



2045 Mills Road West

TEL: (250) 655-5800

Sidney, BC, Canada V8L5X2

TOLL-FREE: 1-888-373-0881

SGS AXYS Client No.: 4066

Client Address: Tetra Tech, Inc. - Pacific Guardian Ctr.
737 Bishop St., Suite 2340, Mauka Tower
Honolulu, HI, US, 96813-3201

The SGS AXYS contact for these data is Dale Robinson.

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BATCH SUMMARY

Batch ID: WG79538	Date: 01-Feb-2022
Analysis Type: Per- and Polyfluoroalkyl Substances (PFAS)	Matrix Type: Leachate
BATCH MAKEUP	
Contract: 4066 Samples: L36097-1 KKLF-WW1-Filtered L36097-2 KKLF-WW2-Filtered L36097-3 KKLF-WW3-Filtered L36097-4 KKLF-2A-Filtered L36097-5 KKLF-2B-Filtered	Blank: WG79538-101 Reference or Spike: WG79538-102 WG79538-103 Duplicate:
Comments: 1. Data are considered final. Note: The reported target analyte concentrations represent the acid version of the compound. 2. For the on-going calibration verification solution injection (FC2L_033 S:50), the percent recovery for the target analyte NFDHA (40.1%) was below the lower method criteria limit (70%). 3. Data are not blank corrected. Blank data should be taken into consideration when evaluating sample data. 4. Blank data should be evaluated against specifications using the same blank sample size as the size of the client samples. 5. For the OPR sample (SGS AXYS ID: WG79538-102), the percent recovery for the target analyte NFDHA (28.1%) was below the lower method criteria limit (45%) and was flagged with an 'N'. The same compound was not detected in any of the field samples. 6. Low recovery of NFDHA was observed for most of the QC samples. For the laboratory procedural blank and all field samples, the results for NFDHA were flagged with an 'H' and provided for information only. 7. For some samples, the percent recoveries for some surrogate compounds did not meet the method criteria limits and were flagged with a 'V'. As the isotope dilution method of quantification produces data that is recovery corrected, these variances from method criteria were deemed to not affect the quantification of the target analytes. Percent surrogate recoveries are used as general method performance indicator only.	

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February 2017



Kekaha Landfill (KKLF)

CHAIN OF CUSTODY

2045 Mills Road West TEL: (250) 655-5800 TOLL FREE 1-888-373-0881
 Sidney, British Columbia, Canada V8L 5X2 FAX: (250) 655-5811

SGS AXYS CLIENT #: 4066

REPORT TO:			INVOICE TO:			ANALYSIS REQUESTED					
Company <u>Hawaii DOH - HEER office</u>			Company <u>Tetrattech</u>			PFAS - MLA 110	TOP - MLA 111	TDF - CIC			
Address <u>2385 Waimano Home Rd #100</u>			Address <u>737 Bishop St Ste 2340</u>								
<u>Pearl City, HI 96782</u>			<u>Honolulu HI 96813</u>								
Contact <u>Diana Felton</u>			Contact <u>Eric Jensen</u>								
Phone <u>808-586-0963</u>			Phone <u>808-225-7084</u>								
FAX			FAX								
E-mail <u>diana.felton@doh.hawaii.gov</u>			E-mail <u>eric.jensen@tetrattech.com</u>								
Project Name/Number: <u>HDOH-PFAS-MM/</u>			Sampler's Name: Signature:								
Client Sample Identification	Matrix	Sampling Date	Sampling Time	Container Type/No.	SGS AXYS Lab Sample ID (Lab use only)						
<u>KKLF-WW1</u>	<u>leachate</u>	<u>10/17/21</u>	<u>830a</u>	<u>4x125mL 4x60mL</u>	<u>L36096-2 / L36097-1</u>	<u>2</u>					
<u>KKLF-WW2</u>				<u>4x125mL 4x60mL</u>	<u>L36096-3 / L36097-2</u>	<u>2</u>					
<u>KKLF-WW3</u>				<u>4x125mL 4x60mL</u>	<u>L36096-4 / L36097-3</u>	<u>2</u>					
<u>KKLF 2A</u>				<u>4x125mL 4x60mL</u>	<u>L36096-5 / L36097-4</u>	<u>2</u>					
<u>KKLF 2B</u>				<u>4x125mL 4x60mL</u>	<u>L36096-6 / L36097-5</u>	<u>2</u>					
<u>KKLF-EB</u>				<u>2x60mL</u>	<u>L36096-1</u>	<u>1</u>					
Relinquished by (Signature) <u>[Signature]</u>			Received by (Signature) <u>[Signature]</u>			Courier		Waybill No.			
Date <u>11/22/21</u> Time <u>12:00 pm</u>			Date <u>24 Nov 2021</u> Time <u>13:15</u>								
Relinquished by (Signature)			Received by (Signature)			Sample Receipt					
Date			Date								
Remarks						Cooler					
						Temp °C					
						Custody Seal #					
						Seal Intact Y / N					
						Sample Tags Y / N					

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW1-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-1

Matrix: LEACHATE

Sample Size: 0.0648 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:44:21

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 56

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng/L

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA		1800	12.4 (Q)		1.005
PFPeA		4080	6.18 (Q)		1.000
PFHxA		3800	7.38 (S)	4.85	1.000
PFHpA		1810	3.09 (Q)	2.10	1.000
PFOA		2860	3.62 (S)	1.83	
PFNA		82.9	3.09 (Q)	2.65	
PFDA		51.1	3.09 (Q)	2.95	1.000
PFUnA	U		3.09 (Q)		
PFDaA	U		3.09 (Q)		
PFTTrDA	U		3.09 (Q)		
PFTeDA	U		3.09 (Q)		
PFBS		283	3.09 (Q)	2.41	1.001
PFPeS		97.6	3.10 (Q)	2.11	0.884
PFHxS		796	3.09 (Q)	2.44	
PFHpS		52.3	3.09 (Q)	2.06	0.924
PFOS		1400	3.09 (Q)	3.17	
PFNS	U		3.09 (Q)		
PFDS	U		3.09 (Q)		
PFDoS	U		3.09 (Q)		
4:2 FTS	U		12.4 (Q)		
6:2 FTS		87.2	11.1 (Q)	0.43	1.000
8:2 FTS	J	47.7	12.4 (Q)	0.54	1.000
PFOSA		78.0	3.09 (Q)		
N-MeFOSA	J	9.76	3.55 (Q)	0.42	
N-EtFOSA	J	11.8	7.72 (Q)	0.52	
MeFOSAA		1950	3.09 (Q)	1.99	
EtFOSAA		618	3.09 (Q)	1.17	
N-MeFOSE		961	30.9 (Q)		
N-EtFOSE		993	23.1 (Q)		
HFPO-DA	U		11.7 (Q)		
ADONA	U		12.4 (Q)		
9Cl-PF3ONS	U		12.4 (Q)		
11Cl-PF3OUdS	U		12.4 (Q)		
3:3 FTCA		195	12.4 (Q)	1.64	0.833
5:3 FTCA		14900	77.2 (Q)	1.27	1.055
7:3 FTCA		2720	77.2 (Q)	0.69	1.354
PFEESA	U		3.09 (Q)		
PFMPA	U		6.18 (Q)		
PFMBA	U		3.09 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; J = concentration less than limit of quantification; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

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SGS AXYS METHOD MLA-110 Rev 02

Form 2

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW1-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-1

Matrix: LEACHATE

Sample Size: 0.0648 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:44:21

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 56

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	34.9	87.1		1.000
13C5-PFPeA		20.0	18.5	92.3		0.861
13C5-PFHxA		10.0	10.9	109	20.6	1.000
13C4-PFHpA		10.0	8.60	86.0		0.892
13C8-PFOA		10.0	7.85	78.5		1.000
13C9-PFNA		5.00	3.95	78.9		0.999
13C6-PFDA		5.00	4.07	81.4		0.999
13C7-PFUnA		5.00	3.84	76.8		1.047
13C2-PFDoA		5.00	3.14	62.8		1.082
13C2-PFTeDA		5.00	2.73	54.5		1.163
13C3-PFBS		10.0	9.32	93.0	2.84	0.796
13C3-PFHxS		10.0	8.74	87.2	2.33	1.000
13C8-PFOS		10.1	8.91	88.6	2.09	1.000
13C2-4:2 FTS		20.2	30.2	150	2.15	0.836
13C2-6:2 FTS		20.0	18.2	91.1	2.16	1.001
13C2-8:2 FTS		20.0	14.1	70.5	3.32	1.268
13C8-PFOSA		10.0	8.66	86.6		1.162
D3-N-MeFOSA		10.0	5.81	58.1		1.343
D5-N-EtFOSA		10.0	5.52	55.2		1.378
D3-MeFOSAA	V	20.0	9.59	47.9		1.313
D5-EtFOSAA		20.0	10.4	52.1		1.340
d7-NMe-FOSE		100	81.6	81.6		1.326
d9-NEt-FOSE		100	50.2	50.2		1.363
13C3-HFPO-DA		40.0	41.8	105	2.81	1.030

(1) Where applicable, custom lab flags have been used on this report; V = surrogate recovery is not within method/contract control limits.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW2-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-2

