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

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Client Project Information

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

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2504188

Final Package Review by: _____

Date Reviewed: 14-Oct-20

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SECTION 1: PROJECT NARRATIVE

ALSE Project Information

Project ID: FAR100
Contact: Claire Kocharakkal
Submission ID(s): L2504188

Client Project Information

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

Analytical Method: PCDD/F by EPA TO9A

ALS Sample ID	Client Sample Descriptions	Matrix	Date Sampled	Date Received	Temp/degrees C. on receipt	Date Extracted	Date Analyzed
L2494490-1	L2483549-13-1	PUF	25-Aug-20	26-Aug-20	5.7	n/a	n/a
L2497813-1	L2483549-20-1	PUF	1-Sep-20	2-Sep-20	5.5	n/a	n/a
L2501323-1	L2483549-17-1	PUF	9-Sep-20	10-Sep-20	4.8	n/a	n/a
L2504187-1	L2483549-7-1	PUF	15-Sep-20	16-Sep-20	7.0	n/a	n/a
L2504188-1	**SITE 1 - COMPOSITE 3 (SEPTEMBER)**	**PUF**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
L2494490-2	L2483549-1-2	PUF	25-Aug-20	26-Aug-20	5.7	n/a	n/a
L2497813-2	L2483549-19-2	PUF	1-Sep-20	2-Sep-20	5.5	n/a	n/a
L2501323-2	L2483549-10-2	PUF	9-Sep-20	10-Sep-20	4.8	n/a	n/a
L2504187-2	L2483549-8-2	PUF	15-Sep-20	16-Sep-20	7.0	n/a	n/a
L2504188-2	**SITE 2 - COMPOSITE 3 (SEPTEMBER)**	**PUF**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
L2494490-3	L2483549-14-3	PUF	25-Aug-20	26-Aug-20	5.7	n/a	n/a
L2497813-3	L2483549-18-3	PUF	1-Sep-20	2-Sep-20	5.5	n/a	n/a
L2501323-3	L2483549-16-3	PUF	9-Sep-20	10-Sep-20	4.8	n/a	n/a
L2504187-3	L2483549-15-3	PUF	15-Sep-20	16-Sep-20	7.0	n/a	n/a
L2504188-3	**SITE 3 - COMPOSITE 3 (SEPTEMBER)**	**PUF**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
L2494490-4	L2483549-12-4	PUF	25-Aug-20	26-Aug-20	5.7	n/a	n/a
L2497813-4	L2483549-5-4	PUF	1-Sep-20	2-Sep-20	5.5	n/a	n/a
L2501323-4	L2483549-9-4	PUF	9-Sep-20	10-Sep-20	4.8	n/a	n/a
L2504187-4	L2483549-2-4	PUF	15-Sep-20	16-Sep-20	7.0	n/a	n/a
L2504188-4	**SITE 4 - COMPOSITE 3 (SEPTEMBER)**	**PUF**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
L2494490-5	L2483549-11-5	PUF	25-Aug-20	26-Aug-20	5.7	n/a	n/a
L2497813-5	L2483549-4-5	PUF	1-Sep-20	2-Sep-20	5.5	n/a	n/a
L2501323-5	L2483549-6-5	PUF	9-Sep-20	10-Sep-20	4.8	n/a	n/a
L2504187-5	L2483549-3-5	PUF	15-Sep-20	16-Sep-20	7.0	n/a	n/a
L2504188-5	**SITE 5 - COMPOSITE 3 (SEPTEMBER)**	**PUF**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
WG3406765-1	**Method Blank**	**MEDIA**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
WG3406765-4	**Method Blank**	**REAGENT**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**
WG3406765-2	**Laboratory Control Sample**	**QC**	**n/a**	**n/a**	**n/a**	**24-Sep-20**	**10-Oct-20**

Comments and Notes:
a) Sample Integrity:

The samples were received on 4 different dates as noted above. The four samples for each sites 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:

The measured mass resolutions are below 10,000 for select masses. However, there is no indication of increased interference or noise. No impact to the reported values is expected. The recoveries of all targets are in control for the laboratory control sample (LCS).

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

14-Oct-20
Date

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SECTION 2a:

CERTIFICATE OF ANALYSIS

SAMPLE AND QUALITY CONTROL SUMMARIES

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#:	L2504188		Issaquah, WA 98027
Date of Report	14-Oct-20		USA
Date of Sample Receipt	17-Sep-20	**Client Contact:**	Amber Bailey
		Client Project ID:	1466-004 SEATTLE IRON & METALS

COMMENTS: **PCDD/F by EPA TO9A**

Certified by:

Steve Kennedy
Technical Supervisor

ALS Life Sciences

Sample Analysis Summary Report

Sample Name	SITE 1 - COMPOSITE 3 (SEPTEMBER)	SITE 2 - COMPOSITE 3 (SEPTEMBER)	SITE 3 - COMPOSITE 3 (SEPTEMBER)	SITE 4 - COMPOSITE 3 (SEPTEMBER)	SITE 5 - COMPOSITE 3 (SEPTEMBER)
ALS Sample ID	L2504188-1	L2504188-2	L2504188-3	L2504188-4	L2504188-5
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	24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20	24-Sep-20
Target Analytes	**pg**	**pg**	**pg**	**pg**	**pg**
2,3,7,8-TCDD	<1.1	<1.9	<1.8	<2.4	<2.2
1,2,3,7,8-PeCDD	<1.5	<1.7	<1.2	<1.6	<2.0
1,2,3,4,7,8-HxCDD	<1.5	<3.9	<1.2	<5.6	<3.9
1,2,3,6,7,8-HxCDD	<1.3	<3.4	<1.3	<5.0	<3.4
1,2,3,7,8,9-HxCDD	<1.4	<3.7	<1.8	<5.4	<3.8
1,2,3,4,6,7,8-HpCDD	<13	<20	25.2	<42	41.9
OCDD	65.0	149	117	262	250
2,3,7,8-TCDF	<1.2	<2.8	<2.6	<3.5	<3.8
1,2,3,7,8-PeCDF	<0.80	<2.2	<1.7	<2.4	3.47
2,3,4,7,8-PeCDF	<0.74	<2.0	1.67	<2.2	2.75
1,2,3,4,7,8-HxCDF	<1.1	<2.3	<2.2	<2.1	<3.4
1,2,3,6,7,8-HxCDF	<1.0	2.37	<2.1	<2.1	<3.3
2,3,4,6,7,8-HxCDF	<1.1	<2.4	<2.3	<2.3	<3.6
1,2,3,7,8,9-HxCDF	1.31	<2.8	<2.7	<2.6	<4.1
1,2,3,4,6,7,8-HpCDF	<1.9	<7.4	<7.8	<7.3	10.2
1,2,3,4,7,8,9-HpCDF	<2.5	<3.1	<1.4	<4.0	<2.4
OCDF	8.26	<9.5	<8.2	<17	22.3
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	98	99	96	97	87
13C12-1,2,3,4,7,8-HxCDD	109	119	111	112	104
13C12-2,3,4,7,8-PeCDF	124	115	118	110	106
13C12-1,2,3,4,7,8-HxCDF	108	108	108	100	98
13C12-1,2,3,4,7,8,9-HpCDF	98	99	104	92	86
Extraction Standards					
13C12-2,3,7,8-TCDD	60	68	82	77	73
13C12-1,2,3,7,8-PeCDD	66	70	91	80	76
13C12-1,2,3,6,7,8-HxCDD	74	75	98	87	83
13C12-1,2,3,4,6,7,8-HpCDD	56	62	84	64	65
13C12-OCDD	51	59	83	55	57
13C12-2,3,7,8-TCDF	60	68	83	78	72
13C12-1,2,3,7,8-PeCDF	53	60	74	65	61
13C12-1,2,3,6,7,8-HxCDF	68	79	93	93	82
13C12-1,2,3,4,6,7,8-HpCDF	57	66	81	69	69
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	61	68	72	67	74
Homologue Group Totals	**pg**	**pg**	**pg**	**pg**	**pg**
Total-TCDD	<1.1	<1.9	<1.8	<2.4	<2.2
Total-PeCDD	<1.5	<1.7	<1.1	<1.6	<1.5
Total-HxCDD	<1.5	8.98	5.08	<5.6	<3.9
Total-HpCDD	<1.6	<3.3	25.2	59.1	107
Total-TCDF	<1.2	13.6	14.9	36.0	30.5
Total-PeCDF	<0.80	<2.2	<1.7	9.27	16.3
Total-HxCDF	4.28	5.73	6.41	2.77	<4.1
Total-HpCDF	<2.5	<3.1	4.19	<4.0	19.3
Toxic Equivalency - (WHO 2005)					
Lower Bound PCDD/F TEQ (WHO 2005)	0.153	0.282	0.788	0.0786	1.53
Mid Point PCDD/F TEQ (WHO 2005)	2.16	3.77	3.97	4.39	6.11
Upper Bound PCDD/F TEQ (WHO 2005)	4.03	6.99	5.55	8.21	8.69

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Quality Control Summary Report

