cl_3$ ^{37}Cl ^{16}O	TCDF	Native			
	315.9419	M	$^{13}C_{12}$ $^{1}H_4$ $^{35}Cl_4$ ^{16}O	TCDF	^{13}C	0.77	0.65	0.89
	317.9389	M+2	$^{13}C_{12}$ $^{1}H_4$ $^{35}Cl_3$ ^{37}Cl ^{16}O	TCDF	^{13}C			
	316.9824	Lock	$^{12}C_9$ $^{19}F_{11}$	PFK	Lock			
	319.8965	M	$^{12}C_{12}$ $^{1}H_4$ $^{35}Cl_4$ $^{16}O_2$	TCDD	Native	0.77	0.65	0.89
	321.8936	M+2	$^{12}C_{12}$ $^{1}H_4$ $^{35}Cl_3$ ^{37}Cl $^{16}O_2$	TCDD	Native			
	327.8847	M+8	$^{12}C_{12}$ $^{1}H_4$ $^{37}Cl_4$ $^{16}O_2$	TCDD	^{37}Cl			
	331.9368	M	$^{13}C_{12}$ $^{1}H_4$ $^{35}Cl_4$ $^{16}O_2$	TCDD	^{13}C	0.77	0.65	0.89
	333.9339	M+2	$^{13}C_{12}$ $^{1}H_4$ $^{35}Cl_3$ ^{37}Cl $^{16}O_2$	TCDD	^{13}C			
	339.8597	M+2	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37}Cl ^{16}O	PeCDF	Native	1.55	1.32	1.78
	341.8568	M+4	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_3$ $^{37}Cl_2$ ^{16}O	PeCDF	Native			
	351.9	M+2	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37}Cl ^{16}O	PeCDF	^{13}C	1.55	1.32	1.78
	353.897	M+4	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_3$ $^{37}Cl_2$ ^{16}O	PeCDF	^{13}C			
	375.8364	M+2	$^{12}C_{12}$ $^{1}H_4$ $^{35}Cl_5$ ^{37}Cl ^{16}O	HxCDPE	Cl-DPE			
	409.7974	M+2	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_6$ ^{37}Cl ^{16}O	HpCDPE	Cl-DPE			
2	339.8597	M+2	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37}Cl ^{16}O	PeCDF	Native	1.55	1.32	1.78
	341.8568	M+4	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_3$ $^{37}Cl_2$ ^{16}O	PeCDF	Native			
	351.9	M+2	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37}Cl ^{16}O	PeCDF	^{13}C	1.55	1.32	1.78
	353.897	M+4	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_3$ $^{37}Cl_2$ ^{16}O	PeCDF	^{13}C			
	353.8576	M	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_5$ $^{16}O_2$	PeCDD	Native	0.63	0.54	0.72
	355.8546	M+2	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37}Cl $^{16}O_2$	PeCDD	Native			
	366.9792	Lock	$^{12}C_{10}$ $^{19}F_{13}$	PFK	Lock			
	365.8978	M	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_5$ $^{16}O_2$	PeCDD	^{13}C	0.63	0.54	0.72
	367.8949	M+2	$^{13}C_{12}$ $^{1}H_3$ $^{35}Cl_4$ ^{37} Cl $^{16}O_2$	PeCDD	^{13}C			
	409.7974	M+2	$^{12}C_{12}$ $^{1}H_3$ $^{35}Cl_6$ ^{37}Cl ^{16}O	HpCDPE	Cl-DPE			
3	373.8207	M+2	$^{12}C_{12}$ $^{1}H_2$ $^{35}Cl_5$ ^{37}Cl ^{16}O	HxCDF	Native	1.24	1.05	1.43
	375.8178	M+4	$^{12}C_{12}$ $^{1}H_2$ $^{35}Cl_4$ $^{37}Cl_2$ ^{16}O	HxCDF	Native			
	380.976	Lock	$^{12}C_8$ $^{19}F_5$	PFK	Lock			
	383.8639	M	$^{13}C_{12}$ $^{1}H_2$ $^{35}Cl_6$ ^{16}O	HxCDF	^{13}C	0.51	0.43	0.59
	385.861	M+2	$^{13}C_{12}$ $^{1}H_2$ $^{35}Cl_5$ ^{37}Cl ^{16}O	HxCDF	^{13}C			
	389.8156	M+2	$^{12}C_{12}$ $^{1}H_2$ $^{35}Cl_5$ ^{37}Cl $^{16}O_2$	HxCDD	Native	1.24	1.05	1.43
	391.8127	M+4	$^{12}C_{12}$ $^{1}H_2$ $^{35}Cl_4$ $^{37}Cl_2$ $^{16}O_2$	HxCDD	Native			
	401.8559	M+2	$^{13}C_{12}$ $^{1}H_2$ $^{35}Cl_5$ ^{37}Cl $^{16}O_2$	HxCDD	^{13}C	1.24	1.05	1.43
	403.853	M+4	$^{13}C_{12}$ $^{1}H_2$ $^{35}Cl_4$ $^{37}Cl_2$ $^{16}O_2$	HxCDD	^{13}C			
	445.7555	M+4	$^{12}C_{12}$ $^{1}H_2$ $^{35}Cl_6$ $^{37}Cl_2$ ^{16}O	OCDPE	Cl-DPE			
4	409.7789	M+4	$^{12}C_{12}$ ^{1}H $^{35}Cl_5$ $^{37}Cl_2$ ^{16}O	HpCDF	Native	1.88	1.60	2.16
	411.7759	M+6	$^{12}C_{12}$ ^{1}H $^{35}Cl_4$ $^{37}Cl_3$ ^{16}O	HpCDF	Native			
	417.8253	M	$^{13}C_{12}$ ^{1}H $^{35}Cl_7$ ^{16}O	HpCDF	^{13}C	0.44	0.37	0.51
	419.822	M+2	$^{13}C_{12}$ ^{1}H $^{35}Cl_6$ ^{37}Cl ^{16}O	HpCDF	^{13}C			
	423.7767	M+2	$^{12}C_{12}$ ^{1}H $^{35}Cl_6$ ^{37}Cl $^{16}O_2$	HpCDD	Native	1.04	0.88	1.20
	425.7737	M+4	$^{12}C_{12}$ ^{1}H $^{35}Cl_5$ $^{37}Cl_2$ $^{16}O_2$	HpCDD	Native			
	430.9728	Lock	$^{12}C_9$ $^{19}F_{17}$	PFK	Lock			
	435.8169	M+2	$^{13}C_{12}$ ^{1}H $^{35}Cl_6$ ^{37}Cl $^{16}O_2$	HpCDD	^{13}C	1.04	0.88	1.20
	437.814	M+4	$^{13}C_{12}$ ^{1}H $^{35}Cl_5$ $^{37}Cl_2$ $^{16}O_2$	HpCDD	^{13}C			
	479.7165	M+4	$^{12}C_{12}$ ^{1}H $^{35}Cl_7$ $^{37}Cl_2$ ^{16}O	NCDPE	Cl-DPE			
5	441.7428	M+2	$^{12}C_{12}$ $^{35}Cl_7$ ^{37}Cl ^{16}O	OCDF	Native	0.89	0.76	1.02
	443.7399	M+4	$^{12}C_{12}$ $^{35}Cl_6$ $^{37}Cl2$ ^{16}O	OCDF	Native			
	454.9728	Lock	$^{12}C_{11}$ $^{19}F_{17}$	PFK	Lock			
	457.7377	M+2	$^{12}C_{12}$ $^{35}Cl_7$ ^{37}Cl $^{16}O_2$	OCDD	Native	0.89	0.76	1.02
	459.7348	M+4	$^{12}C_{12}$ $^{35}Cl_6$ $^{37}Cl_2$ $^{16}O_2$	OCDD	Native			
	469.778	M+2	$^{13}C_{12}$ $^{35}Cl_7$ ^{37}Cl $^{16}O_2$	OCDD	^{13}C	0.89	0.76	1.02
	471.775	M+4	$^{13}C_{12}$ $^{35}Cl_6$ $^{37}Cl_2$ $^{16}O_2$	OCDD	^{13}C			
	513.6775	M+4	$^{12}C_{12}$ $^{35}Cl_8$ $^{37}Cl_2$ ^{16}O	DCDPE	Cl-DPE			

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.

$$RRF = \frac{(A1_t + A2_t)\ C_s}{(A1_s + A2_s)\ C_t} \qquad \text{Equ. 9.1}$$

Where,
$A1_t + A2_t$ = The areas of the two quantification ions for the target analyte
$A1_s + A2_s$ = 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.

$$\text{Amount in sample (pg)} = \frac{(A1_n + A2_n)\ Q_l}{(A1_l + A2_l)\ (RRF_{av})} \qquad \text{Equ. 9.2}$$

$$\text{Concentration in sample (pg/g or pg/l)} = \frac{(A1_n + A2_n)\ Q_l}{(A1_l + A2_l)\ (RRF_{av})\ (W_s)} \qquad \text{Equ. 9.3}$$

Where,

Q_l = 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.