Matrix: LEACHATE

Sample Size:

0.0609 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date:

22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID:

LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:57:18

Column ID:

C18

Extract Volume (uL): 4000

Sample Data Filename:

FC2L_033 S: 57

Injection Volume (uL): 2

Blank Data Filename:

FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename:

FC2L_033 S: 50

Concentration Units: ng/L

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Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA		3100	13.1 (Q)		1.005
PFPeA		8110	7.63 (S)		1.001
PFHxA		6880	3.28 (Q)	4.59	1.000
PFHpA		2420	3.28 (Q)	2.23	1.000
PFOA		1870	3.28 (Q)	1.57	
PFNA		74.6	3.28 (Q)	2.86	
PFDA		33.6	3.28 (Q)	3.07	1.000
PFUnA	U		3.28 (Q)		
PFDaA	U		3.28 (Q)		
PFTTrDA	U		3.28 (Q)		
PFTeDA	U		3.28 (Q)		
PFBS		569	3.28 (Q)	2.45	1.000
PFPeS		421	3.30 (Q)	2.37	0.884
PFHxS		2880	3.28 (Q)	2.23	
PFHpS		23.4	3.28 (Q)	2.20	0.924
PFOS		549	3.28 (Q)	2.76	
PFNS	U		3.28 (Q)		
PFDS	U		3.28 (Q)		
PFDoS	U		3.28 (Q)		
4:2 FTS	J	14.6	13.1 (Q)	0.38	1.000
6:2 FTS		303	11.8 (Q)	0.43	1.000
8:2 FTS		139	13.1 (Q)	0.57	1.000
PFOSA	J	10.8	3.28 (Q)		
N-MeFOSA	U		3.78 (Q)		
N-EtFOSA	U		8.21 (Q)		
MeFOSAA		244	3.28 (Q)	2.03	
EtFOSAA		239	8.38 (S)	1.20	
N-MeFOSE	U		32.8 (Q)		
N-EtFOSE	J	52.5	24.6 (Q)		
HFPO-DA	U		12.5 (Q)		
ADONA	U		13.1 (Q)		
9Cl-PF3ONS	U		13.2 (Q)		
11Cl-PF3OUdS	U		13.2 (Q)		
3:3 FTCA		794	13.1 (Q)	1.96	0.833
5:3 FTCA		19700	82.1 (Q)	1.26	1.054
7:3 FTCA		778	82.1 (Q)	0.68	1.356
PFEESA	U		3.28 (Q)		
PFMPA	U		6.57 (Q)		
PFMBA	U		3.28 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; J = concentration less than limit of quantification; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

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SGS AXYS METHOD MLA-110 Rev 02

Form 2

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW2-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-2

Matrix: LEACHATE

Sample Size: 0.0609 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:57:18

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 57

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELLED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	37.3	93.2		1.000
13C5-PFPeA		20.0	14.5	72.5		0.863
13C5-PFHxA		10.0	9.22	92.2	19.0	1.000
13C4-PFHpA		10.0	9.68	96.8		0.893
13C8-PFOA		10.0	9.13	91.3		1.000
13C9-PFNA		5.00	4.08	81.6		1.000
13C6-PFDA		5.00	3.93	78.6		1.000
13C7-PFUnA		5.00	3.90	78.0		1.048
13C2-PFDoA		5.00	3.38	67.6		1.083
13C2-PFTeDA		5.00	2.80	56.1		1.165
13C3-PFBS		10.0	9.75	97.2	2.81	0.797
13C3-PFHxS		10.0	9.13	91.1	2.23	0.999
13C8-PFOS		10.1	9.64	95.8	2.15	1.000
13C2-4:2 FTS		20.2	27.2	135	1.69	0.835
13C2-6:2 FTS		20.0	19.0	94.9	1.85	1.001
13C2-8:2 FTS		20.0	12.8	63.6	3.08	1.268
13C8-PFOSA		10.0	9.18	91.8		1.163
D3-N-MeFOSA		10.0	5.83	58.3		1.343
D5-N-EtFOSA		10.0	5.78	57.8		1.378
D3-MeFOSAA	V	20.0	9.62	48.1		1.313
D5-EtFOSAA		20.0	10.0	50.1		1.340
d7-NMe-FOSE		100	81.0	81.0		1.326
d9-NEt-FOSE		100	51.7	51.7		1.363
13C3-HFPO-DA		40.0	34.8	86.9	2.77	1.031

(1) Where applicable, custom lab flags have been used on this report; V = surrogate recovery is not within method/contract control limits.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW3-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-3

Matrix: LEACHATE

Sample Size: 0.0625 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 25-Jan-2022 Time: 00:10:23

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 58

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng/L

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA		1000	12.8 (Q)		1.005
PFPeA		3060	114 (S)		1.002
PFHxA		2870	3.20 (Q)	5.45	1.000
PFHpA		437	3.20 (Q)	2.04	1.000
PFOA		521	3.20 (Q)	1.90	
PFNA		20.2	3.20 (Q)	2.57	
PFDA		40.2	3.20 (Q)	3.29	1.000
PFUnA	J	5.29	3.20 (Q)	3.60	1.000
PFDaA	J	4.60	3.20 (Q)	6.01	0.999
PFTTrDA	U		3.20 (Q)		
PFTeDA	U		3.20 (Q)		
PFBS		417	3.20 (Q)	2.79	1.000
PFPeS		91.1	3.22 (Q)	2.34	0.884
PFHxS		748	3.20 (Q)	2.39	
PFHpS	J	8.46	3.20 (Q)	1.80	0.924
PFOS		640	3.20 (Q)	2.68	
PFNS	U		3.20 (Q)		
PFDS	U		3.20 (Q)		
PFDoS	U		3.20 (Q)		
4:2 FTS	U		12.8 (Q)		
6:2 FTS		75.7	11.5 (Q)	0.44	1.000
8:2 FTS	J	42.3	12.8 (Q)	0.61	1.000
PFOSA		67.5	3.20 (Q)		
N-MeFOSA	U		3.68 (Q)		
N-EtFOSA	U		8.01 (Q)		
MeFOSAA		992	3.20 (Q)	1.98	
EtFOSAA		449	3.20 (Q)	1.16	
N-MeFOSE		252	32.0 (Q)		
N-EtFOSE		154	24.0 (Q)		
HFPO-DA	U		12.2 (Q)		
ADONA	U		12.8 (Q)		
9Cl-PF3ONS	U		12.8 (Q)		
11Cl-PF3OUds	U		12.8 (Q)		
3:3 FTCA		277	12.8 (Q)	2.00	0.832
5:3 FTCA		38000	80.1 (Q)	1.20	1.055
7:3 FTCA		3320	80.1 (Q)	0.68	1.354
PFEESA	U		3.20 (Q)		
PFMPA	U		6.40 (Q)		
PFMBA	U		3.20 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; J = concentration less than limit of quantification; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

For Axs Internal Use Only [XSL Template: FC2-Form1A.xsl; Created: 01-Feb-2022 10:20:40; Application: XMLTransformer-1.18.31; Report Filename: PFC_FC_LC_PFAS_L36097-3_Form1A_FC2L_033S58_SJ3019381.html; Workgroup: WG79538; Design ID: 3989]

SGS AXYS METHOD MLA-110 Rev 02

Form 2

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-WW3-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-3

Matrix: LEACHATE

Sample Size: 0.0625 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 25-Jan-2022 Time: 00:10:23

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 58

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELLED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	34.9	87.3		1.000
13C5-PFPeA		20.0	16.4	82.2		0.862
13C5-PFHxA		10.0	9.75	97.5	22.6	1.000
13C4-PFHpA		10.0	8.62	86.2		0.893
13C8-PFOA		10.0	7.99	79.9		1.000
13C9-PFNA		5.00	4.22	84.3		1.000
13C6-PFDA		5.00	4.25	85.0		1.000
13C7-PFUnA		5.00	3.83	76.6		1.047
13C2-PFDoA		5.00	3.29	65.8		1.082
13C2-PFTeDA		5.00	2.83	56.5		1.163
13C3-PFBS		10.0	8.70	86.7	3.19	0.797
13C3-PFHxS		10.0	8.57	85.6	2.30	1.000
13C8-PFOS		10.1	9.34	92.9	2.17	1.000
13C2-4:2 FTS		20.2	25.2	125	1.78	0.836
13C2-6:2 FTS		20.0	18.5	92.7	2.05	1.001
13C2-8:2 FTS		20.0	13.7	68.1	3.09	1.268
13C8-PFOSA		10.0	9.13	91.3		1.162
D3-N-MeFOSA		10.0	5.45	54.5		1.343
D5-N-EtFOSA		10.0	5.23	52.3		1.379
D3-MeFOSAA		20.0	10.3	51.5		1.315
D5-EtFOSAA		20.0	11.1	55.6		1.340
d7-NMe-FOSE		100	80.3	80.3		1.326
d9-NEt-FOSE		100	50.3	50.3		1.363
13C3-HFPO-DA		40.0	31.2	78.0	2.52	1.030

(1) Where applicable, custom lab flags have been used on this report.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLFF-2A-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-4

Matrix: LEACHATE

Sample Size: 0.0640 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 25-Jan-2022 Time: 00:23:29

