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NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Level 4 Laboratory Report, Electronic Data Deliverable, Data Validation Report, and the Sample Location Report, SDG 1801024

Marine Corps Air Station Yuma
Yuma, Arizona

November 2019

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

June 08, 2018

Vista Work Order No. 1801024

Ms. Sabina Sudoko
Tetra Tech EC, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614

Dear Ms. Sudoko,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on May 23, 2018. This sample set was analyzed on a rush turn-around time, under your Project Name '4663.3803'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1801024
Case Narrative

Sample Condition on Receipt:

Six water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

PFAS Isotope Dilution Method

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537).

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 of the LOQ concentrations. The recovery of PFTrDA was > 130% in the LCS and within the acceptance criteria in the LCSD. This analyte was not detected in the samples. The recoveries of all other analytes were within the acceptance criteria.

The extracts of samples "A1-MW-51-SA1", "A1-MW-50-SA1" and "A1-MW-04-SA1" were re-injected because one or more Injection Internal Standard Analyte response areas were outside of criteria. The results were similar in the second injection of "A1-MW-51-SA1" and the results from the original injection have been reported. The area criteria passed for the other second injections and the results from the re-injections have been reported.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1801024-01	A1-MW-51-SA1	PFAS Isotope Dilution Method	13C3-PFBS	H	247
1801024-01	A1-MW-51-SA1	PFAS Isotope Dilution Method	d5-EtFOSAA	H	151
B8E0250-BLK1	B8E0250-BLK1	PFAS Isotope Dilution Method	13C2-PFUnA	H	47.6

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1801024-01	A1-MW-51-SA1	22-May-18 10:14	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801024-02	A1-MW-50-SA1	22-May-18 11:30	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801024-03	A1-MW-49-SA1	22-May-18 12:20	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801024-04	A1-MW-05-SA1	22-May-18 13:19	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801024-05	A1-MW-04-SA1	22-May-18 14:06	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL
1801024-06	FRB-20180522	22-May-18 14:45	23-May-18 10:15	HDPE Bottle, 125 mL
				HDPE Bottle, 125 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Matrix: Aqueous

Laboratory Data

Lab Sample: B8E0250-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00179	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFHxA	307-24-4	ND	0.00218	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFHpA	375-85-9	ND	0.000591	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFHxS	355-46-4	ND	0.000947	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFOA	335-67-1	ND	0.000651	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFOS	1763-23-1	ND	0.000807	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFNA	375-95-1	ND	0.000810	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFDA	335-76-2	ND	0.00149	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
MeFOSAA	2355-31-9	ND	0.00165	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFUnA	2058-94-8	ND	0.00105	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
EtFOSAA	2991-50-6	ND	0.00137	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFDoA	307-55-1	ND	0.000792	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFTrDA	72629-94-8	ND	0.000494	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
PFTeDA	376-06-7	ND	0.000755	0.00500	0.00800	U	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	107	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFHxA	IS	96.3	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C4-PFHpA	IS	81.1	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
18O2-PFHxS	IS	94.0	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFOA	IS	76.9	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C8-PFOS	IS	79.5	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C5-PFNA	IS	75.0	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFDA	IS	65.1	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
d3-MeFOSAA	IS	52.5	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFUnA	IS	47.6	50 - 150	H	B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
d5-EtFOSAA	IS	58.0	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFDoA	IS	60.1	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1
13C2-PFTeDA	IS	61.1	50 - 150		B8E0250	31-May-18	0.125 L	04-Jun-18 23:01	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: LCSD **PFAS Isotope Dilution Method**

Name:	Tetra Tech EC, Inc.	Lab Sample:	B8E0250-BS1/B8E0250-BSD1
Project:	4663.3803	QC Batch:	B8E0250
Matrix:	Aqueous	Samp Size:	0.125/0.125 L
		Date Extracted:	31-May-18
		Column:	BEH C18

Analyte	CAS Number	LCS (ug/L)	LCS Spike Amt	LCS % Rec	LCS Quals	LCSD (ug/L)	LCSD Spike Amt	LCSD % Rec	RPD	LCSD Quals	%Rec Limits	RPD Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
PFBS	375-73-5	0.0826	0.0800	103		0.0916	0.0800	114	10.3		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFHxA	307-24-4	0.0786	0.0800	98.3		0.0879	0.0800	110	11.1		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFHpA	375-85-9	0.0949	0.0800	119		0.0898	0.0800	112	5.46		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFHxS	355-46-4	0.0925	0.0800	116		0.0819	0.0800	102	12.1		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFOA	335-67-1	0.0863	0.0800	108		0.0940	0.0800	118	8.58		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFOS	1763-23-1	0.0884	0.0800	110		0.0815	0.0800	102	8.05		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFNA	375-95-1	0.0924	0.0800	115		0.0798	0.0800	99.8	14.5		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFDA	335-76-2	0.0914	0.0800	114		0.101	0.0800	126	9.90		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
MeFOSAA	2355-31-9	0.0836	0.0800	104		0.0830	0.0800	104	0.705		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFUnA	2058-94-8	0.0842	0.0800	105		0.0929	0.0800	116	9.78		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
EtFOSAA	2991-50-6	0.0782	0.0800	97.7		0.0794	0.0800	99.2	1.48		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFDoA	307-55-1	0.0984	0.0800	123		0.0820	0.0800	102	18.1		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFTrDA	72629-94-8	0.111	0.0800	138	H	0.0923	0.0800	115	18.0		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1
PFTeDA	376-06-7	0.0867	0.0800	108		0.0927	0.0800	116	6.70		70-130	30	04-Jun-18 22:41	1	04-Jun-18 22:51	1