Sample Name	Method Blank	Method Blank	Laboratory Control Sample
ALS Sample ID	WG3406765-1	WG3406765-4	WG3406765-2
Sample Size	1	1	1
Sample size units	sample	sample	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	24-Sep-20	24-Sep-20	24-Sep-20
Target Analytes	**pg**	**pg**	**% Rec**
2,3,7,8-TCDD	<0.98	<1.0	88
1,2,3,7,8-PeCDD	<0.56	<0.47	99
1,2,3,4,7,8-HxCDD	<1.3	<0.64	99
1,2,3,6,7,8-HxCDD	<1.1	<0.56	95
1,2,3,7,8,9-HxCDD	<1.2	<0.61	110
1,2,3,4,6,7,8-HpCDD	<2.6	<0.73	93
OCDD	17.8	<7.3	91
2,3,7,8-TCDF	<0.93	<0.64	88
1,2,3,7,8-PeCDF	<0.81	<0.67	97
2,3,4,7,8-PeCDF	<0.75	<0.62	92
1,2,3,4,7,8-HxCDF	<0.84	<1.5	92
1,2,3,6,7,8-HxCDF	<0.81	<1.5	99
2,3,4,6,7,8-HxCDF	<0.89	<1.6	99
1,2,3,7,8,9-HxCDF	<1.0	2.86	97
1,2,3,4,6,7,8-HpCDF	<0.62	<0.65	94
1,2,3,4,7,8,9-HpCDF	<0.79	<0.83	79
OCDF	11.0	<3.6	78
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	68	63	64
13C12-1,2,3,7,8-PeCDD	74	73	71
13C12-1,2,3,6,7,8-HxCDD	74	67	66
13C12-1,2,3,4,6,7,8-HpCDD	62	69	62
13C12-OCDD	54	71	60
13C12-2,3,7,8-TCDF	67	62	64
13C12-1,2,3,7,8-PeCDF	60	57	58
13C12-1,2,3,6,7,8-HxCDF	74	63	61
13C12-1,2,3,4,6,7,8-HpCDF	66	69	63
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	67	65	63
Homologue Group Totals	**pg**	**pg**	
Total-TCDD	<0.98	<1.0	
Total-PeCDD	<0.56	<0.47	
Total-HxCDD	<1.3	<0.64	
Total-HpCDD	<2.1	<0.73	
Total-TCDF	1.74	<0.64	
Total-PeCDF	<0.81	<0.67	
Total-HxCDF	<1.0	2.86	
Total-HpCDF	<0.79	<0.83	
Toxic Equivalency - (WHO 2005)			
Lower Bound PCDD/F TEQ (WHO 2005)	0.00864	0.286	
Mid Point PCDD/F TEQ (WHO 2005)	1.34	1.49	
Upper Bound PCDD/F TEQ (WHO 2005)	2.65	2.69	

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Continuing Calibration Summary Report

Sample Name	CVS	CCV	CCV
ALS Sample ID	H7-20-RS1-1209	H7-20-CCV-1234	H7-20-CCV-1235
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	90	108	113
1,2,3,7,8-PeCDD	106	98	97
1,2,3,4,7,8-HxCDD	101	98	105
1,2,3,6,7,8-HxCDD	94	97	95
1,2,3,7,8,9-HxCDD	102	101	99
1,2,3,4,6,7,8-HpCDD	98	101	97
OCDD	100	97	97
2,3,7,8-TCDF	100	94	92
1,2,3,7,8-PeCDF	106	90	91
2,3,4,7,8-PeCDF	98	94	96
1,2,3,4,7,8-HxCDF	100	96	97
1,2,3,6,7,8-HxCDF	101	97	96
2,3,4,6,7,8-HxCDF	100	100	101
1,2,3,7,8,9-HxCDF	109	102	100
1,2,3,4,6,7,8-HpCDF	101	97	97
1,2,3,4,7,8,9-HpCDF	108	103	99
OCDF	102	84	87
Field Spike Standards	**% Rec**	**% Rec**	**% Rec**
37Cl4-2,3,7,8-TCDD	107	120	123
13C12-1,2,3,4,7,8-HxCDD	104	103	105
13C12-2,3,4,7,8-PeCDF	100	105	105
13C12-1,2,3,4,7,8-HxCDF	102	102	100
13C12-1,2,3,4,7,8,9-HpCDF	102	118	112
Extraction Standards			
13C12-2,3,7,8-TCDD	101	86	87
13C12-1,2,3,7,8-PeCDD	94	100	103
13C12-1,2,3,6,7,8-HxCDD	94	107	107
13C12-1,2,3,4,6,7,8-HpCDD	102	121	115
13C12-OCDD	105	160	136
13C12-2,3,7,8-TCDF	97	102	104
13C12-1,2,3,7,8-PeCDF	93	99	102
13C12-1,2,3,6,7,8-HxCDF	93	103	107
13C12-1,2,3,4,6,7,8-HpCDF	95	111	111
Cleanup Standard			
13C12-1,2,3,7,8,9-HxCDF	95	113	114

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SECTION 2b:

INDIVIDUAL SAMPLE REPORTS

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Sample Analysis Report

Sample Name	**SITE 1 - COMPOSITE 3 (SEPTEMBER)**	Sampling Date	n/a		
ALS Sample ID	L2504188-1	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A09
Run Date	10-Oct-20 13:09
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.1	1.1	U		5.0
1,2,3,7,8-PeCDD	1	NotFnd	<1.5	1.5	U		25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.5	1.5	U		25
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.3	1.3	U		25
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<1.4	1.4	U		25
1,2,3,4,6,7,8-HpCDD	0.01	35.94	<13	1.6	J,R	13	25
OCDD	0.0003	37.35	65.0	1.5	M,B		50
2,3,7,8-TCDF	0.1	NotFnd	<1.2	1.2	U		5.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.80	0.80	U		25
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.74	0.74	U		25
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.1	1.1	U		25
1,2,3,6,7,8-HxCDF	0.1	33.88	<1.0	1.0	M,U	0.71	25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.1	1.1	U		25
1,2,3,7,8,9-HxCDF	0.1	34.64	1.31	1.3	M,J		25
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<1.9	1.9	U		25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.5	2.5	U		25
OCDF	0.0003	37.45	8.26	0.93	M,J,B		50

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.68	98	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.30	109	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.97	124	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.80	108	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.18	98	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.66	60	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.19	66	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	74	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.94	56	25-130
13C12-OCDD	8000	37.35	51	25-130
13C12-2,3,7,8-TCDF	4000	26.77	60	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.18	53	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	68	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	57	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	61	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.1	1.1	U	5.0
Total-PeCDD	0	<1.5	1.5	U	25
Total-HxCDD	0	<1.5	1.5	U	25
Total-HpCDD	0	<1.6	1.6	U	25
Total-TCDF	0	<1.2	1.2	U	5.0
Total-PeCDF	0	<0.80	0.80	U	25
Total-HxCDF	2	4.28	1.3		25
Total-HpCDF	0	<2.5	2.5	U	25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.153
Mid Point PCDD/F TEQ (WHO 2005)	2.16
Upper Bound PCDD/F TEQ (WHO 2005)	4.03

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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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

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Sample Analysis Report

Sample Name	**SITE 2 - COMPOSITE 3 (SEPTEMBER)**	Sampling Date	n/a		
ALS Sample ID	L2504188-2	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A10
Run Date	10-Oct-20 13:52
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.9	1.9	U		5.0
1,2,3,7,8-PeCDD	1	NotFnd	<1.7	1.7	U		25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.9	3.9	U		25
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<3.4	3.4	U		25
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<3.7	3.7	U		25
1,2,3,4,6,7,8-HpCDD	0.01	35.94	<20	3.3	M,J,R	20	25
OCDD	0.0003	37.36	149	3.9	B		50
2,3,7,8-TCDF	0.1	NotFnd	<2.8	2.8	U		5.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<2.2	2.2	U		25
2,3,4,7,8-PeCDF	0.3	31.98	<2.0	2.0	M,U		25
1,2,3,4,7,8-HxCDF	0.1	33.81	<2.3	2.3	M,U		25
1,2,3,6,7,8-HxCDF	0.1	33.86	2.37	2.2	M,J		25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<2.4	2.4	U		25
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<2.8	2.8	U		25
1,2,3,4,6,7,8-HpCDF	0.01	35.39	<7.4	2.4	J,R	7.4	25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<3.1	3.1	U		25
OCDF	0.0003	37.43	<9.5	2.3	M,J,R	9.5	50

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.68	99	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.30	119	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.96	115	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.79	108	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.17	99	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.65	68	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.18	70	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	75	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.93	62	25-130
13C12-OCDD	8000	37.35	59	25-130
13C12-2,3,7,8-TCDF	4000	26.75	68	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	60	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	79	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	66	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	68	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.9	1.9	U	5.0
Total-PeCDD	0	<1.7	1.7	U	25
Total-HxCDD	1	8.98	3.9		25
Total-HpCDD	0	<3.3	3.3	U	25
Total-TCDF	2	13.6	2.8		5.0
Total-PeCDF	0	<2.2	2.2	U	25
Total-HxCDF	3	5.73	2.8		25
Total-HpCDF	0	<3.1	3.1	U	25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.282
Mid Point PCDD/F TEQ (WHO 2005)	3.77
Upper Bound PCDD/F TEQ (WHO 2005)	6.99

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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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

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Sample Analysis Report

Sample Name	**SITE 3 - COMPOSITE 3 (SEPTEMBER)**	Sampling Date	n/a		
ALS Sample ID	L2504188-3	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A11
Run Date	10-Oct-20 14:34
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<1.8	1.8	U		5.0
1,2,3,7,8-PeCDD	1	32.19	<1.2	1.1	M,J,R	1.2	25
1,2,3,4,7,8-HxCDD	0.1	34.30	<1.2	1.2	M,U	0.91	25
1,2,3,6,7,8-HxCDD	0.1	34.36	<1.3	1.1	M,J,R	1.3	25
1,2,3,7,8,9-HxCDD	0.1	34.48	<1.8	1.2	M,J,R	1.8	25
1,2,3,4,6,7,8-HpCDD	0.01	35.94	25.2	1.8	M		25
OCDD	0.0003	37.35	117	1.9	B		50
2,3,7,8-TCDF	0.1	NotFnd	<2.6	2.6	U		5.0
1,2,3,7,8-PeCDF	0.03	31.17	<1.7	1.7	M,U	1.6	25
2,3,4,7,8-PeCDF	0.3	31.97	1.67	1.6	M,J		25
1,2,3,4,7,8-HxCDF	0.1	33.80	<2.2	2.2	M,U	1.6	25
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<2.1	2.1	U		25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<2.3	2.3	U		25
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<2.7	2.7	U		25
1,2,3,4,6,7,8-HpCDF	0.01	35.39	<7.8	1.1	M,J,R	7.8	25
1,2,3,4,7,8,9-HpCDF	0.01	36.17	<1.4	1.4	M,U	1.2	25
OCDF	0.0003	37.44	<8.2	1.7	M,J,R	8.2	50