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 59

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng/L

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA		1280	12.5 (Q)		1.005
PFPeA		2130	28.9 (S)		1.002
PFHxA		4180	7.29 (S)	4.29	1.000
PFHpA		883	3.12 (Q)	2.18	0.999
PFOA		604	3.12 (Q)	1.79	
PFNA		22.2	3.12 (Q)	3.65	
PFDA	J	7.50	3.12 (Q)	2.90	1.000
PFUnA	U		3.12 (Q)		
PFDaA	U		3.12 (Q)		
PFTTrDA	U		3.12 (Q)		
PFTeDA	U		3.12 (Q)		
PFBS		651	3.12 (Q)	2.75	1.001
PFPeS		1010	3.14 (Q)	2.25	0.884
PFHxS		6820	3.12 (Q)	2.46	
PFHpS		45.0	3.12 (Q)	2.09	0.924
PFOS		1200	3.12 (Q)	2.79	
PFNS	U		3.12 (Q)		
PFDS	U		3.12 (Q)		
PFDoS	U		3.12 (Q)		
4:2 FTS	U		12.5 (Q)		
6:2 FTS	J	36.4	11.3 (Q)	0.42	1.000
8:2 FTS	U		12.5 (Q)		
PFOSA	U		3.12 (Q)		
N-MeFOSA	U		3.59 (Q)		
N-EtFOSA	U		7.81 (Q)		
MeFOSAA	U		3.12 (Q)		
EtFOSAA	U		3.12 (Q)		
N-MeFOSE	U		31.2 (Q)		
N-EtFOSE	U		23.4 (Q)		
HFPO-DA	U		11.9 (Q)		
ADONA	U		12.5 (Q)		
9Cl-PF3ONS	U		12.5 (Q)		
11Cl-PF3OUdS	U		12.5 (Q)		
3:3 FTCA		904	12.5 (Q)	1.96	0.833
5:3 FTCA		33400	78.1 (Q)	1.24	1.053
7:3 FTCA	J	217	78.1 (Q)	0.72	1.354
PFEESA	U		3.12 (Q)		
PFMPA	U		6.25 (Q)		
PFMBA	U		3.12 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; J = concentration less than limit of quantification; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

For Axs Internal Use Only [XSL Template: FC2-Form1A.xsl; Created: 01-Feb-2022 10:20:40; Application: XMLTransformer-1.18.31; Report Filename: PFC_FC_LC_PFAS_L36097-4_Form1A_FC2L_033S59_SJ3019382.html; Workgroup: WG79538; Design ID: 3989]

SGS AXYS METHOD MLA-110 Rev 02

Form 2

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLF-2A-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-4

Matrix: LEACHATE

Sample Size: 0.0640 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 25-Jan-2022 Time: 00:23:29

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 59

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELLED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	38.1	95.2		0.995
13C5-PFPeA		20.0	15.9	79.5		0.864
13C5-PFHxA		10.0	9.54	95.4	20.2	1.000
13C4-PFHpA		10.0	9.33	93.3		0.893
13C8-PFOA		10.0	8.86	88.6		1.000
13C9-PFNA		5.00	4.28	85.6		1.001
13C6-PFDA		5.00	4.22	84.4		0.999
13C7-PFUnA		5.00	3.94	78.8		1.047
13C2-PFDoA		5.00	3.51	70.3		1.082
13C2-PFTeDA		5.00	3.00	60.0		1.163
13C3-PFBS		10.0	9.81	97.8	2.58	0.797
13C3-PFHxS		10.0	8.39	83.8	2.25	1.000
13C8-PFOS		10.1	9.75	96.9	2.11	1.000
13C2-4:2 FTS		20.2	27.2	135	1.86	0.836
13C2-6:2 FTS		20.0	18.4	92.2	2.09	1.001
13C2-8:2 FTS		20.0	15.7	78.3	3.37	1.268
13C8-PFOSA		10.0	9.51	95.1		1.163
D3-N-MeFOSA		10.0	6.20	62.0		1.343
D5-N-EtFOSA		10.0	6.23	62.3		1.379
D3-MeFOSAA		20.0	10.9	54.3		1.313
D5-EtFOSAA		20.0	12.0	60.2		1.340
d7-NMe-FOSE		100	88.4	88.4		1.326
d9-NEt-FOSE		100	55.3	55.3		1.363
13C3-HFPO-DA		40.0	35.2	87.9	2.89	1.030

(1) Where applicable, custom lab flags have been used on this report.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

PERFLUORINATED ORGANICS ANALYSIS REPORT

CLIENT SAMPLE NO.

KKLFF-2B-Filtered

Sample Collection:

17-Oct-2021 08:30

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Lab Sample I.D.:

L36097-5

Contract No.: 4066

Sample Size:

0.0600 L

Matrix: LEACHATE

Initial Calibration Date:

22-Feb-2021

Sample Receipt Date: 24-Nov-2021

Instrument ID:

LCMS/MS

Extraction Date: 24-Jan-2022

Column ID:

C18

Analysis Date: 25-Jan-2022 Time: 00:36:27

Sample Data Filename:

FC2L_033 S: 60

Extract Volume (uL): 4000

Blank Data Filename:

FC2L_033 S: 55

Injection Volume (uL): 2

Cal. Ver. Data Filename:

FC2L_033 S: 50

Dilution Factor: N/A

Concentration Units: ng/L

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA		1190	13.3 (Q)		1.000
PFPeA		1970	15.8 (S)		1.001
PFHxA		4780	5.27 (S)	5.87	1.000
PFHpA		682	3.34 (Q)	2.21	1.000
PFOA		663	3.34 (Q)	1.79	
PFNA		35.8	3.34 (Q)	3.02	
PFDA	J	13.0	3.34 (Q)	3.30	1.000
PFUnA	U		3.34 (Q)		
PFDaA	U		3.34 (Q)		
PFTTrDA	U		3.34 (Q)		
PFTeDA	U		3.34 (Q)		
PFBS		714	3.34 (Q)	2.46	1.000
PFPeS		1110	3.35 (Q)	2.29	0.883
PFHxS		7220	3.34 (Q)	2.40	
PFHpS		69.2	3.34 (Q)	1.82	0.924
PFOS		1660	3.34 (Q)	2.81	
PFNS	U		3.34 (Q)		
PFDS	U		3.34 (Q)		
PFDoS	U		3.34 (Q)		
4:2 FTS	U		13.3 (Q)		
6:2 FTS		59.6	12.0 (Q)	0.45	1.000
8:2 FTS	U		13.3 (Q)		
PFOSA	U		3.34 (Q)		
N-MeFOSA	U		3.84 (Q)		
N-EtFOSA	U		8.34 (Q)		
MeFOSAA	U		3.34 (Q)		
EtFOSAA	U		3.34 (Q)		
N-MeFOSE	U		33.4 (Q)		
N-EtFOSE	U		24.9 (Q)		
HFPO-DA	U		12.7 (Q)		
ADONA	U		13.3 (Q)		
9Cl-PF3ONS	U		13.4 (Q)		
11Cl-PF3OUdS	U		13.4 (Q)		
3:3 FTCA		576	13.3 (Q)	2.02	0.836
5:3 FTCA		15000	83.4 (Q)	1.23	1.055
7:3 FTCA	U		83.4 (Q)		
PFEESA	U		3.34 (Q)		
PFMPA	U		6.67 (Q)		
PFMBA	U		3.34 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; J = concentration less than limit of quantification; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

For Axs Internal Use Only [XSL Template: FC2-Form1A.xsl; Created: 01-Feb-2022 10:20:40; Application: XMLTransformer-1.18.31; Report Filename: PFC_FC_LC_PFAS_L36097-5_Form1A_FC2L_033S60_SJ3019383.html; Workgroup: WG79538; Design ID: 3989]

SGS AXYS METHOD MLA-110 Rev 02

Form 2

CLIENT SAMPLE NO.

KKLF-2B-Filtered

Sample Collection:

17-Oct-2021 08:30

PERFLUORINATED ORGANICS ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Project No.

HDOH - PFAS IN MULTIMEDIA
(TO-17403)

Contract No.: 4066

Lab Sample I.D.:

L36097-5

Matrix: LEACHATE

Sample Size: 0.0600 L

Sample Receipt Date: 24-Nov-2021

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 25-Jan-2022 Time: 00:36:27

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 60

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELLED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	38.9	97.2		1.000
13C5-PFPeA		20.0	22.7	113		0.865
13C5-PFHxA		10.0	11.4	114	20.7	1.000
13C4-PFHpA		10.0	10.5	105		0.893
13C8-PFOA		10.0	9.15	91.5		1.000
13C9-PFNA		5.00	4.31	86.3		1.000
13C6-PFDA		5.00	4.39	87.9		0.999
13C7-PFUnA		5.00	4.27	85.3		1.047
13C2-PFDoA		5.00	3.70	74.1		1.082
13C2-PFTeDA		5.00	3.19	63.9		1.163
13C3-PFBS		10.0	10.8	108	3.74	0.797
13C3-PFHxS		10.0	9.41	93.9	2.35	1.000
13C8-PFOS		10.1	9.85	97.9	2.18	1.000
13C2-4:2 FTS		20.2	25.1	125	2.03	0.834
13C2-6:2 FTS		20.0	19.9	99.3	2.11	1.000
13C2-8:2 FTS		20.0	15.4	76.8	3.29	1.267
13C8-PFOSA		10.0	9.50	95.0		1.163
D3-N-MeFOSA		10.0	6.44	64.4		1.343
D5-N-EtFOSA		10.0	6.35	63.5		1.379
D3-MeFOSAA		20.0	10.1	50.4		1.313
D5-EtFOSAA		20.0	11.0	54.9		1.338
d7-NMe-FOSE		100	85.9	85.9		1.326
d9-NEt-FOSE		100	53.9	53.9		1.363
13C3-HFPO-DA		40.0	42.4	106	2.31	1.030

(1) Where applicable, custom lab flags have been used on this report.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 1A

CLIENT SAMPLE NO.