% Recovery = (Amount in sample)/(Amount added to sample) X 100 Equ. 9.4

c) Estimated Detection Limit

$$EDL = \frac{2.5 \times H_x \times Q_{es}}{H_{es} \times W \times RFF_{av}} \qquad \text{Equ. 9.5}$$

Where,

EDL = estimated detection limit for homologous 2,3,7,8-Substituted PCDD/Fs

H_x = sum of the height of the noise level for each quantification ions for the unlabelled PCDD/Fs.

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:	Example:
AAYYMMDDCC	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 detection limit calculation was manually defined, over-riding the software chosen value
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)

Deviations from the Primary Reference Methods:

The following changes and clarifications apply:

1) The calibration standards as listed in Table 2 are applied appropriately to all of the reference methods listed above. Such an application of one standard calibration series to all of these methods is within the scope of each and every one of the methods. The calibration standard set CS1 through CS5 is consistent with the standards concentration listing in method 1613B Table 4. The CS0 extends the calibration range below what is required by all of the methods. Table 4 defines the use of each of the labelled standards relative to each of the methods.

a. Method 1613B lists a larger suite of labelled extraction standards than does method 8290A. Additional labelled extraction standards have been added into the 8290A analysis to enhance the method and the data quality. These additions to the method constitute performance based enhancements and are within the scope of SW846 Method 8290A.

b. The levels presented in the calibration table of method 8290A are recommended values only. Changes to these concentrations, especially to expand the range, are within the scope of the method. Therefore application of the 1613B calibration standards to method 8290A is compliant with the scope of the method.

c. TO-9A is also a performance based method. It specifically states that different extraction standards and different concentrations of standards from those listed in TO-9A Table 3 is acceptable (see Section 6.8 of reference method).

d. Although OAQPS reference method 23 is not a performance based method, application of the 1613B standards has been defined as within the scope of the method. (see Appendix B)

2) Chlorinated Diphenyl Ether interferences: Both methods 1613B and 8290A indicate that any instrumental response showing the presence of a chlorinated diphenyl ether response and that coelutes with a PCDF represents an interference on that analyte (see Sections 18.3 and 7.8.4.4 respectively). This apparent zero tolerance does not take into account that the response in the diphenyl ether channel may be trivial relative to the corresponding PCDF. For this 'Standard Method', we have defined a chlorinated diphenyl ether interference as the presence of a **significant** response within the chlorinated diphenyl ether channel (rather than zero response) and defined significant as a response equal to or greater than 10% of the peak response in the PCDF channel.

3) When the primary analysis is performed using a DB5MS GC column, 2,3,7,8-TCDF can be resolved to a valley height of 60% from the closest-eluting isomers for this column, providing good quantification of this target without further confirmation. Confirmation of 2,3,7,8-TCDF concentrations above the level of the lowest calibration standard are performed on a second column on a contract basis when requested. Confirmation of additional 2,3,7,8-subtituted PCDD/F isomers is also available when requested.

4) Although not categorically stated in all associated PCDD/F methods, 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 'arsenal' in order to achieve this objective.

5) 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 PCDD/F and related methods, the PCDD/F preparative 'Specific Method' requires solids (including stack and ambient sorbants/filters) to be spiked in the soxhlet thimble from a nonane solution and waters are spiked before filtering from an acetone solution. This is consistent with the 8290A approach.

6) 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 1613B 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.

7) The concentrations 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.

8) With respect to extraction standard recovery limits on non-stack samples analyzed via method 8290A, the limits are based upon the inter-laboratory performance limits defined in method 1613B rather than the relatively arbitrary limits of 35-140% suggested in Section 8.4 of method 8290A.

9) With respect to ions monitored for P5CDD and H7CDF:

a. The 358 ion has a potential for interference from PCB (hexachlorobiphenyls) dependent upon levels of PCBs in the sample and the instrument tuning. Of particular concern is PCB-169 which on a DB5MS column elutes very close to 1,2,3,7,8-P5CDD and which is not removed for the PCDD/F extracts even by carbon clean-up. To eliminate the potential of such interferences from PCB on the 358 mass, we choose to monitor the alternate ion pair of 354 and 356.

b. Similarly, the 408 ion of native H7CDF is prone to problematic interferences arising from 13C12-labeled heptachlorinated biphenyls. To eliminate the potential of such interferences from PCB on the 358 mass, we choose to monitor the alternate ion pair of 410 and 412.

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

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	7-200805B03	05-Aug-2020 12:58
CS-2	7-200805B02	05-Aug-2020 12:16
CS-3	7-200805B01	05-Aug-2020 11:29
CS-4	7-200805B07	05-Aug-2020 15:46
CS-5	7-200805B06	05-Aug-2020 15:04

Approved: *N Ashtari*
--e-signature--
12-Aug-2020

Relative Response Factors

Target Analytes	CS-1	CS-2	CS-3	CS-4	CS-5	Mean	% RSD
2,3,7,8-TCDD	0.887	1.000	0.956	1.028	1.015	0.977	6%
1,2,3,7,8-PeCDD	0.933	0.915	0.934	0.973	0.972	0.945	3%
1,2,3,4,7,8-HxCDD	0.912	0.942	0.926	1.038	1.009	0.965	6%
1,2,3,6,7,8-HxCDD	0.946	1.017	0.967	1.058	1.046	1.007	5%
1,2,3,7,8,9-HxCDD	0.972	0.994	0.956	1.063	1.040	1.005	5%
1,2,3,4,6,7,8-HpCDD	1.004	1.023	1.012	1.057	1.049	1.029	2%
OCDD	0.996	1.033	1.031	1.070	1.058	1.038	3%
2,3,7,8-TCDF	0.945	0.981	1.081	1.087	1.086	1.036	7%
1,2,3,7,8-PeCDF	1.078	1.093	1.100	1.132	1.147	1.110	3%
2,3,4,7,8-PeCDF	1.128	1.179	1.144	1.205	1.220	1.175	3%
1,2,3,4,7,8-HxCDF	1.178	1.228	1.210	1.239	1.211	1.213	2%
1,2,3,6,7,8-HxCDF	1.191	1.227	1.210	1.279	1.270	1.235	3%
2,3,4,6,7,8-HxCDF	1.098	1.174	1.148	1.209	1.197	1.165	4%
1,2,3,7,8,9-HxCDF	0.840	1.011	0.973	1.028	1.037	0.978	8%
1,2,3,4,6,7,8-HpCDF	0.999	1.036	1.039	1.095	1.070	1.048	3%
1,2,3,4,7,8,9-HpCDF	0.846	0.802	0.830	0.864	0.890	0.846	4%
OCDF	1.357	1.420	1.424	1.541	1.546	1.458	6%
Field Spike Standards							
37Cl4-2,3,7,8-TCDD	1.025	1.035	0.931	1.004	1.023	1.004	4%
13C12-1,2,3,4,7,8-HxCDD	0.920	0.919	0.894	0.963	0.955	0.930	3%
13C12-2,3,4,7,8-PeCDF	0.940	0.964	0.966	0.970	0.972	0.962	1%
13C12-1,2,3,4,7,8-HxCDF	0.943	0.955	0.936	0.932	0.911	0.935	2%
13C12-1,2,3,4,7,8,9-HpCDF	0.766	0.789	0.796	0.783	0.816	0.790	2%
Extraction Standards							
13C12-2,3,7,8-TCDD	1.081	1.100	1.130	1.134	1.218	1.133	5%
13C12-1,2,3,7,8-PeCDD	0.676	0.719	0.726	0.757	0.874	0.750	10%
13C12-1,2,3,6,7,8-HxCDD	0.940	0.951	0.979	0.932	0.959	0.952	2%
13C12-1,2,3,4,6,7,8-HpCDD	0.736	0.769	0.763	0.769	0.803	0.768	3%
13C12-OCDD	0.567	0.613	0.608	0.629	0.714	0.626	9%
13C12-2,3,7,8-TCDF	1.373	1.420	1.437	1.445	1.518	1.439	4%
13C12-1,2,3,7,8-PeCDF	1.022	1.085	1.093	1.146	1.290	1.127	9%
13C12-1,2,3,6,7,8-HxCDF	1.347	1.320	1.356	1.323	1.336	1.336	1%
13C12-1,2,3,4,6,7,8-HpCDF	0.979	1.023	0.996	1.004	1.034	1.007	2%
Cleanup Standard							
13C12-1,2,3,7,8,9-HxCDF	1.034	1.075	1.087	1.077	1.093	1.073	2%