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.66	96	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.30	111	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.96	118	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.79	108	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.17	104	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.65	82	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.18	91	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	98	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.93	84	25-130
13C12-OCDD	8000	37.34	83	25-130
13C12-2,3,7,8-TCDF	4000	26.75	83	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	74	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	93	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.38	81	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.62	72	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.8	1.8	U	5.0
Total-PeCDD	0	<1.1	1.1	U	25
Total-HxCDD	1	5.08	1.2		25
Total-HpCDD	1	25.2	1.8		25
Total-TCDF	2	14.9	2.6		5.0
Total-PeCDF	0	<1.7	1.7	U	25
Total-HxCDF	1	6.41	2.7		25
Total-HpCDF	1	4.19	1.4		25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.788
Mid Point PCDD/F TEQ (WHO 2005)	3.97
Upper Bound PCDD/F TEQ (WHO 2005)	5.55

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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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

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Sample Analysis Report

Sample Name	**SITE 4 - COMPOSITE 3 (SEPTEMBER)**	Sampling Date	n/a		
ALS Sample ID	L2504188-4	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	Sample	*N Ashtari*
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	PUF	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A12
Run Date	10-Oct-20 15:16
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.4	2.4	U		5.0
1,2,3,7,8-PeCDD	1	NotFnd	<1.6	1.6	U		25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<5.6	5.6	U		25
1,2,3,6,7,8-HxCDD	0.1	34.37	<5.0	5.0	M,U	2.6	25
1,2,3,7,8,9-HxCDD	0.1	34.48	<5.4	5.4	M,U		25
1,2,3,4,6,7,8-HpCDD	0.01	35.94	<42	2.0	M,R	42	25
OCDD	0.0003	37.36	262	4.8	M		50
2,3,7,8-TCDF	0.1	NotFnd	<3.5	3.5	U		5.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<2.4	2.4	U		25
2,3,4,7,8-PeCDF	0.3	31.97	<2.2	2.2	M,U	1.2	25
1,2,3,4,7,8-HxCDF	0.1	33.79	<2.1	2.1	M,U	1.8	25
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<2.1	2.1	U		25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<2.3	2.3	U		25
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<2.6	2.6	U		25
1,2,3,4,6,7,8-HpCDF	0.01	35.39	<7.3	3.1	M,J,R	7.3	25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<4.0	4.0	U		25
OCDF	0.0003	37.43	<17	3.1	M,J,R	17	50

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.68	97	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.30	112	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.96	110	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.79	100	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.17	92	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.65	77	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.18	80	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	87	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.93	64	25-130
13C12-OCDD	8000	37.35	55	25-130
13C12-2,3,7,8-TCDF	4000	26.75	78	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	65	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	93	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	69	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	67	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.4	2.4	U	5.0
Total-PeCDD	0	<1.6	1.6	U	25
Total-HxCDD	0	<5.6	5.6	U	25
Total-HpCDD	1	59.1	2.0		25
Total-TCDF	4	36.0	3.5		5.0
Total-PeCDF	1	9.27	2.4		25
Total-HxCDF	1	2.77	2.6		25
Total-HpCDF	0	<4.0	4.0	U	25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0786
Mid Point PCDD/F TEQ (WHO 2005)	4.39
Upper Bound PCDD/F TEQ (WHO 2005)	8.21

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 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

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Sample Analysis Report

Sample Name	**SITE 5 - COMPOSITE 3 (SEPTEMBER)**	Sampling Date	n/a		Approved:
ALS Sample ID	L2504188-5	Extraction Date	24-Sep-20		*N Ashtari*
Analysis Method	TO9A	Sample Size	1	Sample	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		13-Oct-2020
Sample Matrix	PUF	Split Ratio	1		

Run Information	**Run 1**
Filename	7-201010A13
Run Date	10-Oct-20 15:59
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<2.2	2.2	U		5.0
1,2,3,7,8-PeCDD	1	32.20	<2.0	1.5	M,J,R	2.0	25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<3.9	3.9	U		25
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<3.4	3.4	U		25
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<3.8	3.8	U		25
1,2,3,4,6,7,8-HpCDD	0.01	35.95	41.9	2.2			25
OCDD	0.0003	37.36	250	3.1			50
2,3,7,8-TCDF	0.1	NotFnd	<3.8	3.8	U		5.0
1,2,3,7,8-PeCDF	0.03	31.19	3.47	2.3	M,J		25
2,3,4,7,8-PeCDF	0.3	31.98	2.75	2.1	M,J		25
1,2,3,4,7,8-HxCDF	0.1	33.80	<3.4	3.4	M,U	1.0	25
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<3.3	3.3	U		25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<3.6	3.6	U		25
1,2,3,7,8,9-HxCDF	0.1	34.64	<4.1	4.1	M,U	1.5	25
1,2,3,4,6,7,8-HpCDF	0.01	35.40	10.2	1.9	M,J		25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<2.4	2.4	U		25
OCDF	0.0003	37.45	22.3	3.3	J,B		50

Field Spike Standards	**pg**		**% Rec**	**Limits**
37Cl4-2,3,7,8-TCDD	2400	27.68	87	70-130
13C12-1,2,3,4,7,8-HxCDD	24000	34.31	104	70-130
13C12-2,3,4,7,8-PeCDF	24000	31.97	106	70-130
13C12-1,2,3,4,7,8-HxCDF	24000	33.80	98	70-130
13C12-1,2,3,4,7,8,9-HpCDF	24000	36.18	86	70-130
Extraction Standards				
13C12-2,3,7,8-TCDD	4000	27.66	73	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.19	76	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.36	83	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.94	65	25-130
13C12-OCDD	8000	37.36	57	25-130
13C12-2,3,7,8-TCDF	4000	26.77	72	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.18	61	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.87	82	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	69	25-130
Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	74	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<2.2	2.2	U	5.0
Total-PeCDD	0	<1.5	1.5	U	25
Total-HxCDD	0	<3.9	3.9	U	25
Total-HpCDD	2	107	2.2		25
Total-TCDF	3	30.5	3.8		5.0
Total-PeCDF	4	16.3	2.3		25
Total-HxCDF	0	<4.1	4.1	U	25
Total-HpCDF	2	19.3	2.4		25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	1.53
Mid Point PCDD/F TEQ (WHO 2005)	6.11
Upper Bound PCDD/F TEQ (WHO 2005)	8.69

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.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
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

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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.

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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

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Calibration Summary Report

Calibration Level	Filename	Run Date
CS-1	7-201001A03	01-Oct-2020 11:01
CS-2	7-201001A02	01-Oct-2020 10:19
CS-3	7-201001A01	01-Oct-2020 09:38
CS-4	7-201001A07	01-Oct-2020 13:51
CS-5	7-201001A06	01-Oct-2020 13:08

Approved: *N Ashtari*
--e-signature--
13-Oct-2020

Relative Response Factors

Target Analytes	CS-1	CS-2	CS-3	CS-4	CS-5	Mean	% RSD
2,3,7,8-TCDD	0.966	0.960	1.149	1.006	0.998	1.016	8%
1,2,3,7,8-PeCDD	0.861	0.913	0.899	0.926	0.902	0.900	3%
1,2,3,4,7,8-HxCDD	0.824	0.819	0.841	0.849	0.901	0.847	4%
1,2,3,6,7,8-HxCDD	0.988	0.942	0.959	0.967	0.947	0.961	2%
1,2,3,7,8,9-HxCDD	0.882	0.853	0.875	0.900	0.901	0.882	2%
1,2,3,4,6,7,8-HpCDD	0.893	0.878	0.952	0.947	0.925	0.919	4%
OCDD	1.008	0.968	0.923	0.994	0.924	0.963	4%
2,3,7,8-TCDF	0.873	0.873	0.916	0.934	0.933	0.906	3%
1,2,3,7,8-PeCDF	0.937	0.957	0.939	1.007	1.001	0.968	3%
2,3,4,7,8-PeCDF	1.001	1.019	1.042	1.071	1.063	1.039	3%
1,2,3,4,7,8-HxCDF	1.068	1.128	1.112	1.122	1.100	1.106	2%
1,2,3,6,7,8-HxCDF	1.133	1.140	1.188	1.172	1.150	1.157	2%
2,3,4,6,7,8-HxCDF	1.003	1.051	1.053	1.081	1.070	1.052	3%
1,2,3,7,8,9-HxCDF	0.874	0.910	0.928	0.942	0.928	0.916	3%
1,2,3,4,6,7,8-HpCDF	1.028	1.017	1.016	1.045	1.021	1.025	1%
1,2,3,4,7,8,9-HpCDF	0.790	0.800	0.783	0.833	0.802	0.802	2%
OCDF	1.246	1.299	1.233	1.351	1.215	1.269	4%
Field Spike Standards							
37Cl4-2,3,7,8-TCDD	0.964	1.033	1.337	0.992	1.028	1.071	14%
13C12-1,2,3,4,7,8-HxCDD	0.883	0.863	0.883	0.870	0.943	0.888	4%
13C12-2,3,4,7,8-PeCDF	0.958	0.957	1.000	0.965	0.968	0.970	2%
13C12-1,2,3,4,7,8-HxCDF	0.894	0.922	0.923	0.898	0.891	0.906	2%
13C12-1,2,3,4,7,8,9-HpCDF	0.786	0.758	0.823	0.768	0.750	0.777	4%
Extraction Standards							
13C12-2,3,7,8-TCDD	1.096	1.110	0.972	1.120	1.237	1.107	9%
13C12-1,2,3,7,8-PeCDD	0.719	0.730	0.787	0.769	0.918	0.785	10%
13C12-1,2,3,6,7,8-HxCDD	0.978	1.002	1.149	1.009	0.979	1.023	7%
13C12-1,2,3,4,6,7,8-HpCDD	0.690	0.700	0.736	0.695	0.713	0.707	3%
13C12-OCDD	0.392	0.404	0.452	0.444	0.493	0.437	9%
13C12-2,3,7,8-TCDF	1.365	1.390	1.529	1.396	1.468	1.430	5%
13C12-1,2,3,7,8-PeCDF	0.992	1.012	1.127	1.061	1.229	1.084	9%
13C12-1,2,3,6,7,8-HxCDF	1.195	1.203	1.402	1.199	1.189	1.238	7%
13C12-1,2,3,4,6,7,8-HpCDF	0.779	0.800	0.929	0.814	0.823	0.829	7%
Cleanup Standard							
13C12-1,2,3,7,8,9-HxCDF	0.924	0.937	1.102	0.925	0.937	0.965	8%