Labeled Standards	Type	LCS % Rec	LCS Quals	LCSD % Rec	LCSD Quals	Limits	LCS Analyzed	LCS Dil	LCSD Analyzed	LCSD Dil
13C3-PFBS	IS	105		105		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFHxA	IS	92.8		91.1		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C4-PFHpA	IS	90.5		88.2		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
18O2-PFHxS	IS	85.0		95.1		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFOA	IS	92.2		73.2		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C8-PFOS	IS	87.9		87.4		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C5-PFNA	IS	79.7		85.2		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFDA	IS	73.0		71.7		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
d3-MeFOSAA	IS	73.3		81.4		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFUnA	IS	67.6		73.2		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
d5-EtFOSAA	IS	76.9		87.9		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFDoA	IS	74.9		78.0		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1
13C2-PFTeDA	IS	79.4		93.6		50-150	04-Jun-18 22:41	1	04-Jun-18 22:51	1

Sample ID: A1-MW-51-SA1

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 10:14

Laboratory Data

Lab Sample: 1801024-01
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0613	0.00187	0.00521	0.00836		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFHxA	307-24-4	0.142	0.00228	0.00521	0.00836		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFHpA	375-85-9	0.0156	0.000618	0.00521	0.00836		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFHxS	355-46-4	0.0918	0.000990	0.00521	0.00836		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFOA	335-67-1	0.0148	0.000680	0.00521	0.00836		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFOS	1763-23-1	0.00303	0.000843	0.00521	0.00836	J	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFNA	375-95-1	ND	0.000847	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFDA	335-76-2	ND	0.00156	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
MeFOSAA	2355-31-9	ND	0.00172	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFUnA	2058-94-8	ND	0.00110	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
EtFOSAA	2991-50-6	ND	0.00143	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFDoA	307-55-1	ND	0.000828	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFTrDA	72629-94-8	ND	0.000516	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
PFTeDA	376-06-7	ND	0.000789	0.00521	0.00836	U	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	247	50 - 150	H	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFHxA	IS	95.7	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C4-PFHpA	IS	90.6	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
18O2-PFHxS	IS	98.3	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFOA	IS	81.9	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C8-PFOS	IS	88.2	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C5-PFNA	IS	71.3	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFDA	IS	87.2	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
d3-MeFOSAA	IS	147	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFUnA	IS	84.5	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
d5-EtFOSAA	IS	151	50 - 150	H	B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFDoA	IS	83.4	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1
13C2-PFTeDA	IS	97.4	50 - 150		B8E0250	31-May-18	0.120 L	04-Jun-18 23:33	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-50-SA1

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 11:30

Laboratory Data

Lab Sample: 1801024-02
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00185	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFHxA	307-24-4	ND	0.00226	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFHpA	375-85-9	ND	0.000611	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFHxS	355-46-4	ND	0.000980	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFOA	335-67-1	ND	0.000674	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFOS	1763-23-1	ND	0.000835	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFNA	375-95-1	ND	0.000838	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFDA	335-76-2	ND	0.00154	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
MeFOSAA	2355-31-9	ND	0.00171	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFUnA	2058-94-8	ND	0.00109	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
EtFOSAA	2991-50-6	ND	0.00142	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFDoA	307-55-1	ND	0.000819	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFTrDA	72629-94-8	ND	0.000511	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
PFTeDA	376-06-7	ND	0.000781	0.00517	0.00828	U	B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	106	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFHxA	IS	86.1	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C4-PFHpA	IS	92.4	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
18O2-PFHxS	IS	85.4	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFOA	IS	81.5	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C8-PFOS	IS	80.4	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C5-PFNA	IS	77.8	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFDA	IS	66.6	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
d3-MeFOSAA	IS	72.5	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFUnA	IS	69.1	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
d5-EtFOSAA	IS	82.0	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFDoA	IS	66.5	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1
13C2-PFTeDA	IS	85.5	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 22:23	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-49-SA1

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 12:20

Laboratory Data

Lab Sample: 1801024-03
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.00627	0.00182	0.00508	0.00812	J	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFHxA	307-24-4	ND	0.00221	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFHpA	375-85-9	ND	0.000600	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFHxS	355-46-4	0.0277	0.000961	0.00508	0.00812		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFOA	335-67-1	ND	0.000661	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFOS	1763-23-1	ND	0.000819	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFNA	375-95-1	ND	0.000822	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFDA	335-76-2	ND	0.00151	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
MeFOSAA	2355-31-9	ND	0.00167	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFUnA	2058-94-8	ND	0.00107	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
EtFOSAA	2991-50-6	ND	0.00139	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFDoA	307-55-1	ND	0.000804	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFTrDA	72629-94-8	ND	0.000501	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
PFTeDA	376-06-7	ND	0.000766	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	113	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFHxA	IS	96.3	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C4-PFHpA	IS	91.2	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
18O2-PFHxS	IS	94.5	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFOA	IS	89.4	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C8-PFOS	IS	93.7	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C5-PFNA	IS	76.8	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFDA	IS	74.3	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
d3-MeFOSAA	IS	81.5	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFUnA	IS	73.6	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
d5-EtFOSAA	IS	88.8	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFDoA	IS	68.8	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1
13C2-PFTeDA	IS	65.7	50 - 150		B8E0250	31-May-18	0.123 L	04-Jun-18 23:54	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-05-SA1

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 13:19

Laboratory Data

Lab Sample: 1801024-04
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0284	0.00188	0.00525	0.00842		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFHxA	307-24-4	0.0866	0.00229	0.00525	0.00842		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFHpA	375-85-9	0.000917	0.000622	0.00525	0.00842	J	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFHxS	355-46-4	0.00278	0.000997	0.00525	0.00842	J	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFOA	335-67-1	ND	0.000685	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFOS	1763-23-1	ND	0.000849	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFNA	375-95-1	ND	0.000853	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFDA	335-76-2	ND	0.00157	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
MeFOSAA	2355-31-9	ND	0.00174	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFUnA	2058-94-8	ND	0.00111	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
EtFOSAA	2991-50-6	ND	0.00144	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFDoA	307-55-1	ND	0.000834	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFTrDA	72629-94-8	ND	0.000520	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
PFTeDA	376-06-7	ND	0.000795	0.00525	0.00842	U	B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	107	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFHxA	IS	90.1	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C4-PFHpA	IS	89.8	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
18O2-PFHxS	IS	96.2	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFOA	IS	83.6	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C8-PFOS	IS	92.8	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C5-PFNA	IS	86.6	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFDA	IS	74.5	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
d3-MeFOSAA	IS	76.7	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFUnA	IS	70.5	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
d5-EtFOSAA	IS	87.2	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFDoA	IS	61.2	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1
13C2-PFTeDA	IS	67.3	50 - 150		B8E0250	31-May-18	0.119 L	05-Jun-18 00:04	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: A1-MW-04-SA1