0.000

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-19-CS1-1116**
Analysis Method TO9-A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-200805B03	HRMS-7	DB5MSUS0173614H	05-Aug-2020 12:58		--e-signature-- 12-Aug-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.06	0.71	0.50	6.09E+03	0.887
1,2,3,7,8-PeCDD	32.1	1.66	2.50	2.01E+04	0.933
1,2,3,4,7,8-HxCDD	34.14	1.31	2.50	1.72E+04	0.912
1,2,3,6,7,8-HxCDD	34.2	1.30	2.50	1.78E+04	0.946
1,2,3,7,8,9-HxCDD	34.32	1.42	2.50	1.83E+04	0.972
1,2,3,4,6,7,8-HpCDD	35.8	1.17	2.50	1.48E+04	1.004
OCDD	37.29	0.91	5.00	2.26E+04	0.996
2,3,7,8-TCDF	27.14	0.80	0.50	8.25E+03	0.945
1,2,3,7,8-PeCDF	31.17	1.59	2.50	3.50E+04	1.078
2,3,4,7,8-PeCDF	31.89	1.63	2.50	3.67E+04	1.128
1,2,3,4,7,8-HxCDF	33.66	1.31	2.50	3.18E+04	1.178
1,2,3,6,7,8-HxCDF	33.72	1.23	2.50	3.21E+04	1.191
2,3,4,6,7,8-HxCDF	34.05	1.20	2.50	2.96E+04	1.098
1,2,3,7,8,9-HxCDF	34.46	1.18	2.50	2.26E+04	0.840
1,2,3,4,6,7,8-HpCDF	35.24	1.75	2.50	1.96E+04	0.999
1,2,3,4,7,8,9-HpCDF	36.05	2.04	2.50	1.66E+04	0.846
OCDF	37.38	0.92	5.00	3.08E+04	1.357
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.06	0.00	0.50	7.04E+03	1.025
13C12-1,2,3,4,7,8-HxCDD	34.13	1.27	100.00	6.92E+05	0.920
13C12-2,3,4,7,8-PeCDF	31.88	1.56	100.00	1.22E+06	0.940
13C12-1,2,3,4,7,8-HxCDF	33.64	0.54	100.00	1.02E+06	0.943
13C12-1,2,3,4,7,8,9-HpCDF	36.04	0.47	100.00	6.01E+05	0.766
Extraction Standards					
13C12-2,3,7,8-TCDD	28.04	0.778	100	1.37E+06	1.081
13C12-1,2,3,7,8-PeCDD	32.09	1.616	100	8.59E+05	0.676
13C12-1,2,3,6,7,8-HxCDD	34.19	1.241	100	7.52E+05	0.94
13C12-1,2,3,4,6,7,8-HpCDD	35.79	1.056	100	5.89E+05	0.736
13C12-OCDD	37.28	0.883	200	9.08E+05	0.567
13C12-2,3,7,8-TCDF	27.13	0.787	100	1.75E+06	1.373
13C12-1,2,3,7,8-PeCDF	31.16	1.595	100	1.30E+06	1.022
13C12-1,2,3,6,7,8-HxCDF	33.71	0.535	100	1.08E+06	1.347
13C12-1,2,3,4,6,7,8-HpCDF	35.23	0.456	100	7.83E+05	0.979
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.46	0.528	100	8.28E+05	1.034
Injection Standards					
13C12-1234-TCDD IS	27.36	0.797	100	1271832.4	12718.324
13C12-123789-HxCDD IS	34.32	1.21	100.00	8.01E+05	8005.233

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-19-CS2-1116**
Analysis Method TO9-A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-200805B02	HRMS-7	DB5MSUS0173614H	05-Aug-2020 12:16		--e-signature-- 12-Aug-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.07	0.81	2.00	3.13E+04	1.000
1,2,3,7,8-PeCDD	32.1	1.62	10.00	9.37E+04	0.915
1,2,3,4,7,8-HxCDD	34.14	1.30	10.00	8.96E+04	0.942
1,2,3,6,7,8-HxCDD	34.19	1.23	10.00	9.67E+04	1.017
1,2,3,7,8,9-HxCDD	34.32	1.23	10.00	9.46E+04	0.994
1,2,3,4,6,7,8-HpCDD	35.8	1.14	10.00	7.86E+04	1.023
OCDD	37.28	0.90	20.00	1.27E+05	1.033
2,3,7,8-TCDF	27.16	0.83	2.00	3.97E+04	0.981
1,2,3,7,8-PeCDF	31.17	1.62	10.00	1.69E+05	1.093
2,3,4,7,8-PeCDF	31.89	1.56	10.00	1.82E+05	1.179
1,2,3,4,7,8-HxCDF	33.65	1.22	10.00	1.62E+05	1.228
1,2,3,6,7,8-HxCDF	33.72	1.22	10.00	1.62E+05	1.227
2,3,4,6,7,8-HxCDF	34.05	1.26	10.00	1.55E+05	1.174
1,2,3,7,8,9-HxCDF	34.46	1.23	10.00	1.33E+05	1.011
1,2,3,4,6,7,8-HpCDF	35.24	1.88	10.00	1.06E+05	1.036
1,2,3,4,7,8,9-HpCDF	36.05	1.94	10.00	8.20E+04	0.802
OCDF	37.39	0.93	20.00	1.74E+05	1.420
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.07	0.00	2.00	3.24E+04	1.035
13C12-1,2,3,4,7,8-HxCDD	34.14	1.25	100.00	8.74E+05	0.919
13C12-2,3,4,7,8-PeCDF	31.88	1.58	100.00	1.49E+06	0.964
13C12-1,2,3,4,7,8-HxCDF	33.64	0.54	100.00	1.26E+06	0.955
13C12-1,2,3,4,7,8,9-HpCDF	36.04	0.46	100.00	8.07E+05	0.789
Extraction Standards					
13C12-2,3,7,8-TCDD	28.04	0.789	100	1.57E+06	1.1
13C12-1,2,3,7,8-PeCDD	32.09	1.623	100	1.02E+06	0.719
13C12-1,2,3,6,7,8-HxCDD	34.19	1.245	100	9.51E+05	0.951
13C12-1,2,3,4,6,7,8-HpCDD	35.79	1.051	100	7.68E+05	0.769
13C12-OCDD	37.28	0.897	200	1.23E+06	0.613
13C12-2,3,7,8-TCDF	27.13	0.789	100	2.02E+06	1.42
13C12-1,2,3,7,8-PeCDF	31.16	1.585	100	1.54E+06	1.085
13C12-1,2,3,6,7,8-HxCDF	33.72	0.542	100	1.32E+06	1.32
13C12-1,2,3,4,6,7,8-HpCDF	35.23	0.457	100	1.02E+06	1.023
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.46	0.538	100	1.07E+06	1.075
Injection Standards					
13C12-1234-TCDD IS	27.37	0.788	100	1423558.1	14235.581
13C12-123789-HxCDD IS	34.31	1.23	100.00	1.00E+06	9997.090