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Calibration Report

ALS Sample ID **H7-20-CS1-1209**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-201001A03	HRMS-7	DB5MSUSR188441H	01-Oct-2020 11:01		--e-signature--
					13-Oct-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.85	0.81	0.50	1.02E+04	0.966
1,2,3,7,8-PeCDD	32.29	1.66	2.50	2.99E+04	0.861
1,2,3,4,7,8-HxCDD	34.38	1.22	2.50	2.71E+04	0.824
1,2,3,6,7,8-HxCDD	34.44	1.27	2.50	3.25E+04	0.988
1,2,3,7,8,9-HxCDD	34.56	1.22	2.50	2.90E+04	0.882
1,2,3,4,6,7,8-HpCDD	36	1.06	2.50	2.07E+04	0.893
OCDD	37.43	0.90	5.00	2.65E+04	1.008
2,3,7,8-TCDF	26.95	0.80	0.50	1.15E+04	0.873
1,2,3,7,8-PeCDF	31.29	1.54	2.50	4.49E+04	0.937
2,3,4,7,8-PeCDF	32.07	1.50	2.50	4.80E+04	1.001
1,2,3,4,7,8-HxCDF	33.88	1.26	2.50	4.28E+04	1.068
1,2,3,6,7,8-HxCDF	33.95	1.22	2.50	4.55E+04	1.133
2,3,4,6,7,8-HxCDF	34.29	1.25	2.50	4.02E+04	1.003
1,2,3,7,8,9-HxCDF	34.71	1.30	2.50	3.50E+04	0.874
1,2,3,4,6,7,8-HpCDF	35.47	2.03	2.50	2.69E+04	1.028
1,2,3,4,7,8,9-HpCDF	36.25	1.90	2.50	2.06E+04	0.790
OCDF	37.52	0.92	5.00	3.28E+04	1.246
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.85	0.00	0.50	1.02E+04	0.964
13C12-1,2,3,4,7,8-HxCDD	34.38	1.28	100.00	1.16E+06	0.883
13C12-2,3,4,7,8-PeCDF	32.05	1.51	100.00	1.84E+06	0.958
13C12-1,2,3,4,7,8-HxCDF	33.87	0.53	100.00	1.44E+06	0.894
13C12-1,2,3,4,7,8,9-HpCDF	36.25	0.44	100.00	8.22E+05	0.786
Extraction Standards					
13C12-2,3,7,8-TCDD	27.82	0.784	100	2.12E+06	1.096
13C12-1,2,3,7,8-PeCDD	32.28	1.602	100	1.39E+06	0.719
13C12-1,2,3,6,7,8-HxCDD	34.43	1.3	100	1.31E+06	0.978
13C12-1,2,3,4,6,7,8-HpCDD	36	1.056	100	9.27E+05	0.69
13C12-OCDD	37.42	0.883	200	1.05E+06	0.392
13C12-2,3,7,8-TCDF	26.93	0.757	100	2.64E+06	1.365
13C12-1,2,3,7,8-PeCDF	31.28	1.563	100	1.92E+06	0.992
13C12-1,2,3,6,7,8-HxCDF	33.94	0.52	100	1.60E+06	1.195
13C12-1,2,3,4,6,7,8-HpCDF	35.46	0.464	100	1.05E+06	0.779
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.7	0.522	100	1.24E+06	0.924
Injection Standards					
13C12-1234-TCDD IS	27.13	0.792	100	1933155.7	19331.557
13C12-123789-HxCDD IS	34.56	1.26	100.00	1.34E+06	13434.236

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-20-CS2-1209**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-201001A02	HRMS-7	DB5MSUSR188441H	01-Oct-2020 10:19		--e-signature--
					13-Oct-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.83	0.79	2.00	3.80E+04	0.960
1,2,3,7,8-PeCDD	32.28	1.61	10.00	1.19E+05	0.913
1,2,3,4,7,8-HxCDD	34.37	1.27	10.00	1.01E+05	0.819
1,2,3,6,7,8-HxCDD	34.43	1.33	10.00	1.17E+05	0.942
1,2,3,7,8,9-HxCDD	34.55	1.30	10.00	1.06E+05	0.853
1,2,3,4,6,7,8-HpCDD	35.99	1.02	10.00	7.60E+04	0.878
OCDD	37.42	0.87	20.00	9.66E+04	0.968
2,3,7,8-TCDF	26.95	0.80	2.00	4.33E+04	0.873
1,2,3,7,8-PeCDF	31.28	1.62	10.00	1.73E+05	0.957
2,3,4,7,8-PeCDF	32.06	1.58	10.00	1.84E+05	1.019
1,2,3,4,7,8-HxCDF	33.86	1.17	10.00	1.68E+05	1.128
1,2,3,6,7,8-HxCDF	33.94	1.14	10.00	1.70E+05	1.140
2,3,4,6,7,8-HxCDF	34.28	1.18	10.00	1.56E+05	1.051
1,2,3,7,8,9-HxCDF	34.7	1.18	10.00	1.35E+05	0.910
1,2,3,4,6,7,8-HpCDF	35.45	2.01	10.00	1.01E+05	1.017
1,2,3,4,7,8,9-HpCDF	36.23	1.99	10.00	7.91E+04	0.800
OCDF	37.5	0.90	20.00	1.30E+05	1.299
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.83	0.00	2.00	4.09E+04	1.033
13C12-1,2,3,4,7,8-HxCDD	34.36	1.24	100.00	1.07E+06	0.863
13C12-2,3,4,7,8-PeCDF	32.05	1.57	100.00	1.73E+06	0.957
13C12-1,2,3,4,7,8-HxCDF	33.86	0.53	100.00	1.37E+06	0.922
13C12-1,2,3,4,7,8,9-HpCDF	36.23	0.47	100.00	7.49E+05	0.758
Extraction Standards					
13C12-2,3,7,8-TCDD	27.81	0.781	100	1.98E+06	1.11
13C12-1,2,3,7,8-PeCDD	32.26	1.612	100	1.30E+06	0.73
13C12-1,2,3,6,7,8-HxCDD	34.42	1.245	100	1.24E+06	1.002
13C12-1,2,3,4,6,7,8-HpCDD	35.99	1.077	100	8.66E+05	0.7
13C12-OCDD	37.41	0.925	200	9.99E+05	0.404
13C12-2,3,7,8-TCDF	26.92	0.769	100	2.48E+06	1.39
13C12-1,2,3,7,8-PeCDF	31.27	1.564	100	1.80E+06	1.012
13C12-1,2,3,6,7,8-HxCDF	33.93	0.518	100	1.49E+06	1.203
13C12-1,2,3,4,6,7,8-HpCDF	35.45	0.452	100	9.89E+05	0.8
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.69	0.517	100	1.16E+06	0.937
Injection Standards					
13C12-1234-TCDD IS	27.11	0.788	100	1784134.8	17841.348
13C12-123789-HxCDD IS	34.54	1.24	100.00	1.24E+06	12368.686

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-20-CCV-1209**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-201001A01	HRMS-7	DB5MSUSR188441H	01-Oct-2020 09:38		--e-signature--
					13-Oct-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.87	0.77	10.00	1.68E+05	1.149
1,2,3,7,8-PeCDD	32.29	1.63	50.00	5.31E+05	0.899
1,2,3,4,7,8-HxCDD	34.38	1.23	50.00	4.59E+05	0.841
1,2,3,6,7,8-HxCDD	34.43	1.21	50.00	5.24E+05	0.959
1,2,3,7,8,9-HxCDD	34.55	1.21	50.00	4.77E+05	0.875
1,2,3,4,6,7,8-HpCDD	36	1.06	50.00	3.33E+05	0.952
OCDD	37.42	0.93	100.00	3.97E+05	0.923
2,3,7,8-TCDF	26.98	0.80	10.00	2.10E+05	0.916
1,2,3,7,8-PeCDF	31.29	1.59	50.00	7.95E+05	0.939
2,3,4,7,8-PeCDF	32.07	1.58	50.00	8.82E+05	1.042
1,2,3,4,7,8-HxCDF	33.88	1.21	50.00	7.41E+05	1.112
1,2,3,6,7,8-HxCDF	33.95	1.22	50.00	7.91E+05	1.188
2,3,4,6,7,8-HxCDF	34.28	1.20	50.00	7.02E+05	1.053
1,2,3,7,8,9-HxCDF	34.7	1.21	50.00	6.19E+05	0.928
1,2,3,4,6,7,8-HpCDF	35.46	1.97	50.00	4.49E+05	1.016
1,2,3,4,7,8,9-HpCDF	36.24	1.88	50.00	3.46E+05	0.783
OCDF	37.51	0.94	100.00	5.30E+05	1.233
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.87	0.00	10.00	1.95E+05	1.337
13C12-1,2,3,4,7,8-HxCDD	34.37	1.25	100.00	9.64E+05	0.883
13C12-2,3,4,7,8-PeCDF	32.06	1.54	100.00	1.69E+06	1.000
13C12-1,2,3,4,7,8-HxCDF	33.87	0.52	100.00	1.23E+06	0.923
13C12-1,2,3,4,7,8,9-HpCDF	36.24	0.46	100.00	7.27E+05	0.823
Extraction Standards					
13C12-2,3,7,8-TCDD	27.84	0.799	100	1.46E+06	0.972
13C12-1,2,3,7,8-PeCDD	32.28	1.607	100	1.18E+06	0.787
13C12-1,2,3,6,7,8-HxCDD	34.43	1.257	100	1.09E+06	1.149
13C12-1,2,3,4,6,7,8-HpCDD	36	1.028	100	7.00E+05	0.736
13C12-OCDD	37.42	0.861	200	8.60E+05	0.452
13C12-2,3,7,8-TCDF	26.95	0.771	100	2.30E+06	1.529
13C12-1,2,3,7,8-PeCDF	31.28	1.551	100	1.69E+06	1.127
13C12-1,2,3,6,7,8-HxCDF	33.94	0.521	100	1.33E+06	1.402
13C12-1,2,3,4,6,7,8-HpCDF	35.46	0.451	100	8.83E+05	0.929
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.7	0.533	100	1.05E+06	1.102
Injection Standards					
13C12-1234-TCDD IS	27.16	0.786	100	1502322.7	15023.227
13C12-123789-HxCDD IS	34.55	1.31	100.00	9.51E+05	9505.725