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 14:06

Laboratory Data

Lab Sample: 1801024-05
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	0.0229	0.00182	0.00508	0.00812		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFHxA	307-24-4	0.0825	0.00221	0.00508	0.00812		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFHpA	375-85-9	ND	0.000600	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFHxS	355-46-4	0.00898	0.000961	0.00508	0.00812		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFOA	335-67-1	0.00333	0.000661	0.00508	0.00812	J	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFOS	1763-23-1	0.00161	0.000819	0.00508	0.00812	J	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFNA	375-95-1	ND	0.000822	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFDA	335-76-2	ND	0.00151	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
MeFOSAA	2355-31-9	ND	0.00167	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFUnA	2058-94-8	ND	0.00107	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
EtFOSAA	2991-50-6	ND	0.00139	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFDoA	307-55-1	ND	0.000804	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFTrDA	72629-94-8	ND	0.000501	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
PFTeDA	376-06-7	ND	0.000766	0.00508	0.00812	U	B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	146	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFHxA	IS	93.9	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C4-PFHpA	IS	84.7	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
18O2-PFHxS	IS	96.2	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFOA	IS	75.7	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C8-PFOS	IS	81.8	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C5-PFNA	IS	78.1	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFDA	IS	59.8	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
d3-MeFOSAA	IS	92.3	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFUnA	IS	61.2	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
d5-EtFOSAA	IS	101	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFDoA	IS	62.5	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1
13C2-PFTeDA	IS	73.4	50 - 150		B8E0250	31-May-18	0.123 L	05-Jun-18 22:34	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

Sample ID: FRB-20180522

PFAS Isotope Dilution Method

Client Data

Name: Tetra Tech EC, Inc.
Project: 4663.3803
Location: Yuma AZ

Matrix: Water
Date Collected: 22-May-18 14:45

Laboratory Data

Lab Sample: 1801024-06
Date Received: 23-May-18 10:15

Column: BEH C18

Analyte	CAS Number	Conc. (ug/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	0.00185	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFHxA	307-24-4	ND	0.00226	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFHpA	375-85-9	ND	0.000612	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFHxS	355-46-4	ND	0.000981	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFOA	335-67-1	ND	0.000674	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFOS	1763-23-1	ND	0.000836	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFNA	375-95-1	ND	0.000839	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFDA	335-76-2	ND	0.00154	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
MeFOSAA	2355-31-9	ND	0.00171	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFUnA	2058-94-8	ND	0.00109	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
EtFOSAA	2991-50-6	ND	0.00142	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFDoA	307-55-1	ND	0.000820	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFTrDA	72629-94-8	ND	0.000512	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
PFTeDA	376-06-7	ND	0.000782	0.00517	0.00829	U	B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBS	IS	117	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFHxA	IS	96.4	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C4-PFHpA	IS	89.7	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
18O2-PFHxS	IS	89.5	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFOA	IS	84.8	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C8-PFOS	IS	84.9	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C5-PFNA	IS	91.7	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFDA	IS	65.4	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
d3-MeFOSAA	IS	76.7	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFUnA	IS	69.2	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
d5-EtFOSAA	IS	76.3	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFDoA	IS	62.9	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1
13C2-PFTeDA	IS	67.9	50 - 150		B8E0250	31-May-18	0.121 L	05-Jun-18 00:25	1

DL - Detection Limit
LOD - Limit of Detection
LOQ - Limit of quantitation
LCL-UCL- Lower control limit - upper control limit
Results reported to the DL.
When reported, PFHxS, PFOA and PFOS include both linear and branched isomers.
Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	**This compound was also detected in the method blank**
Conc.	**Concentration**
D	**Dilution**
DL	**Detection limit**
E	**The associated compound concentration exceeded the calibration range of the instrument**
H	**Recovery and/or RPD was outside laboratory acceptance limits**
I	**Chemical Interference**
J	**The amount detected is below the Reporting Limit/LOQ**
LOD	**Limits of Detection**
LOQ	**Limits of Quantitation**
M	**Estimated Maximum Possible Concentration (CA Region 2 projects only)**
NA	**Not applicable**
ND	**Not Detected**
Q	**Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)**
TEQ	**Toxic Equivalency**
U	**Not Detected (specific projects only)**
*****	**See Cover Letter**

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	17-015-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2016026
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-008
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-17-8
Virginia Department of General Services	9077
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 1801024 Temp: 0.3 °C
Storage ID: WR-2 Storage Secured: Yes ☑ No ☐

Project ID: 4663.383 PO#: 1152405 Sampler: DOOLITTLE (name)

TAT (check one): Standard: ☐ 21 days Rush (surcharge may apply) ☐ 14 days ☐ 7 days Specify: 10 DAYS

Invoice to: Name	Company	Address	City	State	Ph#	Fax#
ACCTS PAYABLE	TETRA TECH EC, INC.	1230 COLUMBIA ST. STE 750	SAN DIEGO	CA	6192348096	

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
Spencer Doolittle	5/22/18	1500	MICHAEL O'HARE	5/22/18	1500
	5/22/18	1600	FEDEX *		