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-19-CS3-1116**
Analysis Method TO9-A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-200805B01	HRMS-7	DB5MSUS0173614H	05-Aug-2020 11:29		--e-signature--
					12-Aug-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.08	0.77	10.00	1.19E+05	0.956
1,2,3,7,8-PeCDD	32.12	1.62	50.00	3.74E+05	0.934
1,2,3,4,7,8-HxCDD	34.15	1.33	50.00	3.47E+05	0.926
1,2,3,6,7,8-HxCDD	34.2	1.23	50.00	3.62E+05	0.967
1,2,3,7,8,9-HxCDD	34.32	1.22	50.00	3.58E+05	0.956
1,2,3,4,6,7,8-HpCDD	35.8	1.06	50.00	2.95E+05	1.012
OCDD	37.29	0.90	100.00	4.79E+05	1.031
2,3,7,8-TCDF	27.16	0.78	10.00	1.72E+05	1.081
1,2,3,7,8-PeCDF	31.18	1.61	50.00	6.63E+05	1.100
2,3,4,7,8-PeCDF	31.9	1.59	50.00	6.90E+05	1.144
1,2,3,4,7,8-HxCDF	33.66	1.22	50.00	6.27E+05	1.210
1,2,3,6,7,8-HxCDF	33.73	1.23	50.00	6.28E+05	1.210
2,3,4,6,7,8-HxCDF	34.05	1.22	50.00	5.95E+05	1.148
1,2,3,7,8,9-HxCDF	34.46	1.19	50.00	5.05E+05	0.973
1,2,3,4,6,7,8-HpCDF	35.24	1.91	50.00	3.96E+05	1.039
1,2,3,4,7,8,9-HpCDF	36.05	1.90	50.00	3.16E+05	0.830
OCDF	37.38	0.92	100.00	6.62E+05	1.424
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.08	0.00	10.00	1.16E+05	0.931
13C12-1,2,3,4,7,8-HxCDD	34.13	1.26	100.00	6.69E+05	0.894
13C12-2,3,4,7,8-PeCDF	31.89	1.59	100.00	1.17E+06	0.966
13C12-1,2,3,4,7,8-HxCDF	33.64	0.54	100.00	9.70E+05	0.936
13C12-1,2,3,4,7,8,9-HpCDF	36.04	0.46	100.00	6.06E+05	0.796
Extraction Standards					
13C12-2,3,7,8-TCDD	28.05	0.778	100	1.25E+06	1.13
13C12-1,2,3,7,8-PeCDD	32.1	1.611	100	8.01E+05	0.726
13C12-1,2,3,6,7,8-HxCDD	34.19	1.254	100	7.49E+05	0.979
13C12-1,2,3,4,6,7,8-HpCDD	35.79	1.056	100	5.83E+05	0.763
13C12-OCDD	37.28	0.901	200	9.30E+05	0.608
13C12-2,3,7,8-TCDF	27.14	0.783	100	1.59E+06	1.437
13C12-1,2,3,7,8-PeCDF	31.17	1.598	100	1.21E+06	1.093
13C12-1,2,3,6,7,8-HxCDF	33.71	0.533	100	1.04E+06	1.356
13C12-1,2,3,4,6,7,8-HpCDF	35.23	0.463	100	7.62E+05	0.996
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.46	0.527	100	8.31E+05	1.087
Injection Standards					
13C12-1234-TCDD IS	27.38	0.789	100	1103722.5	11037.225
13C12-123789-HxCDD IS	34.32	1.26	100.00	7.65E+05	7646.902

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-19-CS4-1116**
Analysis Method TO9-A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-200805B07	HRMS-7	DB5MSUS0173614H	05-Aug-2020 15:46		--e-signature--
					12-Aug-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.05	0.79	40.00	5.97E+05	1.028
1,2,3,7,8-PeCDD	32.09	1.63	200.00	1.89E+06	0.973
1,2,3,4,7,8-HxCDD	34.14	1.27	200.00	1.85E+06	1.038
1,2,3,6,7,8-HxCDD	34.19	1.26	200.00	1.88E+06	1.058
1,2,3,7,8,9-HxCDD	34.31	1.27	200.00	1.89E+06	1.063
1,2,3,4,6,7,8-HpCDD	35.79	1.07	200.00	1.55E+06	1.057
OCDD	37.28	0.89	400.00	2.57E+06	1.070
2,3,7,8-TCDF	27.13	0.78	40.00	8.04E+05	1.087
1,2,3,7,8-PeCDF	31.16	1.59	200.00	3.32E+06	1.132
2,3,4,7,8-PeCDF	31.88	1.61	200.00	3.54E+06	1.205
1,2,3,4,7,8-HxCDF	33.64	1.21	200.00	3.13E+06	1.239
1,2,3,6,7,8-HxCDF	33.72	1.21	200.00	3.23E+06	1.279
2,3,4,6,7,8-HxCDF	34.04	1.24	200.00	3.05E+06	1.209
1,2,3,7,8,9-HxCDF	34.45	1.22	200.00	2.60E+06	1.028
1,2,3,4,6,7,8-HpCDF	35.23	1.88	200.00	2.10E+06	1.095
1,2,3,4,7,8,9-HpCDF	36.04	1.91	200.00	1.66E+06	0.864
OCDF	37.38	0.92	400.00	3.70E+06	1.541
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.05	0.00	40.00	5.83E+05	1.004
13C12-1,2,3,4,7,8-HxCDD	34.13	1.26	100.00	8.56E+05	0.963
13C12-2,3,4,7,8-PeCDF	31.87	1.58	100.00	1.42E+06	0.970
13C12-1,2,3,4,7,8-HxCDF	33.64	0.54	100.00	1.18E+06	0.932
13C12-1,2,3,4,7,8,9-HpCDF	36.03	0.46	100.00	7.50E+05	0.783
Extraction Standards					
13C12-2,3,7,8-TCDD	28.02	0.784	100	1.45E+06	1.134
13C12-1,2,3,7,8-PeCDD	32.08	1.627	100	9.69E+05	0.757
13C12-1,2,3,6,7,8-HxCDD	34.18	1.238	100	8.89E+05	0.932
13C12-1,2,3,4,6,7,8-HpCDD	35.78	1.055	100	7.34E+05	0.769
13C12-OCDD	37.28	0.912	200	1.20E+06	0.629
13C12-2,3,7,8-TCDF	27.11	0.777	100	1.85E+06	1.445
13C12-1,2,3,7,8-PeCDF	31.15	1.614	100	1.47E+06	1.146
13C12-1,2,3,6,7,8-HxCDF	33.7	0.54	100	1.26E+06	1.323
13C12-1,2,3,4,6,7,8-HpCDF	35.22	0.458	100	9.58E+05	1.004
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.45	0.536	100	1.03E+06	1.077
Injection Standards					
13C12-1234-TCDD IS	27.34	0.79	100	1279988.8	12799.888
13C12-123789-HxCDD IS	34.3	1.24	100.00	9.54E+05	9540.853