Lab Blank

Sample Collection:

N/A

PERFLUORINATED ORGANICS ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4066

Project No.

N/A

Lab Sample I.D.:

WG79538-101

Matrix: AQUEOUS

Sample Size:

0.0600 L

Sample Receipt Date: N/A

Initial Calibration Date:

22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID:

LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:31:15

Column ID:

C18

Extract Volume (uL): 4000

Sample Data Filename:

FC2L_033 S: 55

Injection Volume (uL): 2

Blank Data Filename:

FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename:

FC2L_033 S: 50

Concentration Units: ng/L

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

COMPOUND	LAB FLAG ¹	CONC. FOUND	REPORTING LIMIT (RL) ²	RATIO	RRT
PFBA	U		13.3 (Q)		
PFPeA	U		6.67 (Q)		
PFHxA	U		3.33 (Q)		
PFHpA	U		3.33 (Q)		
PFOA	U		3.33 (Q)		
PFNA	U		3.33 (Q)		
PFDA	U		3.33 (Q)		
PFUnA	U		3.33 (Q)		
PFDaA	U		3.33 (Q)		
PFTTrDA	U		3.33 (Q)		
PFTeDA	U		3.33 (Q)		
PFBS	U		3.33 (Q)		
PFPeS	U		3.35 (Q)		
PFHxS	U		3.33 (Q)		
PFHpS	U		3.33 (Q)		
PFOS	U		3.33 (Q)		
PFNS	U		3.33 (Q)		
PFDS	U		3.33 (Q)		
PFDoS	U		3.33 (Q)		
4:2 FTS	U		13.3 (Q)		
6:2 FTS	U		12.0 (Q)		
8:2 FTS	U		13.3 (Q)		
PFOSA	U		3.33 (Q)		
N-MeFOSA	U		3.83 (Q)		
N-EtFOSA	U		8.33 (Q)		
MeFOSAA	U		3.33 (Q)		
EtFOSAA	U		3.33 (Q)		
N-MeFOSE	U		33.3 (Q)		
N-EtFOSE	U		24.9 (Q)		
HFPO-DA	U		12.7 (Q)		
ADONA	U		13.3 (Q)		
9CI-PF3ONS	U		13.4 (Q)		
11CI-PF3OUdS	U		13.4 (Q)		
3:3 FTCA	U		13.3 (Q)		
5:3 FTCA	U		83.3 (Q)		
7:3 FTCA	U		83.3 (Q)		
PFEESA	U		3.33 (Q)		
PFMPA	U		6.67 (Q)		
PFMBA	U		3.33 (Q)		
NFDHA	U H		6.67 (Q)		

- (1) Where applicable, custom lab flags have been used on this report; U = not detected at RL; H = concentration is estimated.
- (2) Reporting Limit (Code): S = sample detection limit; M = method detection limit; L = lowest calibration level equivalent; Q = minimum reporting level.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

For Axs Internal Use Only [XSL Template: FC2-Form1A.xsl; Created: 01-Feb-2022 10:20:40; Application: XMLTransformer-1.18.31; Report Filename: PFC_FC_LC_PFAS_WG79538-101_Form1A_FC2L_033S55_SJ3019377.html; Workgroup: WG79538; Design ID: 3989]

SGS AXYS METHOD MLA-110 Rev 02

Form 2

CLIENT SAMPLE NO.

Lab Blank

Sample Collection:

N/A

PERFLUORINATED ORGANICS ANALYSIS REPORT

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.: 4066

Project No. N/A

Lab Sample I.D.: WG79538-101

Matrix: AQUEOUS

Sample Size: 0.0600 L

Sample Receipt Date: N/A

Initial Calibration Date: 22-Feb-2021

Extraction Date: 24-Jan-2022

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022 Time: 23:31:15

Column ID: C18

Extract Volume (uL): 4000

Sample Data Filename: FC2L_033 S: 55

Injection Volume (uL): 2

Blank Data Filename: FC2L_033 S: 55

Dilution Factor: N/A

Cal. Ver. Data Filename: FC2L_033 S: 50

Concentration Units: ng absolute

This page is part of a total report that contains information necessary for accreditation compliance.
Results are compliant with NELAP accreditation described in the total report. Sample results relate only to the sample tested.

LABELED COMPOUND	LAB FLAG ¹	SPIKE CONC.	CONC. FOUND	R(%) ²	RATIO	RRT
13C4-PFBA		40.0	37.9	94.8		1.000
13C5-PFPeA		20.0	17.0	85.2		0.865
13C5-PFHxA		10.0	9.90	99.0	22.1	1.001
13C4-PFHpA		10.0	9.99	99.9		0.893
13C8-PFOA		10.0	9.20	92.0		1.000
13C9-PFNA		5.00	4.41	88.2		0.999
13C6-PFDA		5.00	4.68	93.6		0.999
13C7-PFUnA		5.00	4.50	90.1		1.047
13C2-PFDoA		5.00	3.77	75.4		1.081
13C2-PFTeDA		5.00	2.98	59.7		1.163
13C3-PFBS		10.0	8.88	88.5	2.34	0.797
13C3-PFHxS		10.0	9.18	91.7	2.27	0.999
13C8-PFOS		10.1	9.97	99.1	2.12	1.000
13C2-4:2 FTS		20.2	21.0	104	1.96	0.836
13C2-6:2 FTS		20.0	19.7	98.7	2.25	1.001
13C2-8:2 FTS		20.0	16.0	79.9	3.40	1.268
13C8-PFOSA		10.0	9.35	93.5		1.162
D3-N-MeFOSA		10.0	5.69	56.9		1.343
D5-N-EtFOSA		10.0	5.44	54.4		1.379
D3-MeFOSAA		20.0	11.0	55.1		1.313
D5-EtFOSAA		20.0	11.7	58.5		1.340
d7-NMe-FOSE		100	81.0	81.0		1.326
d9-NEt-FOSE		100	52.3	52.3		1.363
13C3-HFPO-DA		40.0	30.9	77.1	2.42	1.031

(1) Where applicable, custom lab flags have been used on this report.

(2) R(%) = percent recovery.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 8A

PERFLUORINATED ORGANICS ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4066	Lab Sample I.D.:	WG79538-102
Matrix:	AQUEOUS	Initial Calibration Date:	22-Feb-2021
Extraction Date:	24-Jan-2022	Instrument ID:	LCMS/MS
Analysis Date:	24-Jan-2022 Time: 23:05:12	Column ID:	C18
Extract Volume (uL):	4000	OPR Data Filename:	FC2L_033 S: 53
Injection Volume (uL):	2	Blank Data Filename:	FC2L_033 S: 55
Dilution Factor:	N/A	Cal. Ver. Data Filename:	FC2L_033 S: 50

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 1 mL EXTRACT VOLUME.

COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
PFBA			20.0	19.3	96.3	1.005
PFPeA			10.0	10.4	104	1.000
PFHxA		4.86	5.00	4.48	89.5	1.000
PFHpA		2.16	5.00	4.75	94.9	1.000
PFOA		1.94	5.00	4.48	89.7	
PFNA		3.07	5.00	5.09	102	
PFDA		3.02	5.00	4.96	99.2	1.000
PFUnA		4.52	5.00	5.16	103	1.001
PFDoA		6.93	5.00	4.55	90.9	1.000
PFTTrDA		3.14	5.00	4.79	95.8	0.961
PFTeDA		2.69	5.00	5.06	101	1.000
PFBS		2.26	5.00	4.38	87.7	1.000
PFPeS		2.19	5.01	5.35	107	0.884
PFHxS		2.20	5.00	4.99	99.7	
PFHpS		2.04	5.01	4.75	94.8	0.924
PFOS		2.54	5.00	4.60	92.0	
PFNS		2.18	5.01	4.30	85.8	1.045
PFDS		2.11	5.00	4.07	81.4	1.079
PFDoS		2.36	5.01	3.51	70.1	1.170
4:2 FTS		0.47	20.0	21.3	107	1.000
6:2 FTS		0.43	18.0	17.2	95.2	1.000
8:2 FTS		0.57	20.0	22.5	113	1.000
PFOSA			5.00	4.84	96.8	
N-MeFOSA		0.54	5.75	5.74	99.9	
N-EtFOSA		0.54	12.5	11.7	93.9	
MeFOSAA		2.32	5.00	5.04	101	
EtFOSAA		1.20	5.00	4.88	97.6	
N-MeFOSE			50.0	36.0	72.0	
N-EtFOSE			37.5	40.4	108	
HFPO-DA		2.63	19.0	17.1	90.1	1.001
ADONA		1.08	20.1	22.9	114	1.099
9CI-PF3ONS		3.06	20.0	19.3	96.3	0.967
11CI-PF3OUdS		3.10	20.0	15.6	78.1	1.035
3:3 FTCA		1.83	20.0	19.3	96.3	0.835
5:3 FTCA		0.87	125	87.6	70.1	1.055

COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
7:3 FTCA		0.72	125	101	81.0	1.354
PFEESA		8.92	5.00	4.61	92.2	1.034
PFMPA			10.0	9.97	99.7	0.601
PFMBA			5.00	4.89	97.8	1.065
NFDHA	N	0.59	10.0	2.81	28.1	0.989

(1) Where applicable, custom lab flags have been used on this report; N = authentic recovery in the OPR is not within method/contract control limits.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

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SGS AXYS METHOD MLA-110 Rev 02

Form 8B

PERFLUORINATED ORGANICS ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4066	Lab Sample I.D.:	WG79538-102
Matrix:	AQUEOUS	Initial Calibration Date:	22-Feb-2021
Extraction Date:	24-Jan-2022	Instrument ID:	LCMS/MS
Analysis Date:	24-Jan-2022 Time: 23:05:12	Column ID:	C18
Extract Volume (uL):	4000	OPR Data Filename:	FC2L_033 S: 53
Injection Volume (uL):	2	Blank Data Filename:	FC2L_033 S: 55
Dilution Factor:	N/A	Cal. Ver. Data Filename:	FC2L_033 S: 50

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 1 mL EXTRACT VOLUME.

LABELLED COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
13C4-PFBA			40.0	38.7	96.7	1.000
13C5-PFPeA			20.0	16.3	81.4	0.865
13C5-PFHxA		21.3	10.0	9.86	98.6	1.000
13C4-PFHpA			10.0	9.98	99.8	0.893
13C8-PFOA			10.0	8.77	87.7	1.000
13C9-PFNA			5.00	4.22	84.3	1.001
13C6-PFDA			5.00	4.27	85.4	1.000
13C7-PFUnA			5.00	3.90	77.9	1.047
13C2-PFDoA			5.00	3.46	69.2	1.082
13C2-PFTeDA			5.00	2.81	56.3	1.164
13C3-PFBS		2.56	10.0	9.44	94.1	0.798
13C3-PFHxS		2.33	10.0	9.06	90.4	1.000
13C8-PFOS		2.21	10.1	9.44	93.8	1.000
13C2-4:2 FTS		1.78	20.2	21.0	104	0.836
13C2-6:2 FTS		2.07	20.0	19.0	95.2	1.001
13C2-8:2 FTS		3.38	20.0	15.3	76.3	1.268
13C8-PFOSA			10.0	9.50	95.0	1.162
D3-N-MeFOSA			10.0	6.30	63.0	1.343
D5-N-EtFOSA			10.0	5.87	58.7	1.378
D3-MeFOSAA			20.0	10.6	53.2	1.313
D5-EtFOSAA			20.0	10.8	54.2	1.340
d7-NMe-FOSE			100	75.3	75.3	1.326
d9-NEt-FOSE	V		100	48.3	48.3	1.363
13C3-HFPO-DA		2.67	40.0	33.8	84.5	1.030

(1) Where applicable, custom lab flags have been used on this report; V = surrogate recovery is not within method/contract control limits.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

SGS AXYS METHOD MLA-110 Rev 02

Form 8A

PERFLUORINATED ORGANICS ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4066	Lab Sample I.D.:	WG79538-103
Matrix:	AQUEOUS	Initial Calibration Date:	22-Feb-2021
Extraction Date:	24-Jan-2022	Instrument ID:	LCMS/MS
Analysis Date:	24-Jan-2022 Time: 22:52:07	Column ID:	C18
Extract Volume (uL):	4000	OPR Data Filename:	FC2L_033 S: 52
Injection Volume (uL):	2	Blank Data Filename:	FC2L_033 S: 55
Dilution Factor:	N/A	Cal. Ver. Data Filename:	FC2L_033 S: 50

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 1 mL EXTRACT VOLUME.

COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
PFBA			6.40	5.61	87.6	1.005
PFPeA			3.20	2.74	85.7	1.002
PFHxA		4.42	1.60	1.34	83.7	1.000
PFHpA		1.99	1.60	1.45	90.5	1.000
PFOA		2.00	1.60	1.37	85.6	
PFNA		2.73	1.60	1.42	88.8	
PFDA		3.28	1.60	1.38	86.2	1.000
PFUnA		5.10	1.60	1.48	92.4	1.000
PFDoA		8.49	1.60	1.33	83.1	1.000
PFTTrDA		2.99	1.60	1.26	79.0	0.960
PFTTeDA		2.42	1.60	1.23	76.8	1.000
PFBS		2.71	1.60	1.42	88.9	1.000
PFPeS		2.11	1.60	1.49	93.0	0.884
PFHxS		2.27	1.60	1.34	83.5	
PFHpS		2.07	1.60	1.45	90.6	0.924
PFOS		2.59	1.60	1.52	94.9	
PFNS		2.43	1.60	1.17	72.8	1.045
PFDS		2.24	1.60	1.08	67.6	1.080
PFDoS		2.01	1.60	0.903	56.4	1.170
4:2 FTS		0.42	6.40	5.13	80.1	1.000
6:2 FTS		0.41	5.77	4.65	80.7	1.000
8:2 FTS		0.56	6.40	6.50	102	1.000
PFOSA			1.60	1.40	87.2	
N-MeFOSA		0.57	1.84	1.57	85.5	
N-EtFOSA		0.54	4.00	3.31	82.7	
MeFOSAA		1.74	1.60	1.30	81.0	
EtFOSAA	R	1.71	1.60	1.47	91.8	
N-MeFOSE			16.0	9.98	62.4	
N-EtFOSE			12.0	10.9	90.5	
HFPO-DA		2.43	6.08	4.39	72.1	1.000
ADONA		0.99	6.42	6.43	100	1.099
9Cl-PF3ONS		3.35	6.41	5.52	86.1	0.967
11Cl-PF3OUdS		3.24	6.41	4.11	64.1	1.035
3:3 FTCA		1.66	6.40	5.33	83.3	0.839
5:3 FTCA		1.21	40.0	31.7	79.3	1.055

COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
7:3 FTCA		0.71	40.0	28.1	70.3	1.354
PFEESA		7.42	1.60	1.27	79.2	1.034
PFMPA			3.20	2.55	79.7	0.602
PFMBA			1.60	1.34	83.9	1.067
NFDHA	R	1.49	3.20	1.33	41.5	0.989

(1) Where applicable, custom lab flags have been used on this report; R = peak detected but did not meet quantification criteria, result reported represents the estimated maximum possible concentration.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

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SGS AXYS METHOD MLA-110 Rev 02

Form 8B

PERFLUORINATED ORGANICS ONGOING PRECISION AND RECOVERY (OPR)

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Contract No.:	4066	Lab Sample I.D.:	WG79538-103
Matrix:	AQUEOUS	Initial Calibration Date:	22-Feb-2021
Extraction Date:	24-Jan-2022	Instrument ID:	LCMS/MS
Analysis Date:	24-Jan-2022 Time: 22:52:07	Column ID:	C18
Extract Volume (uL):	4000	OPR Data Filename:	FC2L_033 S: 52
Injection Volume (uL):	2	Blank Data Filename:	FC2L_033 S: 55
Dilution Factor:	N/A	Cal. Ver. Data Filename:	FC2L_033 S: 50

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT, BASED ON A 1 mL EXTRACT VOLUME.

LABELLED COMPOUND	LAB FLAG ¹	RATIO	SPIKE CONC. (ng/mL)	CONC. FOUND (ng/mL)	% RECOVERY	RRT
13C4-PFBA			40.0	36.5	91.3	1.000
13C5-PFPeA			20.0	16.7	83.5	0.864
13C5-PFHxA		23.1	10.0	9.76	97.6	1.000
13C4-PFHpA			10.0	9.31	93.1	0.893
13C8-PFOA			10.0	8.67	86.7	1.000
13C9-PFNA			5.00	3.88	77.7	1.001
13C6-PFDA			5.00	4.11	82.2	0.999
13C7-PFUnA			5.00	3.76	75.1	1.047
13C2-PFDoA			5.00	3.26	65.1	1.081
13C2-PFTeDA			5.00	2.74	54.8	1.163
13C3-PFBS		2.70	10.0	9.73	97.0	0.798
13C3-PFHxS		2.44	10.0	9.05	90.3	1.000
13C8-PFOS		2.11	10.1	9.34	92.8	1.000
13C2-4:2 FTS		2.08	20.2	24.1	119	0.836
13C2-6:2 FTS		2.11	20.0	19.4	96.8	1.001
13C2-8:2 FTS		3.32	20.0	15.4	76.7	1.268
13C8-PFOSA			10.0	9.88	98.8	1.162
D3-N-MeFOSA			10.0	6.73	67.3	1.343
D5-N-EtFOSA			10.0	5.77	57.7	1.379
D3-MeFOSAA			20.0	11.2	56.1	1.313
D5-EtFOSAA			20.0	10.9	54.4	1.340
d7-NMe-FOSE			100	81.2	81.2	1.326
d9-NEt-FOSE			100	52.8	52.8	1.363
13C3-HFPO-DA		2.69	40.0	31.5	78.8	1.030

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

These pages are part of a larger report that may contain information necessary for full data evaluation. Results reported relate only to the sample tested.