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: SAMPLE RECEIVING

Method of Shipment: FED EX

Tracking No.: FED

Add Analysis(es) Requested

Sample ID	Date	Time	Location/Sample Description	Container(s) Quantity	Type	Matrix	Mod. EPA Method 537: PFOA/PFOS	UCMR3 PFAS List:6	537 List: 14	Full List of 26	Other: Please List Below	EPA Method 537(DW only): PFOA/PFOS	UCMR3 PFAS List:6	PFAS List: 14	Comments
A1-MW-51-SA1	5/22/18	0700	YUMA AZ	2	P	W			X						
A1-MW-50-SA1	5/22/18	1014	Yuma AZ	2	P	W			X						
A1-MW-49-SA1	5/22/18	1130	Yuma AZ	2	P	W			X						
A1-MW-05-SA1	5/22/18	1220	Yuma AZ	2	P	W			X						
A1-MW-04-SA1	5/22/18	1319	Yuma AZ	2	P	W			X						
FRB-20180522	5/22/18	1445	Yuma AZ	2	P	W			X						
			MEB TP MSM												

Special Instructions/Comments:

SEND DOCUMENTATION AND RESULTS TO:

Name: SABINA SUDOKO
Company: TETRA TECH EC INC.
Address: 17885 VON KARMAN AVE STE 500
City: IRVINE State: CA Zip: 92614
Phone: 949 809 5022 Fax:
Email: Sabina.Sudoko@tetratech.com

Container Types: P= HDPE, PJ= HDPE Jar, O = Other: P= HDPE

Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: W = WATER

*relinquished by: FedEx 05/23/18 1015 received by: MSparks 05/23/18 1023

Vista Analytical Laboratory

Sample Log-in Checklist

Vista Work Order #: 1801024 **TAT** 14 days

Samples Arrival:	**Date/Time** 05/23/18 1015	**Initials:** WWS	**Location:** WR-2 **Shelf/Rack:** N/a
Logged In:	**Date/Time** 05/23/18 1325	**Initials:** WWS	**Location:** WR-2 **Shelf/Rack:** E-2

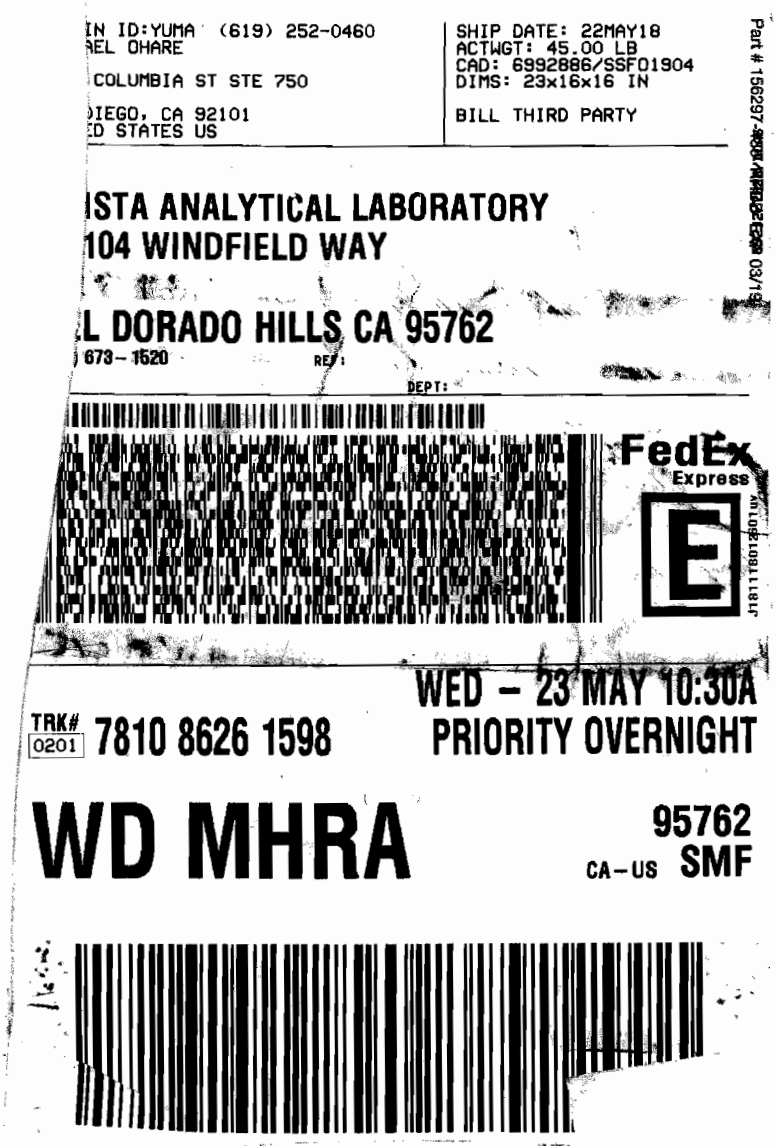
Delivered By:	FedEx	UPS	On Trac	GSO	DHL	Hand Delivered	Other
Preservation:	Ice		Blue Ice		Dry Ice		None

Temp °C: 0.4 (uncorrected)	**Time:** 1022	**Thermometer ID:** IR-4
Temp °C: 0.3 (corrected)	**Probe used:** Yes☐ No☑	

	YES	NO	NA
Adequate Sample Volume Received?	KE		
Holding Time Acceptable?	KE		
Shipping Container(s) Intact?	WWS		
Shipping Custody Seals Intact?	WWS		
Shipping Documentation Present?	WWS		
Airbill — Trk # 7810 8626 1598	WWS		
Sample Container Intact?	KE		
Sample Custody Seals Intact?			KE
Chain of Custody / Sample Documentation Present?	WWS		
COC Anomaly/Sample Acceptance Form completed?		KE	KE

If Chlorinated or Drinking Water Samples, Acceptable Preservation?						KE
Preservation Documented:	$Na_2S_2O_3$	Trizma	None	Yes	No	NA
Shipping Container	Vista	Client	Retain	Return	Dispose	

Comments:


IN ID:YUMA (619) 252-0460
REL OHARE
COLUMBIA ST STE 750
DIEGO, CA 92101
ED STATES US
SHIP DATE: 22MAY18
ACTWGT: 45.00 LB
CAD: 6992886/SSFO1904
DIMS: 23x16x16 IN
BILL THIRD PARTY
ISTA ANALYTICAL LABORATORY
104 WINDFIELD WAY
L DORADO HILLS CA 95762
673-1520
REF:
DEPT:
FedEx
Express
WED - 23 MAY 10:30A
TRK# 0201 7810 8626 1598
PRIORITY OVERNIGHT
WD MHRA
95762
CA-US SMF

EXTRACTION INFORMATION

RUSH 14-DAY TAT

Process Sheet

PRIORITY

Workorder: 1801024

Prep Expiration: 2018-Jun-05
Client: Tetra Tech EC, Inc.