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-20-CS4-1209**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-201001A07	HRMS-7	DB5MSUSR188441H	01-Oct-2020 13:51		--e-signature--
					13-Oct-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.84	0.78	40.00	7.02E+05	1.006
1,2,3,7,8-PeCDD	32.28	1.63	200.00	2.22E+06	0.926
1,2,3,4,7,8-HxCDD	34.37	1.22	200.00	2.01E+06	0.849
1,2,3,6,7,8-HxCDD	34.43	1.23	200.00	2.29E+06	0.967
1,2,3,7,8,9-HxCDD	34.55	1.23	200.00	2.13E+06	0.900
1,2,3,4,6,7,8-HpCDD	36	1.05	200.00	1.55E+06	0.947
OCDD	37.42	0.89	400.00	2.07E+06	0.994
2,3,7,8-TCDF	26.95	0.78	40.00	8.12E+05	0.934
1,2,3,7,8-PeCDF	31.28	1.59	200.00	3.33E+06	1.007
2,3,4,7,8-PeCDF	32.06	1.57	200.00	3.54E+06	1.071
1,2,3,4,7,8-HxCDF	33.87	1.21	200.00	3.16E+06	1.122
1,2,3,6,7,8-HxCDF	33.94	1.21	200.00	3.30E+06	1.172
2,3,4,6,7,8-HxCDF	34.28	1.19	200.00	3.04E+06	1.081
1,2,3,7,8,9-HxCDF	34.7	1.22	200.00	2.65E+06	0.942
1,2,3,4,6,7,8-HpCDF	35.46	1.87	200.00	2.00E+06	1.045
1,2,3,4,7,8,9-HpCDF	36.24	1.90	200.00	1.59E+06	0.833
OCDF	37.51	0.91	400.00	2.82E+06	1.351
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.84	0.00	40.00	6.92E+05	0.992
13C12-1,2,3,4,7,8-HxCDD	34.37	1.25	100.00	1.03E+06	0.870
13C12-2,3,4,7,8-PeCDF	32.05	1.54	100.00	1.60E+06	0.965
13C12-1,2,3,4,7,8-HxCDF	33.86	0.53	100.00	1.26E+06	0.898
13C12-1,2,3,4,7,8,9-HpCDF	36.23	0.44	100.00	7.35E+05	0.768
Extraction Standards					
13C12-2,3,7,8-TCDD	27.81	0.77	100	1.74E+06	1.12
13C12-1,2,3,7,8-PeCDD	32.27	1.59	100	1.20E+06	0.769
13C12-1,2,3,6,7,8-HxCDD	34.43	1.23	100	1.18E+06	1.009
13C12-1,2,3,4,6,7,8-HpCDD	35.99	1.046	100	8.16E+05	0.695
13C12-OCDD	37.41	0.86	200	1.04E+06	0.444
13C12-2,3,7,8-TCDF	26.92	0.771	100	2.17E+06	1.396
13C12-1,2,3,7,8-PeCDF	31.27	1.564	100	1.65E+06	1.061
13C12-1,2,3,6,7,8-HxCDF	33.93	0.524	100	1.41E+06	1.199
13C12-1,2,3,4,6,7,8-HpCDF	35.44	0.444	100	9.56E+05	0.814
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.69	0.534	100	1.09E+06	0.925
Injection Standards					
13C12-1234-TCDD IS	27.13	0.772	100	1557536.4	15575.364
13C12-123789-HxCDD IS	34.55	1.23	100.00	1.17E+06	11743.281

ALS Life Sciences

Calibration Report

ALS Sample ID **H7-20-CS5-1209**
Analysis Method EPA M23
Analysis Type Calibration

Filename	Inst #	Column	Run Date	Approved:	*N Ashtari*
7-201001A06	HRMS-7	DB5MSUSR188441H	01-Oct-2020 13:08		--e-signature-- 13-Oct-2020

Target Analytes	Ret. Time	Ion Ratio	Concentration ng/mL	Response	RRF
2,3,7,8-TCDD	27.84	0.78	200.00	4.45E+06	0.998
1,2,3,7,8-PeCDD	32.28	1.63	1000.00	1.49E+07	0.902
1,2,3,4,7,8-HxCDD	34.37	1.23	1000.00	1.42E+07	0.901
1,2,3,6,7,8-HxCDD	34.43	1.23	1000.00	1.49E+07	0.947
1,2,3,7,8,9-HxCDD	34.55	1.24	1000.00	1.42E+07	0.901
1,2,3,4,6,7,8-HpCDD	36	1.06	1000.00	1.06E+07	0.925
OCDD	37.43	0.89	2000.00	1.47E+07	0.924
2,3,7,8-TCDF	26.93	0.78	200.00	4.94E+06	0.933
1,2,3,7,8-PeCDF	31.29	1.58	1000.00	2.22E+07	1.001
2,3,4,7,8-PeCDF	32.06	1.57	1000.00	2.35E+07	1.063
1,2,3,4,7,8-HxCDF	33.88	1.21	1000.00	2.11E+07	1.100
1,2,3,6,7,8-HxCDF	33.95	1.22	1000.00	2.20E+07	1.150
2,3,4,6,7,8-HxCDF	34.28	1.20	1000.00	2.05E+07	1.070
1,2,3,7,8,9-HxCDF	34.7	1.22	1000.00	1.78E+07	0.928
1,2,3,4,6,7,8-HpCDF	35.46	1.89	1000.00	1.35E+07	1.021
1,2,3,4,7,8,9-HpCDF	36.24	1.90	1000.00	1.06E+07	0.802
OCDF	37.51	0.92	2000.00	1.93E+07	1.215
Field Spike Standards					
37Cl4-2,3,7,8-TCDD	27.83	0.00	200.00	4.58E+06	1.028
13C12-1,2,3,4,7,8-HxCDD	34.37	1.25	100.00	1.49E+06	0.943
13C12-2,3,4,7,8-PeCDF	32.05	1.54	100.00	2.14E+06	0.968
13C12-1,2,3,4,7,8-HxCDF	33.86	0.52	100.00	1.71E+06	0.891
13C12-1,2,3,4,7,8,9-HpCDF	36.23	0.46	100.00	9.93E+05	0.750
Extraction Standards					
13C12-2,3,7,8-TCDD	27.81	0.788	100	2.23E+06	1.237
13C12-1,2,3,7,8-PeCDD	32.27	1.617	100	1.65E+06	0.918
13C12-1,2,3,6,7,8-HxCDD	34.43	1.254	100	1.58E+06	0.979
13C12-1,2,3,4,6,7,8-HpCDD	35.99	1.048	100	1.15E+06	0.713
13C12-OCDD	37.42	0.886	200	1.59E+06	0.493
13C12-2,3,7,8-TCDF	26.92	0.772	100	2.64E+06	1.468
13C12-1,2,3,7,8-PeCDF	31.28	1.553	100	2.21E+06	1.229
13C12-1,2,3,6,7,8-HxCDF	33.93	0.533	100	1.92E+06	1.189
13C12-1,2,3,4,6,7,8-HpCDF	35.46	0.458	100	1.32E+06	0.823
Cleanup Standard					
13C12-1,2,3,7,8,9-HxCDF	34.7	0.538	100	1.51E+06	0.937
Injection Standards					
13C12-1234-TCDD IS	27.13	0.791	100	1801426.6	18014.266
13C12-123789-HxCDD IS	34.55	1.23	100.00	1.61E+06	16108.986

ALS Life Sciences

Second Source Calibration Verification Report

Sample Name	**CVS**	Sampling Date	n/a		
ALS Sample ID	H7-20-RS1-1209	Extraction Date	n/a		Approved:
Analysis Method	TO9A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201001A08
Run Date	01-Oct-20 14:33
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.84	90	75-125	
1,2,3,7,8-PeCDD	50	32.29	106	75-125	
1,2,3,4,7,8-HxCDD	50	34.39	101	75-125	
1,2,3,6,7,8-HxCDD	50	34.44	94	75-125	
1,2,3,7,8,9-HxCDD	50	34.56	102	75-125	
1,2,3,4,6,7,8-HpCDD	50	36.01	98	75-125	
OCDD	100	37.43	100	75-125	
2,3,7,8-TCDF	10	26.95	100	75-125	
1,2,3,7,8-PeCDF	50	31.29	106	75-125	
2,3,4,7,8-PeCDF	50	32.07	98	75-125	M
1,2,3,4,7,8-HxCDF	50	33.88	100	75-125	
1,2,3,6,7,8-HxCDF	50	33.95	101	75-125	
2,3,4,6,7,8-HxCDF	50	34.29	100	75-125	
1,2,3,7,8,9-HxCDF	50	34.71	109	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.47	101	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.25	108	75-125	
OCDF	100	37.52	102	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.84	107	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.37	104	75-125	
13C12-2,3,4,7,8-PeCDF	100	32.06	100	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.87	102	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.24	102	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.81	101	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.28	94	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.43	94	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	36.00	102	70-130	
13C12-OCDD	200	37.42	105	70-130	
13C12-2,3,7,8-TCDF	100	26.92	97	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.28	93	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.94	93	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.46	95	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.70	95	40-130	

M	Indicates that a peak has been manually integrated.