SGS AXYS METHOD MLA-110 Rev 02

Form 3A

INITIAL CALIBRATION RELATIVE RESPONSES

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

Instrument ID: LC MS/MS

LC Column ID: C18

CS0 Data Filename: FC1L_080 S: 16

CS1 Data Filename: FC1L_080 S: 17

CS2 Data Filename: FC1L_080 S: 18

CS3 Data Filename: FC1L_080 S: 19

CS4 Data Filename: FC1L_080 S: 20

CS5 Data Filename: FC1L_080 S: 21

CS6 Data Filename: FC1L_080 S: 22

CS7 Data Filename: FC1L_080 S: 23

CS8 Data Filename: FC1L_080 S: 24

RELATIVE RESPONSE (RR)

COMPOUND	LAB FLAG ¹	RELATIVE RESPONSE (RR)								MEAN RR	CV (%RSD) ²	
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7			CS8
PFBA		1.06	1.05	1.05	1.00	1.01	0.98	0.99	0.96	0.94	1.00	4.20
PFPeA		1.37	1.29	1.24	1.19	1.21	1.17	1.20	1.15	1.12	1.21	6.24
PFHxA		1.16	1.28	1.12	1.05	1.03	0.97	1.04	0.97	0.94	1.06	10.2
PFHpA		1.19	1.14	1.09	1.14	1.10	1.11	1.08	1.05	0.96	1.10	5.97
PFOA		1.57	1.71	1.56	1.40	1.43	1.41	1.37	1.39	1.32	1.46	8.45
PFNA		0.99	1.13	1.10	1.01	0.99	1.02	1.06	0.97	0.99	1.03	5.34
PFDA		0.89	0.87	0.91	0.82	0.83	0.83	0.84	0.83	0.72	0.84	6.35
PFUnA		0.76	0.78	0.88	0.69	0.76	0.74	0.75	0.75		0.76	7.31
PFDaA		1.02	1.34	1.15	1.05	1.09	1.04	1.08	0.99	0.86	1.07	12.1
PFTrDA		0.97	0.93	0.92	0.86	0.83	0.81	0.82	0.61		0.84	13.1
PFTeDA		0.86	0.77	0.79	0.73	0.76	0.72	0.72	0.62		0.74	9.15
PFBS		1.24	1.18	1.13	1.14	1.21	1.14	1.16	1.11	1.10	1.16	4.01
PFPeS		0.96	1.07	1.12	1.04	1.03	1.02	1.01	0.88	0.77	0.99	10.8
PFHxS		1.26	1.23	1.21	1.20	1.14	1.15	1.15	1.08	1.14	1.17	4.74
PFHpS		1.11	1.07	1.14	1.10	1.09	1.12	1.05	1.05	1.10	1.09	2.81
PFOS		1.25	1.39	1.30	1.17	1.28	1.24	1.20	1.16	1.26	1.25	5.50
PFNS		1.31	1.22	1.18	1.17	1.25	1.18	1.18	1.10	1.10	1.19	5.56
PFDS		1.10	1.23	1.17	1.14	1.16	1.16	1.12	1.04	1.08	1.13	5.03
PFDoS		0.95	0.93	0.96	0.88	0.93	0.93	0.90	0.91	1.00	0.93	3.65
4:2 FTS		0.43	0.50	0.50	0.51	0.52	0.47	0.45	0.42		0.48	8.19
6:2 FTS		0.63	0.54	0.58	0.50	0.52	0.49	0.47	0.40		0.52	13.6
8:2 FTS		0.30	0.27	0.26	0.27	0.25	0.28	0.27	0.23		0.27	7.98
PFOSA		1.04	1.05	1.02	0.99	0.98	0.99	0.97	0.94		1.00	3.72
N-MeFOSA		1.09	1.26	1.14	1.11	1.12	1.09	1.10	0.98		1.11	6.86
N-EtFOSA		1.20	1.27	1.24	1.19	1.18	1.19	1.23	1.15	1.16	1.20	3.34
MeFOSAA		0.86	0.81	0.86	0.84	0.91	0.89	0.86	0.81	0.81	0.85	4.20
EtFOSAA		0.78	0.63	0.92	0.72	0.73	0.74	0.78	0.68		0.75	11.3
N-MeFOSE		1.14	1.16	1.16	1.11	1.12	1.10	1.09	1.03	0.98	1.10	5.47
N-EtFOSE		1.25	1.25	1.27	1.21	1.21	1.18	1.20	1.10	1.04	1.19	6.47
HFPO-DA		1.16	1.24	1.13	1.10	1.08	1.02	1.05	0.96		1.09	7.93
ADONA		7.27	7.33	6.94	6.75	7.00	6.76	7.15	6.93		7.02	3.07
9CI-PF3ONS		2.07	2.11	2.07	2.00	1.93	1.86	1.98	1.90		1.99	4.46
11CI-PF3OUdS		1.05	1.11	1.06	1.04	1.02	1.06	1.12	1.14		1.07	3.83
3:3 FTCA		0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.10		0.08	9.63
5:3 FTCA		0.19	0.18	0.17	0.17	0.16	0.16	0.17	0.17		0.17	6.49
7:3 FTCA		0.10	0.10	0.10	0.10	0.10	0.09	0.10	0.11		0.10	4.46
PFEESA		3.72	3.25	3.11	3.23	3.09	2.95	3.20	2.99	2.87	3.16	7.86
PFMPA		1.78	1.77	1.75	1.69	1.72	1.72	1.78	1.94	2.27	1.82	10.1

RELATIVE RESPONSE (RR)

COMPOUND	LAB FLAG ¹	RELATIVE RESPONSE (RR)									MEAN RR	CV (%RSD) ²
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8		
PFMBA		2.48	2.43	2.35	2.30	2.32	2.33	2.26	2.60	2.81	2.43	7.22
NFDHA		0.05	0.04	0.04	0.04	0.05	0.05	0.04			0.04	17.6

(1) Where applicable, custom lab flags have been used on this report.

(2) For contract CV specifications, see SGS AXYS METHOD MLA-110 Rev 02

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Henry Huang _____

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SGS AXYS METHOD MLA-110 Rev 02

Form 3B
INITIAL CALIBRATION RELATIVE RESPONSES

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

Instrument ID: LC MS/MS

LC Column ID: C18

CS0 Data Filename: FC1L_080 S: 16

CS1 Data Filename: FC1L_080 S: 17

CS2 Data Filename: FC1L_080 S: 18

CS3 Data Filename: FC1L_080 S: 19

CS4 Data Filename: FC1L_080 S: 20

CS5 Data Filename: FC1L_080 S: 21

CS6 Data Filename: FC1L_080 S: 22

CS7 Data Filename: FC1L_080 S: 23

CS8 Data Filename: FC1L_080 S: 24

RELATIVE RESPONSE (RR)

LABELED COMPOUND	LAB FLAG ¹	RELATIVE RESPONSE (RR)								MEAN RR	CV (%RSD) ²	
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7			CS8
13C4-PFBA		1.17	1.16	1.14	1.16	1.13	1.13	1.13	1.13	1.11	1.14	1.73
13C5-PFPeA		0.83	0.85	0.85	0.88	0.87	0.84	0.81	0.79	0.69	0.82	7.00
13C5-PFHxA		0.67	0.69	0.72	0.70	0.74	0.73	0.68	0.70	0.66	0.70	3.78
13C4-PFHpA		3.63	3.49	3.60	3.42	3.44	3.25	3.33	2.97	2.73	3.32	8.93
13C8-PFOA		3.82	3.60	3.79	3.80	3.79	3.66	3.71	3.61	3.76	3.73	2.31
13C9-PFNA		1.16	1.15	1.14	1.17	1.16	1.13	1.10	1.17	1.15	1.15	2.03
13C6-PFDA		1.13	1.06	0.97	1.06	0.99	0.99	0.92	1.02	0.90	1.01	7.22
13C7-PFUnA		1.23	1.22	1.07	1.22	1.08	1.08	0.99	0.84		1.09	12.2
13C2-PFDoA		1.04	0.95	0.90	0.92	0.94	0.93	0.89	0.98	0.91	0.94	5.00
13C2-PFTeDA		0.86	0.85	0.81	0.83	0.80	0.77	0.74	0.94	1.11	0.86	13.0
13C3-PFBS		1.33	1.36	1.31	1.41	1.25	1.29	1.31	1.00	0.99	1.25	12.1
13C3-PFHxS		1.20	1.16	1.10	1.15	1.12	1.15	1.17	1.16	1.05	1.14	3.86
13C8-PFOS		0.96	0.91	0.93	0.94	0.92	0.87	0.93	0.94	0.90	0.92	3.08
13C2-4:2 FTS		1.25	1.08	1.11	1.04	1.05	1.03	1.06	1.14	1.47	1.14	12.5
13C2-6:2 FTS		0.98	0.88	0.86	0.84	0.90	0.84	0.91	1.06		0.91	8.52
13C2-8:2 FTS		1.50	1.37	1.48	1.38	1.53	1.32	1.40	1.52		1.44	5.42
13C8-PFOA		1.84	1.83	1.86	1.78	1.80	1.74	1.82	2.08		1.84	5.54
D3-N-MeFOA		0.29	0.28	0.28	0.27	0.28	0.27	0.27	0.32		0.28	6.63
D5-N-EtFOA		0.28	0.28	0.28	0.27	0.28	0.26	0.27	0.30	0.33	0.28	6.96
D3-MeFOA		0.96	0.84	0.87	0.86	0.91	0.83	0.97	1.12	1.21	0.95	13.9
D5-EtFOA		0.82	0.76	0.72	0.74	0.77	0.70	0.77	1.00		0.78	12.0
d7-NMe-FOSE		1.93	1.87	1.80	1.81	1.86	1.76	1.81	1.95	2.09	1.88	5.39
d9-NEt-FOSE		2.46	2.39	2.35	2.36	2.44	2.27	2.30	2.52	2.79	2.43	6.37
13C3-HFPO-DA		0.33	0.33	0.34	0.34	0.36	0.33	0.31	0.27		0.33	8.42