Workorder Due: 06-Jun-18 00:00
TAT: 14

Method: **537M PFAS DOD (LOQ as mRL)**
Matrix: **Aqueous**

Prep Batch: B8E0250

Prep Data Entered: HB 6/1/18 (Date and Initials)

Version: 537 (14 Analyte)
DoD: DoD QSM 5.1

Initial Sequence: S8F0012

LabSampID	A/B	Prep Rec	Spike Rec	ClientSampleID	Comments	Location	Container
1801024-01	A	☑	☑	A1-MW-51-SA1		WR-2 E-2	HDPE Bottle, 125 mL
1801024-02		☑	☑	A1-MW-50-SA1		WR-2 E-2	HDPE Bottle, 125 mL
1801024-03		☑	☑	A1-MW-49-SA1		WR-2 E-2	HDPE Bottle, 125 mL
1801024-04		☑	☑	A1-MW-05-SA1		WR-2 E-2	HDPE Bottle, 125 mL
1801024-05		☑	☑	A1-MW-04-SA1		WR-2 E-2	HDPE Bottle, 125 mL
1801024-06		☑	☑	FRB-20180522		WR-2 E-2	HDPE Bottle, 125 mL

Pre-Prep Check Out: HB 5/31/18
Pre-Prep Check In: HB 5/31/18

Prep Check Out: HN 5/31/18 ~~HN 5/31/18~~ HN 5/31/18
Prep Check In: N/A

Prep Reconciled Initals/Date: HB 5/31/18
Spike Reconciled Initals/Date: HN 5/31/18
VialBoxID: Lapras

Internal Chain of Custody
1801024

Vista Analytical Laboratory

Client: Tetra Tech EC, Inc. | Project Number: 4663.3803 | Received: 23-May-18 10:15 | Received By: Marissa N. Sparks

		Sample				Extract	
Vista Sample ID	Bottle	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location
1801024-01	A/B	KE 05/23/18 WR-2 E-2	HB 5/31/18 soil lab	HB 5/31/18 WR-2 backwall	HN 5/31/18 Air Lab	dm 6/5/18 1625 instrument	
1801024-02	A/B	KE 05/23/18 WR-2 E-2	↓	↓	↓	↓	
1801024-03	A/B	KE 05/23/18 WR-2 E-2	↓	↓	↓	↓	
1801024-04	A/B	KE 05/23/18 WR-2 E-2	↓	↓	↓	↓	
1801024-05	A/B	KE 05/23/18 WR-2 E-2	↓	↓	↓	↓	
1801024-06	A/B	KE 05/23/18 WR-2 E-2	↓	↓	↓	↓	

Note in grid if sample or extract are depleted. See Login Checklist for initial location.

Internal Chain of Custody
1801024

Vista Analytical Laboratory

Client: Tetra Tech EC, Inc. | Project Number: 4663.3803 | Received: 23-May-18 10:15 | Received By: Marissa N. Sparks

		Sample				Extract	
Vista Sample ID	Bottle	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location	Initials Date/Time New Location
1801024-01	A/B	HN ~~6/1/18~~ HN 6/1/18 5/31/18 R-7	mg 06/01/18 soil Lab			Am 6/5/18 1415 instrument	
1801024-02	A/B						
1801024-03	A/B						
1801024-04	A/B						
1801024-05	A/B						
1801024-06	A/B						

Note in grid if sample or extract are depleted. See Login Checlist for initial location.

Page 1 of 1

PREPARATION BENCH SHEET

Matrix: Aqueous

Method: 537M PFAS DOD (LOQ as mRL)

B8E0250

Chemist: HN

Prep Date: 5/31/18

Prep Time: 12:35

Prepared using: LCMS - SPE Extraction-LCMS

SR 5/31/18

Date/Initals: HB ~~5/30 HB~~ 5/31/18 BalanceID: MT245-8

Cen	VISTA Sample ID	pH Before	pH After	Chlorine (Cl)	Drops HCl Added	Bottle + Sample (g)	Bottle Only (g)	Sample Amt. (L)	IS/NS CHEM/WIT DATE	SPE	RS CHEM/WIT DATE
☐	B8E0250-BLK1	5	2	0	3	NA	NA	(0.125)	HN 7R 5/31/18	HN 5/31/18	HN MY 5/31/18
☐	B8E0250-BS1	5	2	0	3	↓	↓	(0.125)	↓	↓	↓
☐	B8E0250-BSD1	5	2	0	3	↓	↓	(0.125)	↓	↓	↓
☐	1801003-01 (A)(B)	5	2	0	3	142.87	26.88	0.11594	↓	↓	↓
☐	1801003-02	4	2	0	3	145.27	26.94	0.11833	↓	↓	↓
☐	1801024-01	5	2	0	3	146.54	26.93	0.11961 ✓	↓	↓	↓
☐	1801024-02	6	2	0	3	147.77	26.95	0.12082 HB ~~0.12051~~ 6/1/18 ✓	↓	↓	↓
☐	1801024-03	5	2	0	3	150.06	26.89	0.12317 ✓	↓	↓	↓
☐	1801024-04	5	2	0	3	145.62	26.87	0.11875 ✓	↓	↓	↓
☐	1801024-05	6	2	0	3	150.14	26.99	0.12315 ✓	↓	↓	↓
☐	1801024-06	6	2	0	3	147.64	26.96	0.12068 ✓	↓	↓	↓

IS: 18D2004, 10µL (V3)