ALS Life Sciences

Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-20-CCV-1234	Extraction Date	n/a		Approved:
Analysis Method	TO9A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A01
Run Date	10-Oct-20 07:31
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.69	108	75-125	
1,2,3,7,8-PeCDD	50	32.20	98	75-125	
1,2,3,4,7,8-HxCDD	50	34.31	98	75-125	
1,2,3,6,7,8-HxCDD	50	34.36	97	75-125	
1,2,3,7,8,9-HxCDD	50	34.49	101	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.94	101	75-125	
OCDD	100	37.36	97	75-125	
2,3,7,8-TCDF	10	26.80	94	75-125	
1,2,3,7,8-PeCDF	50	31.19	90	75-125	
2,3,4,7,8-PeCDF	50	31.98	94	75-125	
1,2,3,4,7,8-HxCDF	50	33.81	96	75-125	
1,2,3,6,7,8-HxCDF	50	33.88	97	75-125	
2,3,4,6,7,8-HxCDF	50	34.21	100	75-125	
1,2,3,7,8,9-HxCDF	50	34.63	102	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.39	97	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.18	103	75-125	
OCDF	100	37.44	84	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.69	120	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.30	103	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.97	105	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.79	102	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.18	118	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.66	86	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.19	100	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.35	107	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.94	121	70-130	
13C12-OCDD	200	37.35	160	70-130	
13C12-2,3,7,8-TCDF	100	26.77	102	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.18	99	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.86	103	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.39	111	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.63	113	40-130	

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Continuing Calibration Report

Sample Name	**CCV**	Sampling Date	n/a		
ALS Sample ID	H7-20-CCV-1235	Extraction Date	n/a		Approved:
Analysis Method	TO9A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	CCV	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A17
Run Date	10-Oct-20 18:48
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**pg/uL**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	10	27.68	113	75-125	
1,2,3,7,8-PeCDD	50	32.20	97	75-125	
1,2,3,4,7,8-HxCDD	50	34.31	105	75-125	
1,2,3,6,7,8-HxCDD	50	34.37	95	75-125	
1,2,3,7,8,9-HxCDD	50	34.49	99	75-125	
1,2,3,4,6,7,8-HpCDD	50	35.94	97	75-125	
OCDD	100	37.36	97	75-125	
2,3,7,8-TCDF	10	26.78	92	75-125	
1,2,3,7,8-PeCDF	50	31.19	91	75-125	
2,3,4,7,8-PeCDF	50	31.98	96	75-125	
1,2,3,4,7,8-HxCDF	50	33.81	97	75-125	
1,2,3,6,7,8-HxCDF	50	33.88	96	75-125	
2,3,4,6,7,8-HxCDF	50	34.22	101	75-125	
1,2,3,7,8,9-HxCDF	50	34.64	100	75-125	
1,2,3,4,6,7,8-HpCDF	50	35.40	97	75-125	
1,2,3,4,7,8,9-HpCDF	50	36.18	99	75-125	
OCDF	100	37.45	87	70-130	
Field Spike Standards	**pg/uL**		**% Rec**	**Limits**	
37Cl4-2,3,7,8-TCDD	10	27.68	123	75-125	
13C12-1,2,3,4,7,8-HxCDD	100	34.30	105	75-125	
13C12-2,3,4,7,8-PeCDF	100	31.97	105	75-125	
13C12-1,2,3,4,7,8-HxCDF	100	33.80	100	75-125	
13C12-1,2,3,4,7,8,9-HpCDF	100	36.18	112	75-125	
Extraction Standards					
13C12-2,3,7,8-TCDD	100	27.65	87	75-125	
13C12-1,2,3,7,8-PeCDD	100	32.19	103	70-130	
13C12-1,2,3,6,7,8-HxCDD	100	34.36	107	75-125	
13C12-1,2,3,4,6,7,8-HpCDD	100	35.94	115	70-130	
13C12-OCDD	200	37.35	136	70-130	
13C12-2,3,7,8-TCDF	100	26.75	104	70-130	
13C12-1,2,3,7,8-PeCDF	100	31.18	102	70-130	
13C12-1,2,3,6,7,8-HxCDF	100	33.87	107	70-130	
13C12-1,2,3,4,6,7,8-HpCDF	100	35.39	111	70-130	
Cleanup Standard	**pg/uL**				
13C12-1,2,3,7,8,9-HxCDF	100	34.63	114	40-130	

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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	WG3406765-1	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A06
Run Date	10-Oct-20 11:02
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg**	**EDL pg**	**Flags**	**EMPC pg**	**LQL**
2,3,7,8-TCDD	1	NotFnd	<0.98	0.98	U		5.0
1,2,3,7,8-PeCDD	1	NotFnd	<0.56	0.56	U		25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<1.3	1.3	U		25
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<1.1	1.1	U		25
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<1.2	1.2	U		25
1,2,3,4,6,7,8-HpCDD	0.01	35.94	<2.6	2.1	M,J,R	2.6	25
OCDD	0.0003	37.36	17.8	2.7	J		50
2,3,7,8-TCDF	0.1	NotFnd	<0.93	0.93	U		5.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.81	0.81	U		25
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.75	0.75	U		25
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.84	0.84	U		25
1,2,3,6,7,8-HxCDF	0.1	33.88	<0.81	0.81	M,U	0.57	25
2,3,4,6,7,8-HxCDF	0.1	34.21	<0.89	0.89	M,U	0.56	25
1,2,3,7,8,9-HxCDF	0.1	34.63	<1.0	1.0	M,U	0.79	25
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.62	0.62	U		25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.79	0.79	U		25
OCDF	0.0003	37.45	11.0	3.5	M,J		50

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	27.66	68	40-130	
13C12-1,2,3,7,8-PeCDD	4000	32.19	74	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	34.36	74	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.94	62	25-130	
13C12-OCDD	8000	37.35	54	25-130	M
13C12-2,3,7,8-TCDF	4000	26.77	67	40-130	
13C12-1,2,3,7,8-PeCDF	4000	31.18	60	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.87	74	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	66	25-130	

Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	67	40-130	

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<0.98	0.98	U	5.0
Total-PeCDD	0	<0.56	0.56	U	25
Total-HxCDD	0	<1.3	1.3	U	25
Total-HpCDD	0	<2.1	2.1	U	25
Total-TCDF	1	1.74	0.93		5.0
Total-PeCDF	0	<0.81	0.81	U	25
Total-HxCDF	0	<1.0	1.0	U	25
Total-HpCDF	0	<0.79	0.79	U	25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.00864
Mid Point PCDD/F TEQ (WHO 2005)	1.34
Upper Bound PCDD/F TEQ (WHO 2005)	2.65

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	WG3406765-4	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	sample	*N Ashtari*
Analysis Type	Blank	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A07
Run Date	10-Oct-20 11:44
Final Volume	10 uL
Dilution Factor	1
Analysis Units	pg
Instrument - Column	HRMS-7 DB5MSUSR188441H

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		5.0
1,2,3,7,8-PeCDD	1	32.18	<0.47	0.47	M,U	0.40	25
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.64	0.64	U		25
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.56	0.56	U		25
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.61	0.61	U		25
1,2,3,4,6,7,8-HpCDD	0.01	NotFnd	<0.73	0.73	U		25
OCDD	0.0003	37.35	<7.3	0.82	M,J,R	7.3	50
2,3,7,8-TCDF	0.1	NotFnd	<0.64	0.64	U		5.0
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.67	0.67	U		25
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.62	0.62	U		25
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<1.5	1.5	U		25
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<1.5	1.5	U		25
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<1.6	1.6	U		25
1,2,3,7,8,9-HxCDF	0.1	34.63	2.86	1.9	J		25
1,2,3,4,6,7,8-HpCDF	0.01	NotFnd	<0.65	0.65	U		25
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.83	0.83	U		25
OCDF	0.0003	37.45	<3.6	1.4	M,J,R	3.6	50

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	27.65	63	40-130
13C12-1,2,3,7,8-PeCDD	4000	32.18	73	40-130
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	67	40-130
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.93	69	25-130
13C12-OCDD	8000	37.34	71	25-130
13C12-2,3,7,8-TCDF	4000	26.75	62	40-130
13C12-1,2,3,7,8-PeCDF	4000	31.17	57	40-130
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	63	40-130
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.38	69	25-130

Cleanup Standard	**pg**			
13C12-1,2,3,7,8,9-HxCDF	4000	34.62	65	40-130

Homologue Group Totals	**# peaks**	**Conc. pg**	**EDL pg**		
Total-TCDD	0	<1.0	1.0	U	5.0
Total-PeCDD	0	<0.47	0.47	U	25
Total-HxCDD	0	<0.64	0.64	U	25
Total-HpCDD	0	<0.73	0.73	U	25
Total-TCDF	0	<0.64	0.64	U	5.0
Total-PeCDF	0	<0.67	0.67	U	25
Total-HxCDF	1	2.86	1.9		25
Total-HpCDF	0	<0.83	0.83	U	25

Toxic Equivalency - (WHO 2005)	**pg**
Lower Bound PCDD/F TEQ (WHO 2005)	0.286
Mid Point PCDD/F TEQ (WHO 2005)	1.49
Upper Bound PCDD/F TEQ (WHO 2005)	2.69

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	WG3406765-2	Extraction Date	24-Sep-20		Approved:
Analysis Method	TO9A	Sample Size	1	n/a	*N Ashtari*
Analysis Type	LCS	Percent Moisture	n/a		--e-signature--
Sample Matrix	QC	Split Ratio	1		13-Oct-2020

Run Information	**Run 1**
Filename	7-201010A02
Run Date	10-Oct-20 08:12
Final Volume	10 uL
Dilution Factor	1
Analysis Units	%
Instrument - Column	HRMS-7 DB5MSUSR188441H