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-19-CS5-1116**
Analysis Method TO9-A
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-200805B06	HRMS-7	DB5MSUS0173614H	05-Aug-2020 15:04		--e-signature-- 12-Aug-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	28.06	0.78	200.00	3.43E+06	1.015
1,2,3,7,8-PeCDD	32.12	1.59	1000.00	1.18E+07	0.972
1,2,3,4,7,8-HxCDD	34.15	1.25	1000.00	1.18E+07	1.009
1,2,3,6,7,8-HxCDD	34.2	1.27	1000.00	1.22E+07	1.046
1,2,3,7,8,9-HxCDD	34.32	1.26	1000.00	1.22E+07	1.040
1,2,3,4,6,7,8-HpCDD	35.8	1.07	1000.00	1.03E+07	1.049
OCDD	37.3	0.90	2000.00	1.84E+07	1.058
2,3,7,8-TCDF	27.14	0.80	200.00	4.57E+06	1.086
1,2,3,7,8-PeCDF	31.18	1.61	1000.00	2.05E+07	1.147
2,3,4,7,8-PeCDF	31.89	1.59	1000.00	2.18E+07	1.220
1,2,3,4,7,8-HxCDF	33.66	1.22	1000.00	1.98E+07	1.211
1,2,3,6,7,8-HxCDF	33.73	1.22	1000.00	2.07E+07	1.270
2,3,4,6,7,8-HxCDF	34.05	1.22	1000.00	1.95E+07	1.197
1,2,3,7,8,9-HxCDF	34.47	1.22	1000.00	1.69E+07	1.037
1,2,3,4,6,7,8-HpCDF	35.24	1.90	1000.00	1.35E+07	1.070
1,2,3,4,7,8,9-HpCDF	36.05	1.88	1000.00	1.12E+07	0.890
OCDF	37.39	0.92	2000.00	2.69E+07	1.546
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	28.06	0.00	200.00	3.46E+06	1.023
13C12-1,2,3,4,7,8-HxCDD	34.14	1.27	100.00	1.12E+06	0.955
13C12-2,3,4,7,8-PeCDF	31.88	1.57	100.00	1.74E+06	0.972
13C12-1,2,3,4,7,8-HxCDF	33.65	0.53	100.00	1.49E+06	0.911
13C12-1,2,3,4,7,8,9-HpCDF	36.04	0.47	100.00	1.03E+06	0.816
Extraction Standards					
13C12-2,3,7,8-TCDD	28.04	0.777	100	1.69E+06	1.218
13C12-1,2,3,7,8-PeCDD	32.09	1.587	100	1.21E+06	0.874
13C12-1,2,3,6,7,8-HxCDD	34.19	1.259	100	1.17E+06	0.959
13C12-1,2,3,4,6,7,8-HpCDD	35.8	1.056	100	9.80E+05	0.803
13C12-OCDD	37.29	0.873	200	1.74E+06	0.714
13C12-2,3,7,8-TCDF	27.13	0.781	100	2.10E+06	1.518
13C12-1,2,3,7,8-PeCDF	31.16	1.601	100	1.79E+06	1.29
13C12-1,2,3,6,7,8-HxCDF	33.72	0.547	100	1.63E+06	1.336
13C12-1,2,3,4,6,7,8-HpCDF	35.23	0.463	100	1.26E+06	1.034
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.46	0.543	100	1.33E+06	1.093
Injection Standards					
13C12-1234-TCDD IS	27.35	0.784	100	1386687.4	13866.874
13C12-123789-HxCDD IS	34.32	1.24	100.00	1.22E+06	12207.989

ALS Life Sciences

Second Source CalibrationVerification Report

Sample Name	**CVS**	Sampling Date	n/a		
ALS Sample ID	1613B-RS1-012	Extraction Date	n/a		Approved:
Analysis Method	TO9-A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		12-Aug-2020

Run Information	**Run 1**
Filename	7-200805B08
Run Date	05-Aug-20 16:28
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.08	96	75-125	
1,2,3,7,8-PeCDD	50	32.12	106	75-125	
1,2,3,4,7,8-HxCDD	50	34.15	100	75-125	
1,2,3,6,7,8-HxCDD	50	34.21	99	75-125	
1,2,3,7,8,9-HxCDD	50	34.33	102	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.81	98	75-125	
OCDD	100	37.30	97	75-125	
2,3,7,8-TCDF	10	27.16	100	75-125	
1,2,3,7,8-PeCDF	50	31.18	104	75-125	
2,3,4,7,8-PeCDF	50	31.90	96	75-125	
1,2,3,4,7,8-HxCDF	50	33.66	100	75-125	
1,2,3,6,7,8-HxCDF	50	33.73	100	75-125	
2,3,4,6,7,8-HxCDF	50	34.06	99	75-125	
1,2,3,7,8,9-HxCDF	50	34.48	105	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.26	98	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.07	101	75-125	
OCDF	100	37.39	100	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.08	113	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.15	101	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.89	101	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.66	100	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.05	102	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.05	100	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.10	98	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.20	100	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.80	102	70-130	
13C12-OCDD	200	37.29	99	70-130	
13C12-2,3,7,8-TCDF	100	27.14	101	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.17	98	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.72	102	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.24	102	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.47	101	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-19-CCV-1130	Extraction Date	n/a		Approved:
Analysis Method	TO9-A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A14
Run Date	09-Aug-20 18:07
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.08	97	75-125	
1,2,3,7,8-PeCDD	50	32.12	95	75-125	
1,2,3,4,7,8-HxCDD	50	34.15	84	75-125	
1,2,3,6,7,8-HxCDD	50	34.21	98	75-125	
1,2,3,7,8,9-HxCDD	50	34.33	93	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.81	98	75-125	
OCDD	100	37.30	97	75-125	
2,3,7,8-TCDF	10	27.16	103	75-125	
1,2,3,7,8-PeCDF	50	31.18	90	75-125	
2,3,4,7,8-PeCDF	50	31.90	92	75-125	
1,2,3,4,7,8-HxCDF	50	33.66	83	75-125	
1,2,3,6,7,8-HxCDF	50	33.73	91	75-125	
2,3,4,6,7,8-HxCDF	50	34.06	83	75-125	
1,2,3,7,8,9-HxCDF	50	34.48	82	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.26	95	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.07	88	75-125	
OCDF	100	37.39	88	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.08	90	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.15	89	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.89	101	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.66	88	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.05	93	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.05	96	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.10	87	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.20	102	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.80	88	70-130	
13C12-OCDD	200	37.29	78	70-130	
13C12-2,3,7,8-TCDF	100	27.14	93	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.17	86	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.72	102	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.24	87	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.47	88	40-130	

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-19-CCV-1131	Extraction Date	n/a		Approved:
Analysis Method	TO9-A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A30
Run Date	10-Aug-20 05:29
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	28.05	96	75-125	
1,2,3,7,8-PeCDD	50	32.12	96	75-125	
1,2,3,4,7,8-HxCDD	50	34.15	84	75-125	
1,2,3,6,7,8-HxCDD	50	34.20	98	75-125	
1,2,3,7,8,9-HxCDD	50	34.32	93	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.80	97	75-125	
OCDD	100	37.30	96	75-125	
2,3,7,8-TCDF	10	27.14	98	75-125	
1,2,3,7,8-PeCDF	50	31.18	91	75-125	
2,3,4,7,8-PeCDF	50	31.89	89	75-125	
1,2,3,4,7,8-HxCDF	50	33.66	87	75-125	
1,2,3,6,7,8-HxCDF	50	33.73	95	75-125	
2,3,4,6,7,8-HxCDF	50	34.06	90	75-125	
1,2,3,7,8,9-HxCDF	50	34.47	85	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.24	95	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.05	90	75-125	
OCDF	100	37.39	88	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	28.05	90	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.14	87	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.88	97	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.65	96	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.05	97	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	28.04	98	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.10	86	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.19	104	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.80	88	70-130	
13C12-OCDD	200	37.29	78	70-130	
13C12-2,3,7,8-TCDF	100	27.11	94	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.17	87	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.72	97	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.24	86	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.46	88	40-130	

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

SVOC DATA PACKAGE

SECTION 5: QC SAMPLE DATA

Including:

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

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3369876-1	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	MEDIA	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A18
Run Date	09-Aug-20 21:04
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.6	1.6	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.93	0.93	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.2	1.2	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<1.1	1.1	U		100
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<1.1	1.1	U		100
OCDD	0.0003	37.30	<3.8	1.3	M,J,R	3.8	200
2,3,7,8-TCDF	0.1	NotFnd	<0.83	0.83	U		20
1,2,3,7,8-PeCDF	0.03	31.17	<0.73	0.73	M,U	0.54	100
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.69	0.69	U		100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.78	0.78	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.76	0.76	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.81	0.81	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.96	0.96	U		100
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.63	0.63	U		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.78	0.78	U		100
OCDF	0.0003	NotFnd	<1.4	1.4	U		200

Field Spike Standards	**pg**	**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0	NS	
13C12-1,2,3,4,7,8-HxCDD	0	NS	
13C12-2,3,4,7,8-PeCDF	0	NS	
13C12-1,2,3,4,7,8-HxCDF	0	NS	
13C12-1,2,3,4,7,8,9-HpCDF	0	NS	

Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.04	57	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.10	57	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.19	61	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.80	53	25-130
13C12-OCDD	8000	37.29	44	25-130
13C12-2,3,7,8-TCDF	4000	27.13	56	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	52	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.72	57	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.24	53	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	55	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.6	1.6	U	20
Total-PeCDD	0	<0.93	0.93	U	100
Total-HxCDD	0	<1.2	1.2	U	100
Total-HpCDD	0	<1.1	1.1	U	100
Total-TCDF	0	<0.83	0.83	U	20
Total-PeCDF	0	<0.73	0.73	U	100
Total-HxCDF	0	<0.96	0.96	U	100
Total-HpCDF	0	<0.78	0.78	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00
Mid Point PCDD/F TEQ (WHO 2005)	1.77
Upper Bound PCDD/F TEQ (WHO 2005)	3.54