IS SUP: N/A

NS: ~~18D2005~~ 18E0923, 10µL (V5) HN 5/31/18

RS: 18D2005, 10µL (V2)

SPE Chem: Strata-X-AW 33µm

Ele SOLV: MeOH/0.5% NH4OH in MeOH

Final Volume(s) _____

Notes: (A) Sample foamy after shaking HN 5/31/18

(B) Sample clogged cartridge after 100mL were siphoned, used N_2 gas to push rest through HN 5/31/18

Envicarb lot #: 10186601

Comments: Assume 1 g = 1 mL

Cen = Centrifuged

Batch: B8E0250

Matrix: Aqueous

LabNumber	WetWeight (Initial)	% Solids (Extraction Solids)	DryWeight	Final	Extracted	Ext By	Spike	SpikeAmount	ClientMatrix	Analysis
1801003-01	0.11594 ✓	NA	NA	1000	31-May-18 12:35	HN			Surface Water	537M PFAS DOD (LOQ as
1801003-02	0.11833 ✓			1000	31-May-18 12:35	HN			Aqueous	537M PFAS DOD (LOQ as
1801024-01	0.11961 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
1801024-02	0.12082 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
1801024-03	0.12317 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
1801024-04	0.11875 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
1801024-05	0.12315 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
1801024-06	0.12068 ✓			1000	31-May-18 12:35	HN			Water	537M PFAS DOD (LOQ as
B8E0250-BLK1	0.125 ✓			1000	31-May-18 12:35	HN				QC
B8E0250-BS1	0.125 ✓			1000	31-May-18 12:35	HN	18E0923 ✓	10 ✓		QC
B8E0250-BSD1	0.125 ✓			1000	31-May-18 12:35	HN	18E0923 ✓	10 ✓		QC

HB 6/1/18

Printed: 6/1/2018 12:51:18PM

Sample Data – PFAS Isotope Dilution Method

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:41 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	1	PFBA	213.0 > 168.8		6.23e3	0.1250		1.33						
2	2	PFPeA	263.1 > 218.9		8.26e3	0.1250		2.31						
3	3	PFBS	299.0 > 79.7		1.22e3	0.1250		2.60						
4	4	4:2 FTS	327.2>307.2		2.45e3	0.1250		3.01						
5	5	PFHxA	313.2 > 268.9		3.09e3	0.1250		3.09						
6	6	PFPeS	349.1>80.1		1.22e3	0.1250		3.29						
7	7	PFHpA	363.0 > 318.9		7.46e3	0.1250		3.71						
8	8	L-PFHxS	398.9 > 79.6		9.96e2	0.1250		3.86						
9	10	6:2 FTS	427.1 > 407	1.73e1	2.67e3	0.1250		4.17	4.17	0.0811	0.720		6.875	YES
10	11	L-PFOA	413 > 368.7		1.09e4	0.1250		4.25						
11	13	PFHpS	449 > 80.0		1.09e4	0.1250		4.33						
12	14	PFNA	463.0 > 418.8		9.34e3	0.1250		4.66						
13	15	PFOSA	498.2 > 77.9		5.69e2	0.1250		4.73						
14	16	L-PFOS	499.1 > 79.9		2.19e3	0.1250		4.74						
15	18	PFDA	513 > 468.8		1.04e4	0.1250		5.03						
16	19	8:2 FTS	527 > 506.9		1.89e3	0.1250		5.00						
17	20	PFNS	549.1>80.1		2.19e3	0.1250		5.09						
18	21	L-MeFOSAA	570.1 > 419		1.92e3	0.1250		5.18						