Target Analytes	**pg**	**Ret. Time**	**% Rec**	**Limits**	**Flags**
2,3,7,8-TCDD	400	27.68	88	70-130	
1,2,3,7,8-PeCDD	2000	32.20	99	70-130	
1,2,3,4,7,8-HxCDD	2000	34.31	99	70-130	
1,2,3,6,7,8-HxCDD	2000	34.36	95	70-130	
1,2,3,7,8,9-HxCDD	2000	34.49	110	70-130	
1,2,3,4,6,7,8-HpCDD	2000	35.94	93	70-130	
OCDD	4000	37.35	91	70-130	
2,3,7,8-TCDF	400	26.78	88	70-130	
1,2,3,7,8-PeCDF	2000	31.19	97	70-130	
2,3,4,7,8-PeCDF	2000	31.98	92	70-130	
1,2,3,4,7,8-HxCDF	2000	33.81	92	70-130	
1,2,3,6,7,8-HxCDF	2000	33.88	99	70-130	
2,3,4,6,7,8-HxCDF	2000	34.21	99	70-130	
1,2,3,7,8,9-HxCDF	2000	34.63	97	70-130	
1,2,3,4,6,7,8-HpCDF	2000	35.39	94	70-130	
1,2,3,4,7,8,9-HpCDF	2000	36.18	79	70-130	
OCDF	4000	37.44	78	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	27.65	64	40-130	
13C12-1,2,3,7,8-PeCDD	4000	32.18	71	40-130	
13C12-1,2,3,6,7,8-HxCDD	4000	34.35	66	40-130	
13C12-1,2,3,4,6,7,8-HpCDD	4000	35.94	62	25-130	
13C12-OCDD	8000	37.35	60	25-130	
13C12-2,3,7,8-TCDF	4000	26.77	64	40-130	
13C12-1,2,3,7,8-PeCDF	4000	31.18	58	40-130	
13C12-1,2,3,6,7,8-HxCDF	4000	33.86	61	40-130	
13C12-1,2,3,4,6,7,8-HpCDF	4000	35.39	63	25-130	
Cleanup Standard	**pg**				
13C12-1,2,3,7,8,9-HxCDF	4000	34.63	63	40-130	

NS Indicates that this standard has not been added.

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SVOC DATA PACKAGE

SECTION 6: INTERNAL RECORDS

Including:

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

Extraction Workup Sheet

Batch ID:	WG3406765	Analysis:	DX/PCB - PUFs

Prep procedure BU-TM-1110 Overall HR Prep

Analyst:	Jackson Pegg	Date:	24-Sep-2020

SUBSAMPLING

Sample I.D.	Client I.D.	Wet Sub-sample (g)
WG3406765-1	Method Blank	L2483549-21
WG3406765-2	Laboratory Control Sample	L2483549-22
WG3406765-3	Extraction and Injection STD.	—
WG3406765-4	Method Blank (Reagent Blank)	Glass Wool Sodium Sulfate
L2504188-1	SITE 1 - COMPOSITE 3 (SEPTEMBER)	L2483549-17,7,20,13
L2504188-2	SITE 2 - COMPOSITE 3 (SEPTEMBER)	L2483549-1,8,10,19
L2504188-3	SITE 3 - COMPOSITE 3 (SEPTEMBER)	L2483549-14,15,16,18
L2504188-4	SITE 4 - COMPOSITE 3 (SEPTEMBER)	L2483549-2,5,9,12
L2504188-5	SITE 5 - COMPOSITE 3 (SEPTEMBER)	L2483549-3,6,11,4

4 PUFs per sample. Use glasswool + sodium sulfate in soxhlet

BATCH TRACKING

	Date/Time/Initials
Subsampling:	24-Sep-2020 9:00PM JP
Client Labels Checked:	JP
Balance ID:	—
Samples Spiked	JP
Soxhlet Start Time:	24-Sep-20 9:30PM JP
Soxhlets Reflux Properly:	JP
Soxhlet End Time:	MM 25-Sep-2020 2:00pm
Rotovap Reduction + temp check:	01-Oct-2020 AP
Archive portion:	01-Oct-2020 AP
Acid Column + temp check:	01-Oct-2020 AP
Copper treat:	1-Oct-2020 NB
Solvent exchange:	01-Oct-2020 NB
Alumina Column + temp check:	1-Oct-2020 NB
Split:	1-Oct-2020 NB
Carbon column + temp check:	2-Oct-20 KB
Microvial:	1-Oct-20 NB

DX 2-Oct-20 KB

Batch ID:	WG3406765

DX Extraction Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-1	40	✓
WG3406765-2	40	✓
WG3406765-3	40	✓
WG3406765-4	40	✓
L2504188-1	40	✓
L2504188-2	40	✓
L2504188-3	40	✓
L2504188-4	40	✓
L2504188-5	40	✓

Syringe ID: 320

Standard: M23-ES#2- 040E

Spike Date: 24-Sept-20

Spike Witnessing

Chemist: JP (Chemist's Initials)

Witness: Bm (Witness's Initials)

Correct Syringe Obtained: Bm (Witness's Initials)

Correct Standard Obtained: Bm (Witness's Initials)

Correct Technique Followed: Bm (Witness's Initials)

PCB Extraction Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-1	40	✓
WG3406765-2	40	✓
WG3406765-3	40	✓
WG3406765-4	40	✓
L2504188-1	40	✓
L2504188-2	40	✓
L2504188-3	40	✓
L2504188-4	40	✓
L2504188-5	40	✓

Syringe ID: 382

Standard: 1668A-ES#2- 0644

Spike Date: 24-Sept-20

Spike Witnessing

Chemist: JP (Chemist's Initials)

Witness: Bm (Witness's Initials)

Correct Syringe Obtained: Bm (Witness's Initials)

Correct Standard Obtained: Bm (Witness's Initials)

Correct Technique Followed: Bm (Witness's Initials)

Batch ID:	WG3406765

DX Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-2	40	✓
WG3406765-3	40	✓

Syringe ID: 322
Standard: 1613B-NS#3- 028A
Date & Initials: 24-Sept-20 JP

PCB Native Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-2	40	✓
WG3406765-3	40	✓

Syringe ID: 394
Standard: 1668A-NS#1- 039E
Date & Initials: 24-Sept-20 JP

Batch ID:	WG3406765

DX Cleanup Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3406765-1	20	✓
WG3406765-2	20	✓
WG3406765-3	20	N/A
WG3406765-4	20	✓
L2504188-1	20	✓
L2504188-2	20	✓
L2504188-3	20	✓
L2504188-4	20	✓
L2504188-5	20	✓

Syringe ID: 357

Standard: M23-CL#1- 036B

Date & Initials: 01-Oct-2020 AP

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

PCB Cleanup Standard:

Sample I.D.	Volume (ul)	Spiked (Checkmark)
WG3406765-1	20	✓
WG3406765-2	20	✓
WG3406765-3	20	N/A
WG3406765-4	20	✓
L2504188-1	20	✓
L2504188-2	20	✓
L2504188-3	20	✓
L2504188-4	20	✓
L2504188-5	20	✓

Syringe ID: 378

Standard: 1668A-CL#2- 036G

Date & Initials: 01-Oct-2020 AP

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

Batch ID:	WG3406765

DX Injection Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-1	~~10~~ 20 *	✓
WG3406765-2	~~10~~ 20	✓
WG3406765-3	~~10~~ 20	✓
WG3406765-4	~~10~~ 20	✓
L2504188-1	~~10~~ 20	✓
L2504188-2	~~10~~ 20	✓
L2504188-3	~~10~~ 20	✓
L2504188-4	~~10~~ 20	✓
L2504188-5	~~10~~ 20	✓

NB 1-Oct-2020

Syringe ID: ~~365~~ 392108

Standard: 1613B-IS#1- 01 (1613BIS#1.054D)

Date & Initials: ~~1-Oct-2020 NB~~ 2-Oct-20 KS

Witness's Initials

Correct Syringe Obtained: ~~NB~~ KS

Witness's Initials

Correct Standard Obtained: ~~NB~~ KS

Witness's Initials

Correct Technique Followed: ~~NB~~ KS

* - Analytical results indicate that the IS was spiked with 20 uL instead of 10uL. Prep analyst has attested this is highly likely.

13-Oct-20

PCB Injection Standard:

Sample I.D.	Volume (ul)	(Checkmark) Spiked
WG3406765-1	5	✓
WG3406765-2	5	✓
WG3406765-3	5	✓
WG3406765-4	5	✓
L2504188-1	5	✓
L2504188-2	5	✓
L2504188-3	5	✓
L2504188-4	5	✓
L2504188-5	5	✓

Syringe ID: 365

Standard: 1668A-IS#2- 013A

Date & Initials: 1-Oct-2020 NB

Chemist's Initials

Correct Syringe Obtained: NB

Chemist's Initials

Correct Standard Obtained: NB

Chemist's Initials

Correct Technique Followed: NB

WG3406765
2-Apr-20 / MSM
Page 5 of 8

Batch ID:	WG3406765

Reagent Lot Numbers:

Reagent	Lot#	Comment
Acetone	105484	
Hexane	165457	
DCM	165733	
Toluene	165743	
Nonane	ORG-NON- 055	
1:1 DCM:HEX	ORG-DH2- 648	
Sodium Sulphate	ORG-SSU- 2370, 2373	
Acid Silica	ORG-ASI- 9770	
Neutral Silica	ORG-NSI- 2399	
Alumina	ORG-ALU- 476	
Chromacarb	ORG-CC- 278	
Copper	ORG-CU- —	
Sand	ORG-SAND- —	
Corn oil	ORG-CO- 071	
Thimbles		

Batch ID:	WG3406765

Procedure:

This batchsheet is a guideline only. Please see test procedure for complete set of instructions.
Extraction:
- For MB and LCS you **must** include blank media - if not available see your Team Lead
- In a soxhlet that contains glasswool (sonicated In DCM) and Sodium Sulphate
- Place the filter (if there is a filter present) and the PUF into the soxhlet body. Spike Extraction and Native standards
Soxhlet extract in DCM for 16 hours
- Roto-vap down to ~2ml. Transfer to a c-tube with 3x2ml Hexane rinses.
- Reduce to 2mL. Split 1/2 **Archive,** 1/2 **DX/PCB.** Spike DX/PCB portion with Cleanup Standards
- Acid Silica column
- Elute to 50ml with Hexane.
- Perform copper treatment before solvent exchange
DX/PCB
- Reduce to **50uL**, bulk up with 1mL of Hexane
- Perform Alumina Column: • Pre-elute the Alumina Column with 7ml Hexane • Place F1 c-tube under the column, then load the sample with 3x 1ml Hexane Rinses • F1 1mL of Hexane • F2 (DX/PCB) 14ml 1:1 DCM:Hexane
- Blow down to 2ml
-Split 1/2 PCB and 1/2 DX
PCB:
- Vortex **very** well.
- Transfer every last drop to a micro-vial (no rinses).
- Blow down to the mark. (Micro-vial should contain 20ul Nonane, and the level should be marked.)
- Spike PCB Injection Standard. Cap and Vortex **FV = 25ul**

DX:

- Carbon Column: - 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)

- 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**

Approval of Deviation from Standard Method

(Batch Writer): _____

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

Comments:

- Label and save all columns.