(1) Where applicable, custom lab flags have been used on this report.

(2) For contract CV specifications, see SGS AXYS METHOD MLA-110 Rev 02.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Henry Huang _____

Form 3C
LC MS/MS INITIAL CALIBRATION RATIOS

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

Instrument ID: LC MS/MS

LC Column ID: C18

CS0 Data Filename: FC1L_080 S: 16

CS1 Data Filename: FC1L_080 S: 17

CS2 Data Filename: FC1L_080 S: 18

CS3 Data Filename: FC1L_080 S: 19

CS4 Data Filename: FC1L_080 S: 20

CS5 Data Filename: FC1L_080 S: 21

CS6 Data Filename: FC1L_080 S: 22

CS7 Data Filename: FC1L_080 S: 23

CS8 Data Filename: FC1L_080 S: 24

COMPOUND	LAB FLAG ¹	RATIOS								
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8
PFBA										
PFPeA										
PFHxA		4.58	5.38	6.09	4.84	4.81	4.94	4.81	4.64	4.80
PFHpA		2.19	2.08	2.00	2.16	2.04	1.97	2.06	2.06	2.02
PFOA		1.85	2.15	2.04	1.95	2.03	2.00	1.96	2.06	2.02
PFNA		2.97	2.96	2.87	2.85	2.95	2.94	2.87	2.87	2.86
PFDA		3.23	3.02	3.02	3.06	3.07	3.16	2.96	3.21	3.03
PFUnA		4.29	4.50	4.89	4.31	4.74	4.28	4.73	4.49	
PFDoA		5.72	8.83	6.70	7.41	7.85	7.83	7.95	7.48	7.67
PFTrDA		3.32	3.58	2.95	3.08	3.04	3.14	3.22	3.02	
PFTeDA		2.75	2.65	2.75	2.82	2.80	2.68	2.71	2.70	
PFBS		2.27	2.65	2.32	2.59	2.71	2.59	2.67	2.60	2.59
PFPeS		1.83	2.06	2.39	2.25	2.35	2.31	2.27	2.26	2.33
PFHxS		2.64	2.36	2.44	2.39	2.28	2.34	2.44	2.32	2.38
PFHpS		2.08	1.90	2.00	2.12	2.08	2.20	2.08	2.10	2.08
PFOS		2.29	2.51	2.55	2.58	2.67	2.70	2.60	2.59	2.66
PFNS		2.07	2.08	2.27	2.36	2.41	2.26	2.32	2.18	2.30
PFDS		2.08	2.80	2.21	2.35	2.38	2.17	2.36	2.18	2.30
PFDoS		2.31	2.11	2.33	2.23	2.18	2.26	2.25	2.27	2.28
4:2 FTS		0.38	0.41	0.44	0.43	0.45	0.46	0.43	0.45	
6:2 FTS		0.51	0.43	0.47	0.44	0.43	0.47	0.45	0.44	
8:2 FTS		0.58	0.48	0.55	0.57	0.53	0.57	0.54	0.54	
PFOSA										
N-MeFOSA		0.52	0.55	0.50	0.54	0.53	0.53	0.53	0.53	
N-EtFOSA		0.52	0.56	0.54	0.53	0.53	0.53	0.53	0.53	0.54
MeFOSAA		1.88	2.07	2.11	1.85	1.98	2.02	1.98	1.94	1.94
EtFOSAA		1.85	1.56	1.58	1.09	1.16	1.10	1.15	1.10	
N-MeFOSE										
N-EtFOSE										
HFPO-DA		2.58	3.07	2.82	2.87	2.67	2.50	2.63	2.75	
ADONA		1.15	1.12	1.08	1.08	1.20	1.11	1.13	1.06	
9CI-PF3ONS		3.24	3.13	3.02	3.20	3.02	3.04	3.13	3.07	
11CI-PF3OUdS		2.63	3.01	3.14	3.13	3.06	3.19	3.14	3.05	
3:3 FTCA		1.69	1.51	1.64	1.78	1.89	1.91	1.92	1.96	
5:3 FTCA		0.85	1.08	1.14	1.21	1.22	1.24	1.26	1.31	

COMPOUND	LAB FLAG ¹	RATIOS								
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8
7:3 FTCA		0.69	0.69	0.70	0.71	0.69	0.68	0.71	0.68	
PFEEA		8.11	7.52	8.32	9.28	8.69	8.99	9.71	9.18	9.28
PFMPA										
PFMBA										
NFDHA		0.83	1.08	1.12	0.95	1.69	1.32	1.19		

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Henry Huang _____

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SGS AXYS METHOD MLA-110 Rev 02

Form 3D
LC MS/MS INITIAL CALIBRATION RATIOS

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

Instrument ID: LC MS/MS

LC Column ID: C18

CS0 Data Filename: FC1L_080 S: 16

CS1 Data Filename: FC1L_080 S: 17

CS2 Data Filename: FC1L_080 S: 18

CS3 Data Filename: FC1L_080 S: 19

CS4 Data Filename: FC1L_080 S: 20

CS5 Data Filename: FC1L_080 S: 21

CS6 Data Filename: FC1L_080 S: 22

CS7 Data Filename: FC1L_080 S: 23

CS8 Data Filename: FC1L_080 S: 24

LABELED COMPOUND	LAB FLAG ¹	RATIOS								
		CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8
13C4-PFBA										
13C5-PFPeA										
13C5-PFHxA		24.2	23.3	27.8	23.3	25.6	26.9	25.6	24.5	26.7
13C4-PFHpA										
13C8-PFOA										
13C9-PFNA										
13C6-PFDA										
13C7-PFUnA										
13C2-PFDoA										
13C2-PFTeDA										
13C3-PFBS		2.57	2.71	2.73	2.73	2.72	2.72	2.79	2.69	2.85
13C3-PFHxS		2.40	2.29	2.34	2.38	2.29	2.40	2.49	2.36	2.28
13C8-PFOS		2.08	2.05	2.09	2.33	2.09	2.15	2.22	2.37	2.14
13C2-4:2 FTS		1.84	1.90	1.74	1.62	1.51	1.55	1.25	0.54	0.24
13C2-6:2 FTS		1.93	2.03	1.87	1.87	1.80	1.74	1.44	0.71	
13C2-8:2 FTS		3.89	3.55	3.84	3.75	3.20	3.03	2.50	1.10	
13C8-PFOA										
D3-N-MeFOSA										
D5-N-EtFOSA										
D3-MeFOSAA										
D5-EtFOSAA										
d7-NMe-FOSE										
d9-NEt-FOSE										
13C3-HFPO-DA		2.67	2.74	2.54	2.64	2.57	2.89	2.76	2.91	