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	23	L-EtFOSAA	584.2 > 419		2.58e3	0.1250		5.37						
2	25	PFUdA	563.0 > 518.9		8.89e3	0.1250		5.35						
3	26	PFDS	598.8 > 80		8.89e3	0.1250		5.40						
4	27	PFDoA	612.9 > 569.0		9.96e3	0.1250		5.63						
5	28	N-MeFOSA	512.1 > 168.9			0.1250		5.82						
6	29	PFTrDA	662.9 > 618.9		9.96e3	0.1250		5.88						
7	30	PFTeDA	712.9 > 668.8		8.61e3	0.1250		6.10						
8	31	N-EtFOSA	526.1 > 168.9			0.1250		6.23						
9	32	PFHxDA	813.1 > 768.6		5.79e3	0.1250		6.43						
10	33	PFODA	913.1 > 868.8	1.83e1	5.79e3	0.1250		6.67	6.67	0.0158	0.341			
11	34	N-MeFOSE	616.1 > 58.9			0.1250		6.37						
12	35	N-EtFOSE	630.1 > 58.9			0.1250		6.52						
13	36	13C3-PFBA	216.1 > 171.8	6.23e3	7.28e3	0.1250	0.885	1.34	1.34	10.7	96.606	96.6		
14	37	13C3-PFPeA	266. > 221.8	8.26e3	1.10e4	0.1250	0.849	2.31	2.31	9.39	88.430	88.4		
15	38	13C3-PFBS	302. > 98.8	1.22e3	1.10e4	0.1250	0.104	2.60	2.60	1.39	106.983	107.0		
16	39	13C2-4:2 FTS	329.2>308.9	2.45e3	1.10e4	0.1250	0.248	3.01	3.01	2.79	90.129	90.1		
17	40	13C2-PFHxA	315 > 269.8	3.09e3	1.10e4	0.1250	0.729	3.09	3.09	3.51	38.508	96.3		
18	41	13C4-PFHpA	367.2 > 321.8	7.46e3	1.10e4	0.1250	0.836	3.71	3.71	8.48	81.136	81.1		
19	42	18O2-PFHxS	403.0 > 102.6	9.96e2	2.39e3	0.1250	0.443	3.86	3.86	5.20	93.987	94.0		
20	43	13C2-6:2 FTS	429.1 > 408.9	2.67e3	1.07e4	0.1250	0.249	4.17	4.17	3.13	100.657	100.7		
21	44	13C2-PFOA	414.9 > 369.7	1.09e4	1.07e4	0.1250	1.332	4.23	4.23	12.8	76.863	76.9		
22	45	13C5-PFNA	468.2 > 422.9	9.34e3	1.31e4	0.1250	0.951	4.66	4.66	8.91	74.959	75.0		
23	46	13C8-PFOSA	506.1 > 77.7	5.69e2	2.00e4	0.1250	0.140	4.73	4.72	0.357	20.445	20.4		
24	47	13C8-PFOS	507.0 > 79.9	2.19e3	2.60e3	0.1250	1.060	4.74	4.74	10.5	79.529	79.5		
25	48	13C2-PFDA	515.1 > 469.9	1.04e4	1.42e4	0.1250	1.130	5.03	5.03	9.19	65.056	65.1		
26	49	13C2-8:2 FTS	529.1 > 508.7	1.89e3	1.10e4	0.1250	0.217	5.00	5.00	2.15	79.085	79.1		
27	50	d3-N-MeFOSAA	573.3 > 419	1.92e3	2.00e4	0.1250	0.184	5.18	5.18	1.20	52.495	52.5		
28	51	d5-N-EtFOSAA	589.3 > 419	2.58e3	2.00e4	0.1250	0.223	5.34	5.34	1.62	58.043	58.0		
29	52	13C2-PFUdA	565 > 519.8	8.89e3	2.00e4	0.1250	0.936	5.35	5.35	5.57	47.562	47.6	H	
30	53	13C2-PFDoA	615.0 > 569.7	9.96e3	1.42e4	0.1250	1.168	5.63	5.63	8.78	60.116	60.1		
31	54	d3-N-MeFOSA	515.2 > 168.9		2.00e4	0.1250	0.051	5.85						
32	55	13C2-PFTeDA	714.8 > 669.6	8.61e3	2.00e4	0.1250	0.706	6.09	6.09	5.40	61.137	61.1		AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	56	d5-N-ETFOSA	531.1 > 168.9		2.00e4	0.1250	0.071	6.24						
34	57	13C2-PFHxDA	815 > 769.7	5.79e3	2.00e4	0.1250	1.079	6.43	6.43	3.63	26.897	67.2		
35	58	d7-N-MeFOSE	623.1 > 58.9		2.00e4	0.1250	0.041	6.37						
36	59	d9-N-EtFOSE	639.2 > 58.8		2.00e4	0.1250	0.038	6.51						
37	60	13C4-PFBA	217. > 171.8	7.28e3	7.28e3	0.1250	1.000	1.35	1.34	12.5	100.000	100.0		
38	61	13C5-PFHxA	318 > 272.9	1.10e4	1.10e4	0.1250	1.000	3.09	3.09	12.5	100.000	100.0		
39	62	13C3-PFHxS	401.9 > 79.9	2.39e3	2.39e3	0.1250	1.000	3.86	3.86	12.5	100.000	100.0		
40	63	13C8-PFOA	421.3 > 376	1.07e4	1.07e4	0.1250	1.000	4.23	4.23	12.5	100.000	100.0		
41	64	13C9-PFNA	472.2 > 426.9	1.31e4	1.31e4	0.1250	1.000	4.66	4.66	12.5	100.000	100.0		
42	65	13C4-PFOS	503 > 79.9	2.60e3	2.60e3	0.1250	1.000	4.74	4.74	12.5	100.000	100.0		
43	66	13C6-PFDA	519.1 > 473.7	1.42e4	1.42e4	0.1250	1.000	5.03	5.03	12.5	100.000	100.0		
44	67	13C7-PFUdA	570.1 > 524.8	2.00e4	2.00e4	0.1250	1.000	5.35	5.35	12.5	100.000	100.0		
45	68	Total PFHxS	398.9 > 79.6	0.00e0	9.96e2	0.1250		4.05		0.000				
46	69	Total PFOA	413 > 368.7	0.00e0	1.09e4	0.1250		4.30		0.000				
47	70	Total PFOS	499.1 > 79.9	0.00e0	2.19e3	0.1250		4.90		0.000				
48	71	Total N-MeFOSAA	570.1 > 419	0.00e0	1.92e3	0.1250		5.55		0.000				
49	72	Total N-EtFOSAA	584.2 > 419	0.00e0	2.58e3	0.1250		5.70		0.000				

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

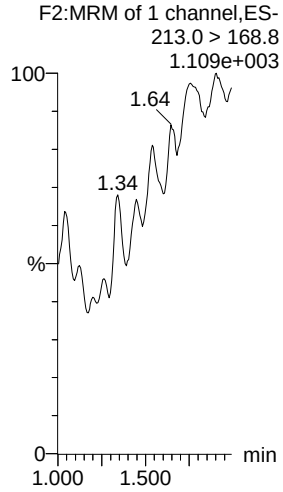
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

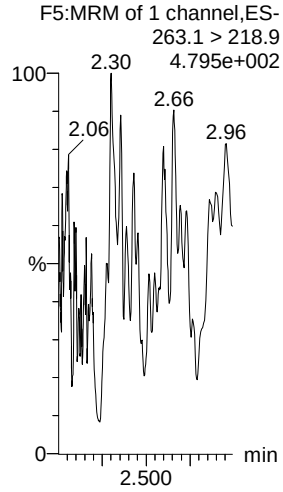
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