WG3406765
2-Apr-20 / MSM
Page 8 of 8

ALS Life Sciences

Sample Calculation Report

CS3 RRF Check

Approved: *N Ashtari* --e-signature-- 13-Oct-2020

RRF = (Response of 2,3,7,8-TCDD / Response of 13C12-2,3,7,8-TCDD) x (Concentration of 13C12-2,3,7,8-TCDD / Concentration of TCDD)

							Calculated Value	Value from TargetLynx
RRF	**=**	**167775.70** / **1460254.80**	**x**	**100** / **10**		**=**	**1.149**	**1.149**

Calculation of OCDD amount in L2504188-1

pg = (Response of OCDD / Response of 13C12-OCDD) x (pg of 13C12-OCDD spiked / Mean RRF * Sample Size)

pg	**=**	**1653.6** / **211148.2**	**x**	**8000** / **0.96**	*****	**1.00**	**=**	**65.0**	**65.0**

Calculation of 13C12-2,3,7,8-TCDD Recovery in L2504188-1

% Recovery = (Response of 13C12-2,3,7,8-TCDD / Response of 13C12-1,2,3,4-TCDD) x (pg of 13C12-1,2,3,4-TCDD spiked * 100 / Mean RRF * Amount Spiked)

% Recovery	**=**	**519394** / **784998.3**	**x**	**4000** / **1.11**	*****	**100** / **4000**	**=**	**60**	**60**	**%**

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:

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2494490-COFC

COC Number: 17 - 792152

Page 1 of 1

Composite WO: L2504188

Report To	Contact and company name below will appear on the final report
Company:	Farallon Consulting
Contact:	Amber Bailey
Phone:	206-735-6178
	Company address below will appear on the final report
Street:	975 5th Ave NW
City/Province:	Issaquah WA
Postal Code:	98059

Report Format / Distribution	
Select Report Format:	[X] PDF [X] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report	[ ] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	[X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax	abailey@farallonconsulting.com
Email 2	
Email 3	

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)			
Regular [R]	[X]	Standard TAT if received by 3 pm - business days - no surcharges apply	
PRIORITY (Business Days)	4 day [P4-20%]	[ ]	EMERGENCY: 1 Business day [E - 100%] [ ]
	3 day [P3-25%]	[ ]	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]
	2 day [P2-50%]	[ ]	
Date and Time Required for all E&P TATs:			dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.			

Invoice To		
	Same as Report To	[X] YES [ ] NO
	Copy of Invoice with Report	[X] YES [ ] NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	[X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax	AP@farallonconsulting.com
Email 2	abailey@farallonconsulting.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 Method 1668	Dioxins EPA method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2483549-13-1	25-8-20	0855	Air	1	X	X	X	
2	L2483549-1-2		0915		1	X	X	X	
3	L2483549-14-3		0933		1	X	X	X	
4	L2483549-12-4		0944		1	X	X	X	
5	L2483549-11-5		0955		1	X	X	X	

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	Please hold samples for Monthly composite.
Are samples for human consumption/ use? [ ] YES [ ] NO	

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
5.7°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Mark Ala	8/25/2020	1127	BARAN PORTAS	28-Aug-2020	12:20			

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**

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

L2497813-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 17 - 792250

Page 1 of 1

Composite WO: L2504188

Report To	Contact and company name below will appear on the final report
Company:	Farallon Consulting
Contact:	Amber Bailey
Phone:	206-735-6178
	Company address below will appear on the final report
Street:	975 5TH AVE NW
City/Province:	Issaquah, WA
Postal Code:	98059

Report Format / Distribution	
Select Report Format:	[X] PDF [X] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report	[ ] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	[X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax	abailey@farallonconsulting.com
Email 2	
Email 3	

Invoice To		
	Same as Report To	[X] YES [ ] NO
	Copy of Invoice with Report	[X] YES [ ] NO
Company:		
Contact:		

Invoice Distribution	
Select Invoice Distribution:	[X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax	AP@farallonconsulting.com
Email 2	abailey@farallonconsulting.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:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)			
Regular [R]	[X] Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4-20%] [ ]	EMERGENCY	1 Business day [E - 100%] [ ]
	3 day [P3-25%] [ ]		Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]
	2 day [P2-50%] [ ]		
Date and Time Required for all E&P TATs:	dd-mmm-yy hh:mm		
For tests that can not be performed according to the service level selected, you will be contacted.			

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	PCB's EPA Method 1668	Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2483549-20-1	01-Sep-20	0854	Air	1	X	X	X	
2	L2483549-19-2		0914		1	X	X	X	
3	L2483549-18-3		0954		1	X	X	X	
4	L2483549-5-4		1010		1	X	X	X	
5	L2483549-4-5		1027		1	X	X	X	

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	Please hold samples for Monthly composite L2483549-19-2 glass is broken at top.
Are samples for human consumption/ use? [ ] YES [ ] NO	

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			
5.5°C					

SHIPMENT RELEASE (client use)		
Released by:	Date:	Time:
[signature]	9/11/2020	1214

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:
AARON BURTON	2-Sept-2020	12:20

FINAL SHIPMENT RECEPTION (lab use only)		
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**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2501323-COFC

COC Number: 17 - 792248

Page 1 of 1

Composite WO: L2504188

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:	Farallon Consulting	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:	206-735-6178	[ ] 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@farallonconsulting.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:	98059	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 APE@farallonconsulting.com	
Contact:		Email 2 abailey@farallonconsulting.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	PCB's EPA Method 1668	Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2483549-17-1	09-Sep-20	0909	Air	1	X	X	X	
2	L2483549-10-2	"	0917	"	1	X	X	X	
3	L2483549-16-3	"	0953	"	1	X	X	X	
4	L2483549-9-4	"	1007	"	1	X	X	X	
5	L2483549-6-5	"	1039	"	1	X	X	X	

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	Please hold samples for monthly composite.
Are samples for human consumption/ use? [ ] YES [ ] NO	

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			
4.8°C							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
[signature]	9/9/2020	1220	AARON BURTON	10-Sept-2020	11:30			

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**.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2504187-COFC

COC Number: 17 - 792249

Page of

Composite WO: L2504188

Report To	Contact and company name below will appear on the final report
Company:	Farallon Consulting
Contact:	Amber Bailey
Phone:	206 735 6178
	Company address below will appear on the final report
Street:	975 5th AVE NW
City/Province:	Issaquah WA
Postal Code:	98027
~~Invoice To~~	~~Same as Report To~~ [X] YES [ ] NO
	Copy of Invoice with Report [X] YES [ ] NO
Company:	AP@farallonconsulting.com
Contact:	Accounts Payable

Report Format / Distribution

Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)

Quality Control (QC) Report with Report [ ] YES [ ] NO

[ ] Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: abailey@farallonconsulting.com

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX

Email 1 or Fax: AP@farallonconsulting.com

Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]

EMERGENCY: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:

Job #:

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner:

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 method 1668	Dioxins EPA Method 8290A	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
1	L2483549 - 7 - 1	9/15/20	0954	Air	1	X	X		
2	L2483549 - 8 - 2		1326		1	X	X		
3	L2483549 - 15 - 3		1215		1	X	X		
4	L2483549 - 2 - 4		1237		1	X	X		
5	L2483549 - 3 - 5		1259		1	X	X		

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO

Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Please composites all 4 of the last sets of samples.

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			
7.0°C							

SHIPMENT RELEASE (client use)

Released by: | Date: 9/15/2020 | Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: AARON BURTON | Date: 16-Sept-2020 | Time: 16:10

FINAL SHIPMENT RECEPTION (lab use only)

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
26-Aug-2020 12:20	FARALLON	5 x FUFs	5.9°C	Good Fedex 7712 2334 4966	NJ	26-Aug-2020 15:45	L2494490	-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]								
2-Sept-2020 12:20	FARALLON	5 x PUFs	5.5°C	Good FedEx 7712 2340 2388	NJ	2-Sept-2020 16:20	L2497813	-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
[redacted]								
10-Sept-2020 11:30	FARALLON	5 x PUFs	4.8°C	Good FedEx 7712 2343 9683	MJ	10-Sept-2020 15:20	L2501323	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
[redacted]								
16-Sept-2020 16:10	FARALLON	5 x PUFs	7.0°C	Good FedEx 7714 6815 2639	NJ	17-Sept-2020 9:25	L2504187 L2504188	-1-5 -1-5
[redacted]								

*Temperatures were recorded using :

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

☐ Other (specify): _____

[redacted]

BU-FM-0261c v03 Sample Receiving Log

Date Issued: 18-Jul-2019

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