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
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Method Blank Analysis Report

Sample Name	**Method Blank**	Sampling Date	n/a		
ALS Sample ID	WG3369876-4	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	sample	*N Ashtari*
Analysis Type	REAGENT	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A19
Run Date	09-Aug-20 21:46
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.0	1.0	U		20
1,2,3,7,8-PeCDD	1	NotFnd	<0.76	0.76	U		100
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.66	0.66	U		100
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.64	0.64	U		100
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.64	0.64	U		100
1,2,3,4,6,7,8-HpCDD	0.01	35.81	<0.86	0.69	M,J,R	0.86	100
OCDD	0.0003	37.29	<1.8	0.93	M,J,R	1.8	200
2,3,7,8-TCDF	0.1	NotFnd	<0.67	0.67	U		20
1,2,3,7,8-PeCDF	0.03	31.18	0.900	0.56	M,J		100
2,3,4,7,8-PeCDF	0.3	31.89	<0.53	0.53	M,U	0.49	100
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.50	0.50	U		100
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.49	0.49	U		100
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.52	0.52	U		100
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.62	0.62	U		100
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.63	0.63	U		100
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.79	0.79	U		100
OCDF	0.0003	NotFnd	<0.91	0.91	U		200

Field Spike Standards	**pg**	**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	0	NS	
13C12-1,2,3,4,7,8-HxCDD	0	NS	
13C12-2,3,4,7,8-PeCDF	0	NS	
13C12-1,2,3,4,7,8-HxCDF	0	NS	
13C12-1,2,3,4,7,8,9-HpCDF	0	NS	

Extraction Standards				
13C12-2,3,7,8-TCDD	4000	28.03	68	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.09	70	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.19	73	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.80	72	25-130
13C12-OCDD	8000	37.29	62	25-130
13C12-2,3,7,8-TCDF	4000	27.13	68	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.16	66	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.71	73	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.23	72	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	59	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.0	1.0	U	20
Total-PeCDD	0	<0.76	0.76	U	100
Total-HxCDD	0	<0.66	0.66	U	100
Total-HpCDD	0	<0.69	0.69	U	100
Total-TCDF	0	<0.67	0.67	U	20
Total-PeCDF	1	0.900	0.56		100
Total-HxCDF	0	<0.62	0.62	U	100
Total-HpCDF	0	<0.79	0.79	U	100

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0270
Mid Point PCDD/F TEQ (WHO 2005)	1.24
Upper Bound PCDD/F TEQ (WHO 2005)	2.44

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
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure
NS	Indicates that this standard has not been added.

ALS Life Sciences

Laboratory Control Sample Analysis Report

Sample Name	**Laboratory Control Sample**	Sampling Date	n/a		
ALS Sample ID	WG3369876-2	Extraction Date	30-Jul-20		Approved:
Analysis Method	TO9-A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	4		12-Aug-2020

Run Information	**Run 1**
Filename	7-200809A15
Run Date	09-Aug-20 18:58
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUS0173614H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	400	28.06	91	70-130	
1,2,3,7,8-PeCDD	2000	32.10	100	70-130	
1,2,3,4,7,8-HxCDD	2000	34.14	93	70-130	
1,2,3,6,7,8-HxCDD	2000	34.19	107	70-130	
1,2,3,7,8,9-HxCDD	2000	34.32	109	70-130	
1,2,3,4,6,7,8-HpCDD	2000	35.80	96	70-130	
OCDD	4000	37.29	91	70-130	
2,3,7,8-TCDF	400	27.14	94	70-130	
1,2,3,7,8-PeCDF	2000	31.18	96	70-130	
2,3,4,7,8-PeCDF	2000	31.89	89	70-130	
1,2,3,4,7,8-HxCDF	2000	33.66	85	70-130	
1,2,3,6,7,8-HxCDF	2000	33.73	103	70-130	
2,3,4,6,7,8-HxCDF	2000	34.05	91	70-130	
1,2,3,7,8,9-HxCDF	2000	34.46	85	70-130	
1,2,3,4,6,7,8-HpCDF	2000	35.24	99	70-130	
1,2,3,4,7,8,9-HpCDF	2000	36.05	82	70-130	
OCDF	4000	37.38	76	70-130	
Field Spike Standards	**pg**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	0		NS		
13C12-1,2,3,4,7,8-HxCDD	0		NS		
13C12-2,3,4,7,8-PeCDF	0		NS		
13C12-1,2,3,4,7,8-HxCDF	0		NS		
13C12-1,2,3,4,7,8,9-HpCDF	0		NS		
Extraction Standards					
13C12-2,3,7,8-TCDD	4000	28.04	76	40-130	
13C12-1,2,3,7,8-PeCDD	4000	32.09	82	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	34.19	80	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.79	82	25-130	
13C12-OCDD	8000	37.28	72	25-130	
13C12-2,3,7,8-TCDF	4000	27.13	76	40-130	
13C12-1,2,3,7,8-PeCDF	4000	31.16	74	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.71	81	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.23	79	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	4000	34.46	75	40-130	

R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
NS	Indicates that this standard has not been added.

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

SVOC DATA PACKAGE

SECTION 6: INTERNAL RECORDS

Including:

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

8

Extraction Workup Sheet

Batch ID:	WG3369876	Analysis:	PUFS - DX/1668A (HR)

WG3369876

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

Analyst:	Sawin Patel	Date:	30-July-20

SUBSAMPLING

Sample I.D.	Client I.D.	Media Prep L#
WG3369876-1	Method Blank	L2453849-17
WG3369876-2	Laboratory Control Sample	L2453849-18
WG3369876-3	Extraction and Injection STD.	
WG3369876-4	Method Blank(Reagent)	Florisil + Celium Sample
L2479138-1	SITE 1 - COMPOSITE 1 (JULY)	L2453849-6,-8,16-1
L2479138-2	SITE 2 - COMPOSITE 1 (JULY)	L2453849-23,-24,14,-7
L2479138-3	SITE 3 - COMPOSITE 1 (JULY)	L2453849-4,-10,-11,-5
L2479138-4	SITE 4 - COMPOSITE 1 (JULY)	L2453849-12,-19,-20,-21
L2479138-5	SITE 5 - COMPOSITE 1 (JULY)	L2453849-3,2,22,13
	Composite 4 PUFS per sample	
Sample ID	Composite:	
L2479138-1	L2472393-1, L2479135-1, L2468702-1	L2475162-1
L2479138-2	L2472393-2, L2479135-2, L2468702-2	L2475162-2
L2479138-3	L2472393-3, L2479135-3 SP 30-JUL-20, L2468702-3,	L2475162-3
L2479138-4	L2472393-4, L2479135-4, L2468702-4,	L2475162-4
L2479138-5	L2472393-5, L2479135-5, L2468702-5,	L2475162-5

BATCH TRACKING

	Date/Time/Initials
Client Labels Checked:	SP 30-Jul-20
Media transfer to soxhlet:	SP 30-Jul-20
	—
	—
	—
Soxhlet Start Time:	11:30AM 30-Jul-20 SP
Soxhlets Reflux Properly:	SP
Soxhlet End Time:	31-Jul-20 SP 7:45 AM
	—
	—
	—
	—
Rotovap Reduction + verify temp:	31-Jul-2020 AP
Extract split:	31-Jul-2020 AP
Acid Silica Column:	31-Jul-2020 AP
Solvent exchange:	4-Aug-20 BB
Alumina Column:	4-Aug-20 BB
Carbon column:	5-Aug-20 BB
PCB microvial:	4-Aug-20 BB
Micro/Robo Vial:	5-Aug-20 BB
Update to LIMS:	4-Aug-2020 BB

Batch ID:	WG3369876

DX Extraction Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3369876-1	40	✓
WG3369876-2	40	✓
WG3369876-3	40	✓
WG3369876-4	40	✓
L2479138-1	40	✓
L2479138-2	40	✓
L2479138-3	40	✓
L2479138-4	40	✓
L2479138-5	40	✓
	40	
	40	
	40	