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Henry Huang _____

SGS AXYS METHOD MLA-110 Rev 02

Form 4A

LC MS/MS CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

VER Data Filename: FC2L_033 S: 50

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022

LC Column ID: C18

Analysis Time: 22:25:57

COMPOUND	LAB FLAG ¹	RRT	QUANT TRANSITION	RATIO	EXPECTED CONC. (ng)	CONC. FOUND (ng)	RECOVERY (%)
PFBA		1.005	213 > 169		20.0	20.0	100
PFPeA		0.999	263 > 219		10.0	10.5	105
PFHxA		1.000	313 > 269	5.44	5.00	4.72	94.4
PFHpA		1.000	363 > 319	2.32	5.00	5.33	107
PFOA		1.000	413 > 369	2.02	5.00	4.68	93.7
PFNA		1.000	463 > 419	2.91	5.00	4.88	97.6
PFDA		1.001	513 > 469	2.85	5.00	4.95	99.0
PFUnA		1.000	563 > 519	4.46	5.00	5.10	102
PFDoA		0.999	613 > 569	6.71	5.00	4.93	98.6
PFTTrDA		0.960	663 > 619	3.17	5.00	5.18	104
PFTTeDA		1.000	713 > 669	2.47	5.00	5.06	101
PFBS		1.000	299 > 80	2.85	5.00	4.60	92.0
PFPeS		0.882	349 > 80	2.49	5.01	5.84	116
PFHxS		1.000	399 > 80	2.42	5.00	4.95	99.0
PFHpS		0.924	449 > 80	2.10	5.01	4.80	95.8
PFOS		1.000	499 > 80	2.63	5.00	4.77	95.3
PFNS		1.045	549 > 80	2.24	5.01	4.79	95.6
PFDS		1.080	599 > 80	2.16	5.00	4.74	94.7
PFDoS		1.170	699 > 80	2.18	5.01	4.49	89.6
4:2 FTS		1.000	327 > 307	0.44	20.0	21.1	105
6:2 FTS		0.999	427 > 407	0.43	18.0	18.5	103
8:2 FTS		1.000	527 > 507	0.53	20.0	21.1	106
PFOSA		1.000	498 > 78		5.00	5.14	103
N-MeFOSA		1.000	512 > 219	0.55	5.75	5.82	101
N-EtFOSA		1.001	526 > 219	0.52	12.5	12.8	103
MeFOSAA		1.001	570 > 419	1.96	5.00	4.62	92.5
EtFOSAA		1.000	584 > 419	1.20	5.00	4.59	91.8
N-MeFOSE		1.002	616 > 59		50.0	54.9	110
N-EtFOSE		1.002	630 > 59		37.5	46.9	125
HFPO-DA		1.000	285 > 169	3.30	19.0	18.9	99.5
ADONA		1.097	377 > 251	1.02	20.0	22.7	113
9CI-PF3ONS		0.966	531 > 351	3.10	20.0	22.8	114
11CI-PF3OUdS		1.035	631 > 451	3.09	20.0	20.8	104
3:3 FTCA		0.839	241 > 177	2.00	20.0	16.1	80.5
5:3 FTCA		1.053	341 > 237	1.18	125	93.9	75.1
7:3 FTCA		1.353	441 > 317	0.70	125	88.6	70.9
PFEESA		1.034	315 > 135	8.79	5.00	4.57	91.5
PFMPA		0.607	229 > 85		10.0	9.93	99.3
PFMBA		1.063	279 > 85		5.00	5.75	115
NFDHA		0.987	295 > 201	0.84	10.0	4.01	40.1

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

SGS AXYS METHOD MLA-110 Rev 02

Form 4B

LC MS/MS CALIBRATION VERIFICATION

SGS AXYS ANALYTICAL SERVICES

2045 MILLS RD., SIDNEY, B.C., CANADA
V8L 5X2 TEL (250) 655-5800 FAX (250) 655-5811

Initial Calibration Date: 22-Feb-2021

VER Data Filename: FC2L_033 S: 50

Instrument ID: LCMS/MS

Analysis Date: 24-Jan-2022

LC Column ID: C18

Analysis Time: 22:25:57

LABELED COMPOUND	LAB FLAG ¹	RRT	QUANT TRANSITION	RATIO	EXPECTED CONC. (ng)	CONC. FOUND (ng)	RECOVERY (%)
13C4-PFBA		0.995	217 > 172		40.0	40.9	102
13C5-PFPeA		0.866	268 > 223		20.0	18.5	92.5
13C5-PFHxA		1.000	318 > 273	21.8	10.0	11.4	114
13C4-PFHpA		0.893	367 > 322		10.0	9.81	98.1
13C8-PFOA		1.000	421 > 376		10.0	9.50	95.0
13C9-PFNA		1.001	472 > 427		5.00	4.85	97.1
13C6-PFDA		0.999	519 > 474		5.00	5.09	102
13C7-PFUnA		1.047	570 > 525		5.00	5.24	105
13C2-PFDoA		1.082	615 > 570		5.00	5.01	100
13C2-PFTeDA		1.163	715 > 670		5.00	4.32	86.3
13C3-PFBS		0.797	302 > 80	2.64	10.0	10.6	105
13C3-PFHxS		1.000	402 > 80	2.35	10.0	10.1	101
13C8-PFOS		1.000	507 > 80	2.10	10.1	11.1	110
13C2-4:2 FTS		0.836	329 > 81	1.78	20.2	21.8	108
13C2-6:2 FTS		1.003	429 > 81	1.96	20.0	21.1	105
13C2-8:2 FTS		1.268	529 > 81	3.09	20.0	19.5	97.1
13C8-PFOSA		1.163	506 > 78		10.0	11.2	112
D3-N-MeFOSA		1.343	515 > 219		10.0	8.75	87.5
D5-N-EtFOSA		1.378	531 > 219		10.0	8.01	80.1
D3-MeFOSAA		1.313	573 > 419		20.0	14.1	70.6
D5-EtFOSAA		1.340	589 > 419		20.0	16.0	79.9
d7-NMe-FOSE		1.326	623 > 59		100	82.1	82.1
d9-NEt-FOSE		1.363	639 > 59		100	70.4	70.4
13C3-HFPO-DA		1.030	287 > 169	2.67	40.0	37.0	92.5

(1) Where applicable, custom lab flags have been used on this report.

These data are validated and reported as accurate and in accord with SGS AXYS Analytical Services Ltd. ISO17025 compliant quality assurance processes.

Signed: _____ Andrew Porat _____

Accreditation Scope
 SGS AXYS Analytical Services Ltd.
 file ref.: ACC-103 Rev. 60

Compound Class	Compound	Accredited Method ID	SGS AXYS Method ID	Serum										Tissue and Tissue Flora						Water, Non-Potable															
				CALA	Alaska DEC	ANAB DoD **	ANAB ISO 17025	CALA	California WB	Florida DOH	Maine DOH	Minnesota DOH	New Jersey DEP	New York DOH	Virginia DGS	Washington DE	ANAB DoD **	ANAB ISO 17025	CALA	Florida DOH	Minnesota DOH	New Jersey DEP	Virginia DGS	CALA	CALA	Alaska DEC	ANAB DoD **	ANAB ISO 17025	California WB	Florida DOH	Maine DOH	Minnesota DOH	New Jersey DEP	New York DOH	Pennsylvania DEP
Endrin aldehyde	SGS AXYS MLA-228	MLA-228				Y		Y					Y	Y			Y	Y			Y						Y	Y	Y			Y	Y		
	EPA 608	MLA-007																								Y	Y	Y			Y	Y			
	EPA 8081	MLA-007					Y	Y				Y	Y	Y																					
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y							Y												Y	
	SGS AXYS MLA-007	MLA-007				Y	Y															Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
	Endrin ketone	EPA 8081	MLA-007				Y	Y						Y	Y																				
		EPA 1699	MLA-028					Y											Y																
		SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y						Y												Y	
		SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y
		SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y	
	Gamma-HCH (Lindane)	EPA 625	MLA-007																								Y	Y	Y			Y	Y		
		EPA 8270	MLA-007					Y	Y	Y				Y	Y	Y																			
		EPA 1699	MLA-028						Y										Y																
		SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y							Y											Y	
		SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y
		SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y	
	Heptachlor	EPA 625	MLA-007																								Y	Y	Y			Y	Y		
		EPA 8270	MLA-007					Y	Y	Y				Y	Y	Y																			
EPA 1699		MLA-028						Y										Y																	
SGS AXYS MLA-028		MLA-028	Y			Y	Y							Y	Y							Y											Y		
SGS AXYS MLA-007		MLA-007				Y	Y											Y				Y												Y	
SGS AXYS MLA-228		MLA-228				Y	Y						Y	Y								Y										Y	Y		
Heptachlor epoxide	EPA 608	MLA-007																								Y	Y	Y			Y	Y			
	EPA 8081	MLA-007					Y	Y	Y				Y	Y	Y																				
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y							Y											Y		
	SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
Hexachlorobenzene	EPA 1625	MLA-007																								Y	Y				Y				
	EPA 8270	MLA-007					Y	Y					Y	Y	Y																				
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y				Y							Y	Y							Y											Y		
	SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
Methoxychlor	EPA 608	MLA-007																																	
	EPA 8081	MLA-007					Y	Y	Y				Y	Y	Y																				
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y							Y											Y		
	SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
Mirex	EPA 8270	MLA-007						Y					Y	Y												Y	Y				Y	Y			
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y						Y												Y		
	SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
Oxychlordane	EPA 8270	MLA-007						Y																											
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y						Y												Y		
	SGS AXYS MLA-007	MLA-007				Y	Y											Y				Y												Y	
	SGS AXYS MLA-228	MLA-228				Y	Y						Y	Y								Y										Y	Y		
Toxaphene	EPA 8270	MLA-007																																	
	SGS AXYS MLA-007	MLA-007				Y												Y				Y													
trans-Chlordane (gamma-Chlordane)	EPA 8270	MLA-007						Y	Y				Y	Y												Y	Y				Y				
	EPA 1699	MLA-028						Y										Y																	
	SGS AXYS MLA-028	MLA-028	Y			Y	Y							Y	Y						Y												Y		
	SGS AXYS MLA-007	MLA-007				Y	Y			</																									