Syringe ID: 320

Standard: M23-ES#2-039F

Spike Date: 30-Jul-2020

Spike Witnessing

Chemist's Initials

Chemist: SP

Witness's Initials

Witness: A.M

Witness's Initials

Correct Syringe Obtained: A.M

Witness's Initials

Correct Standard Obtained: A.M

Witness's Initials

Correct Technique Followed: A.M

PCB Extraction Standard:

A.M

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3369876-1	40	✓
WG3369876-2	40	✓
WG3369876-3	40	✓
WG3369876-4	40	✓
L2479138-1	40	✓
L2479138-2	40	✓
L2479138-3	40	✓
L2479138-4	40	✓
L2479138-5	40	* ✓
	40	
	40	

Syringe ID: ~~383~~ 382

Standard: 1668A-ES#2- 063G * 063F

Spike Date: 30-Jul-2020

Spike Witnessing

Chemist's Initials

Chemist: SP

Witness's Initials

Witness: A.M

Witness's Initials

Correct Syringe Obtained: A.M

Witness's Initials

Correct Standard Obtained: A.M

Witness's Initials

Correct Technique Followed: A.M

Batch ID:	WG3369876

Batch ID:	WG3369876

DX Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3369876-2	40	✓
WG3369876-3	40	✓

Syringe ID:	322
Standard:	1613B-NS#3-028F
Date & Initials:	30-Jul-2020 SP

√=20ul.

PCB Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3369876-2	40	✓✓
WG3369876-3	40	✓✓

Syringe ID:	385
Standard:	1668A-NS#1-038B
Date & Initials:	30-Jul-2020 SP

DX Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3369876-1	20	✓
WG3369876-2	20	✓
WG3369876-3	N/A	N/A
WG3369876-4	20	✓
L2479138-1	20	✓
L2479138-2	20	✓
L2479138-3	20	✓
L2479138-4	20	✓
L2479138-5	20	✓
	20	
	20	

Syringe ID: 357

Standard: M23-CL#1- 036E

Date & Initials: 31-Jul-2020 AP

	Chemist's Initials
Correct Syringe Obtained:	AP
Correct Standard Obtained:	AP
Correct Technique Followed:	AP

PCB Cleanup Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3369876-1	20	✓
WG3369876-2	20	✓
WG3369876-3	N/A	N/A
WG3369876-4	20	✓
L2479138-1	20	✓
L2479138-2	20	✓
L2479138-3	20	✓
L2479138-4	20	✓
L2479138-5	20	✓
	20	
	20	

Syringe ID: 378

Standard: 1668A-CL#2- 035B

Date & Initials: 31-Jul-2020 AP

	Chemist's Initials
Correct Syringe Obtained:	AP
Correct Standard Obtained:	AP
Correct Technique Followed:	AP

Batch ID:	WG3369876

DX Injection Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3369876-1	10	✓
WG3369876-2	10	✓
WG3369876-3	10	✓
WG3369876-4	10	✓
L2479138-1	10	✓
L2479138-2	10	✓
L2479138-3	10	✓
L2479138-4	10	✓
L2479138-5	10	✓
	10	
	10	
	10	
	10	
	10	
	10	
	10	

Syringe ID: 387

Standard: 1613B-IS#1- 083C

Date & Initials: 5 Aug-2020 [illegible]

	Chemist's Initials
Correct Syringe Obtained:	[illegible]
Correct Standard Obtained:	[illegible]
Correct Technique Followed:	[illegible]

PCB Injection Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3369876-1	5	✓
WG3369876-2	5	✓
WG3369876-3	5	✓
WG3369876-4	5	✓
L2479138-1	5	✓
L2479138-2	5	✓
L2479138-3	5	✓
L2479138-4	5	✓
L2479138-5	5	✓
	5	
	5	
	5	
	5	
	5	
	5	
	5	

Syringe ID: 260

Standard: 1668A-IS#2- 013C

Date & Initials: 4. Aug. 2020 [illegible]

	Chemist's Initials
Correct Syringe Obtained:	[illegible]
Correct Standard Obtained:	[illegible]
Correct Technique Followed:	[illegible]

Batch ID:	WG3369876

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Acetone	105124	
Hexane	105436	
DCM	105533	
Toluene	105355	
Nonane	ORG-WAKONON- 052	
1:1 DCM:HEX	ORG-DH2- 641	
Sodium Sulphate	ORG-SSU- 2233, 3326	
Acid Silica	ORG-ASI- 9636, 9638	
Neutral Silica	ORG-NSI- 2359	
Alumina	ORG-ALU- 469	
1% Deactivated Silica	ORG-2%DAS- -	
Chromacarb	ORG-CC- 276	
Corn oil	ORG-CO-070	

Batch ID:	WG3369876

Procedure:

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

Extraction:

- For MB and LCS you **must** use blank media - if not available see your Team Lead

- Place a layer of pre-cleaned glasswool in to the bottom of the soxhlet body.
- Add ~1cm Sodium Sulphate.
-Place the contents of the PUF tubes into the soxhlet body (4 per sample)

- Spike with Extraction Standard (plus Native for LCS and ENI).
- Soxhlet extract in ~~DCM~~ Toluene for 16 hours (check with team lead or supervisor) – SP 30-Jul-20 as per MM

Rotovap:

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

Batch ID:	WG3369876

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:	WG3369876

Comments:

NOTE: Label and Save All Columns including Acid Silica Columns

Approval of Deviation from Standard Method

(Batch Writer): _____

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

WG3369876			Prep Analyst:		
PUFS - DX/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					

Re-column/Re-work Requisition Form

Workgroup	WG3369876	
Samples	Rework 1: Take ***HALF*** of the alumina F1. Blow down to just dryness. Alumina column it. Combine with PCB microvial.	
WG3369876-1	x	
WG3369876-2	x	
WG3369876-3		
WG3369876-4	x	
L2479138-1	x	
L2479138-2	x	
L2479138-3	x	
L2479138-4	x	
L2479138-5	x	

	Initials	Date	Analysis
Re-Work Sent to Prep:	ES	10-Aug-20	PCB

If all samples from a batch are being sent for remedial re-work or procedural re-work, be sure to include QC samples. If selected samples are being sent for remedial re-work, create a procedural blank which will receive the prescribed re-work.

	Initials	Date
Column:	MM	10-Aug-2020
Microvial:	AP	11-Aug-2020
Spiking	—	—

Initials	Standards Used:
—	—

Reagent Lot Numbers:

Reagent	Lot#	Manufacturer
Copper	—	
Hexane	105456	
DCM	105532	
Toluene	105876	
1:1 DCM:HEX	ORG-DHX-641	
Sodium Sulphate	ORG-SSU-2334	
Acid Silica	—	
Neutral Silica	—	
Florisil	—	
Alumina	ORG-ALU-470	
Nitrogen	—	
Chromacarb	—	

CHECK WHEN SPLIT - PUT IN ORDER 251 cutpoint half F1
3-Mar-2015 / MK

ALS Life Sciences

Sample Calculation Report

Approved: *N Ashtari* --e-signature-- 12-Aug-2020

CS3 RRF Check

$$RRF = \frac{\text{Response of 2,3,7,8-TCDD}}{\text{Response of 13C12-2,3,7,8-TCDD}} \times \frac{\text{Concentration of 13C12-2,3,7,8-TCDD}}{\text{Concentration of TCDD}}$$

		Calculated Value	Value from TargetLynx
RRF	$= \frac{119288.60}{1247280.90} \times \frac{100}{10}$	**0.956**	**0.956**

Calculation of OCDD amount in L2479138-1

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

pg	$= \frac{3075.6}{504512} \times \frac{8000}{1.038 * 1.00}$	**47.0**	**47.0**

Calculation of 13C12-2,3,7,8-TCDD Recovery in L2479138-1

$$\%\ Recovery = \frac{\text{Response of 13C12-2,3,7,8-TCDD}}{\text{Response of 13C12-1,2,3,4-TCDD}} \times \frac{\text{pg of 13C12-1,2,3,4-TCDD spiked} * 100}{\text{Mean RRF} * \text{Amount Spiked}}$$

% Recovery	$= \frac{818256.7}{1060422.3} \times \frac{4000 * 100}{1.13 * 4000}$	**68**	**68 %**

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

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:

L2468702

Chain of Custody / Analytical Request Form

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

Tel +1-905-331-3111 Fax +1-905-331-4567 www.alsglobal.com

Composite WO: L2479138

ALS Environmental

Report To		Report Format / Distribution		Service Requested
Company:	Farallon Consulting	☑ Standard ☐ Other:		☑ Regular Service
Contact:	206 735 6178 Amber Bailey	☑ PDF ☑ Excel ☐ Digital ☐ Fax		☐ Rush Service (with prior consultation) - surcharge applies
Address:	975 5th AVE NE Issaquah WA 98027	Email 1:		☐ Other - Please contact ALS
Phone:	206 735 6178 Fax:	Email 2:		
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Company:		Job #:	1466-004	
Contact:		Location:	Seattle Iron and Metals	
Address:		PO:		
Phone:	Fax:	Sampled by:	Amber Bailey	
Lab Work Order #		**ALS Contact:**		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCBs method 1668	Dioxin method 8290A	Hazardous? Provide Details	Highly Contaminated?	Number of Containers
1	L2453819-8-062920-1	6/29/20	1200	Air	X	X			
2	L2453819-23-062920-2	"	1246	"	X	X			
3	L2453819-10-062920-3	"	1338	"	X	X			
4	L2453819-21-062920-4	"	1405	"	X	X			
5	L2453819-22-062920-5	"	1428	"	X	X			

Special Instructions / Regulations / Hazardous Details

Hold for composite at end of project, please call Amber upon receipt 206-735-6178

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided by ALS

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date (dd-mmm-yy)	Time (hh:mm)	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
	6/29/20	1715	ARRON BURTON	2-JUL-2020	11:50	25.0 °C				

Composite WO: L2479138

ALS Environmental

Chain of Custody / Analytical Request Form
1435 Norjohn Court, Unit 1, Burlington, Ontario, Canada, L7L 0E6
Tel +1-905-331-3111 Fax +1-905-331-4567 www.alsglobal.com

L2472393

Report To		Report Format / Distribution		Service Requested
Company:	Farallon consulting	☑ Standard ☐ Other:		☑ Regular Service
Contact:	Amber Bailey, 206 910 4320	☑ PDF ☑ Excel ☐ Digital ☐ Fax		☐ Rush Service (with prior consultation) - surcharge applies
Address:	975 5th Ave NW, Issaquah WA	Email 1:	abailey@farallonconsulting.com	☐ Other - Please contact ALS
Phone:	206 910 4320 Fax:	Email 2:		
Invoice To	Same as Report? ☑ Yes ☐ No	**Client / Project Information**		**Analysis Request**
Company:	Floyd / Snider	Job #:	1466-004	
Contact:	Amanda McKay	Location:	Seattle Iron and Metal	
Address:		PO:		
Phone:	Fax:	Sampled by:	Amber Bailey	
Lab Work Order #		**ALS Contact:**		

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCBs method 1668b	Dioxin method 8290A	Hazardous? Provide Details	Highly Contaminated?	Number of Containers
1	L2453819-16-070720-1	7/7/2020	0849	air	X	X			
2	L2453819-24-070720-2	"	0945	"	X	X			
3	L2453819-11-070720-3	"	1005	"	X	X			
4	L2453819-20-070720-4	"	1028	"	X	X			
5	L2453819-13-070720-5	"	1054	"	X	X			

Special Instructions / Regulations / Hazardous Details

Hold for composite at end of project. please call Amber upon Receipt. Home: 206 910 4320 Cell: 206 735 6178

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided by ALS

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
ALS Canada Ltd.	7/7/2020	1421	HARON BURTON	9-July-2020	11:40	23.5 °C				

Composite WO: L2479138

ALS Environmental

Chain of Custody / Analytical Request Form

1435 Norjohn Court, Unit 1, Burlington, Ontario, Canada, L7L 0E6
Tel +1-905-331-3111 Fax +1-905-331-4567 www.alsglobal.com

L2475162

Report To
Company: Farallon Consulting
Contact: Amber Bailey 206 910 4320
Address: 975 5th Ave NW, Issaquah WA
Phone: 206 910 4320 Fax:

Invoice To Same as Report? ☑ Yes ☐ No
Company:
Contact:
Address:
Phone: Fax:

Lab Work Order #

Report Format / Distribution
☑ Standard ☐ Other:
☑ PDF ☑ Excel ☐ Digital ☐ Fax
Email 1: abailey@farallonconsulting.com
Email 2: spatterson@farallonconsulting.com

Client / Project Information
Job #: 1466-004
Location: Seattle Iron and Metals
PO: 601 S Myrtle Street, Seattle
Sampled by: Amber Bailey

ALS Contact: Claire K.

Service Requested
☑ Regular Service
☐ Rush Service (with prior consultation) - surcharge applies
☐ Other - Please contact ALS

Analysis Request

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PCBs Method 1668B	Dioxin 8290A	Hazardous? Provide Details	Highly Contaminated?	Number of Containers
1	L2453819-1-071420-1	7/14/20	1051	Air	X	X			
2	L2453819-14-071420-2		1140		X	X			
3	L2453819-4-071420-3		1210		X	X			
4	L2453819-12-071420-4		1234		X	X			
5	L2453819-3-071420-5		1255		X	X			

Special Instructions / Regulations / Hazardous Details

Please hold samples for composite after 4 weeks. Email receipt to Amber Bailey

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided by ALS

Released by: ALS Canada Ltd.	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No If Yes add SIF
	7/14/20	1521	Ainsley Preston	15-July-2020	15:35	4.9 °C				

Composite WO: L2479138

Chain of Custody (COC) / Analytical Request Form

L2479135-COFC

COC Number: 17 - 792163

Page of

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Favallon Consulting LLC	Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Amber Bailey	Quality Control (QC) Report with Report [ ] YES [ ] NO	PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]
Phone:	206 910 4320	[ ] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]
Company address below will appear on the final report		Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	975 5TH AVE NW	Email 1 or Fax abailey@favallonconsulting.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Issaquah WA	Email 2	
Postal Code:	98027	Email 3	
Invoice To	Same as Report To [X] YES [ ] NO	Invoice Distribution	
	Copy of Invoice with Report [X] YES [ ] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX	
Company:		Email 1 or Fax APC@favallonconsulting.com	
Contact:		Email 2 Abailey@favallonconsulting.com	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	PCBs EPA 1668 Dioxins EPA 1613		SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2453819-6-072120-1	7/21/20	0857	Air	1	X	X		
2	L2453819-7-072120-2	"	0922	"	1	X	X		
3	L2453819-5-072120-3	"	0957	"	1	X	X		
4	L2453819-19-072120-4	"	1110	"	1	X	X		
5	L2453819-2-072120-5	"	1132	"	1	X	X		

AR

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [ ] NO	L2453819-9 : Broken
Are samples for human consumption/ use? [ ] YES [ ] NO	Please composite All 4 sets of samples from previous weeks

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [X]

Ice Packs [X] Ice Cubes [ ] Custody seal intact Yes [X] No [ ]

Cooling Initiated [X]

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
6.5°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 7/21/2020	Time: 1530	Received by: AARON BURTON	Date: 23-July-2020	Time: 11:45	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

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
2-JULY-2020 11:50	FLOYD SNIDER	5 x PUFs	25.0°C	>10°C Fedex 3943 4802 4116	MJ	2-JULY-2020 15:50	L2468702	-1-5

*Temperatures were recorded using:

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____

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
[redacted]								
9-July-2020 11:40	FLOYD SNIDER	5xPUFs	23.5°C	>10°C Fedex 3945 9996 5985	NB	10-July-2020 10:13	L2472393	-1-5

*Temperatures were recorded using:

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____

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
[redacted]								
15-July-2020 15:35	FARALLON Consulting	5 x PUFs	4.9°C	Good FedEx 3rd 3948 3691 3698	NJ	16-July-2020 12:35	L2475162	-1-5
[redacted]								

*Temperatures were recorded using:

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____

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
23-July-2020 11:45	FARALLON Consulting	6 x PUFs	6.5°C	Good FedEx 7910 6547 7025	RJ	24-July-2020 10:30	L2479135	-1-5

*Temperatures were recorded using:

☑ VWR Traceable dedicated I.R. gun (model 36934-178 SN 192108143)

☐ Other (specify): _____