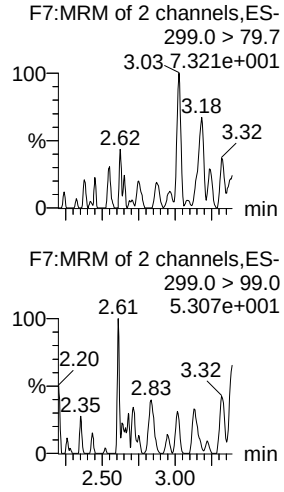
PFBA



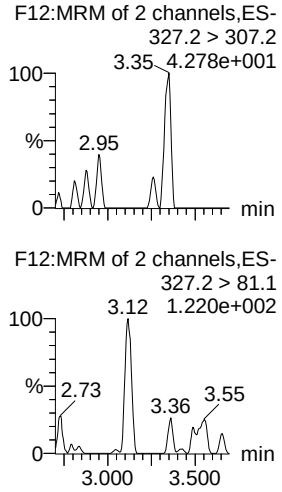
PFPeA



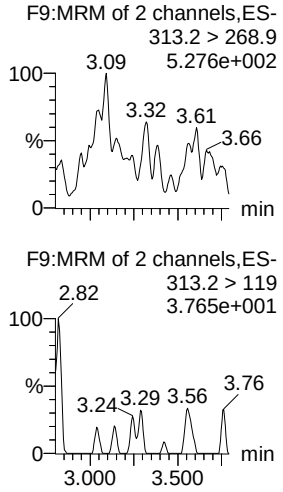
PFBS



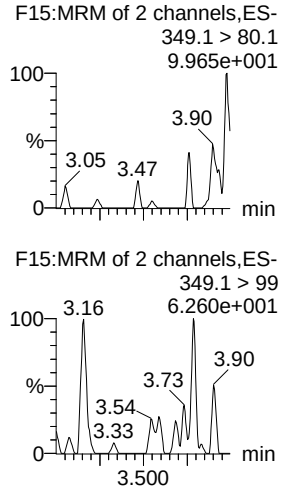
4:2 FTS



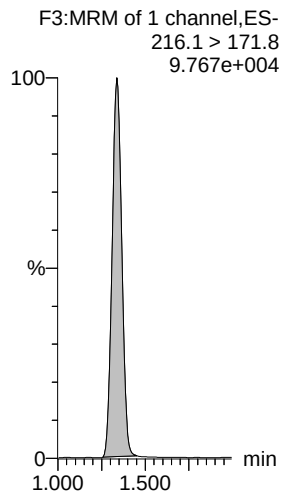
PFHxA



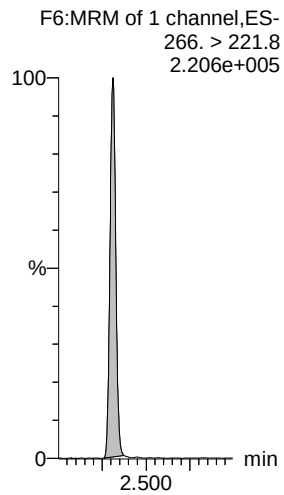
PFPeS



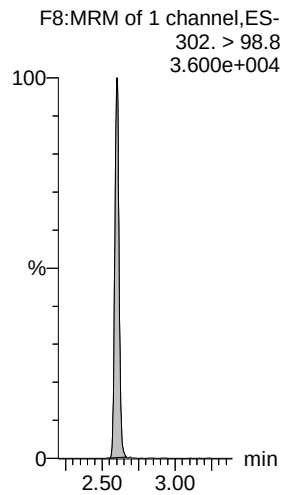
13C3-PFBA



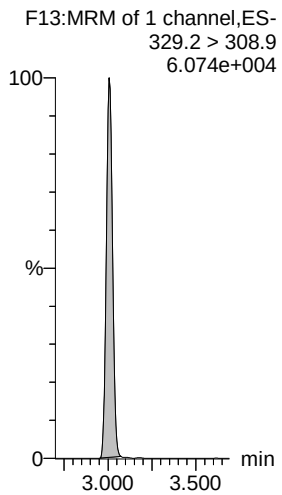
13C3-PFPeA



13C3-PFBS



13C2-4:2 FTS



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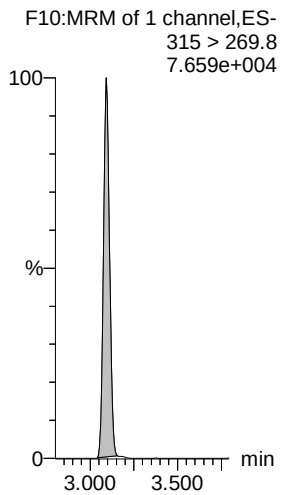
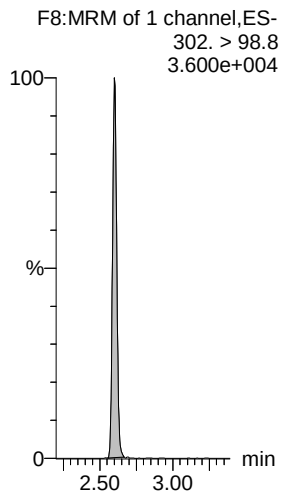


13C3-PFBS



AR 6/6/2018

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

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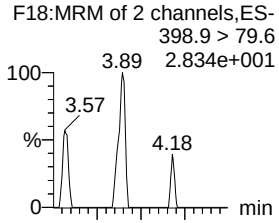
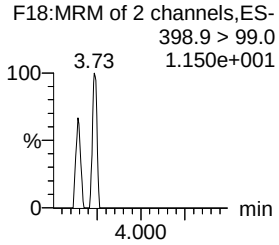
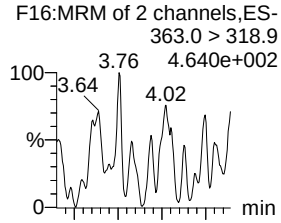
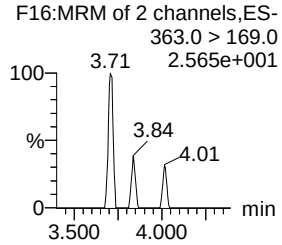


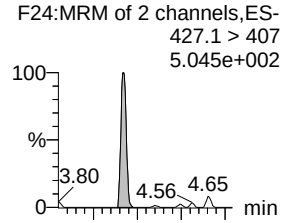


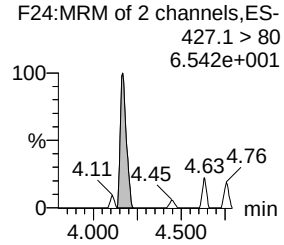
PFHpA



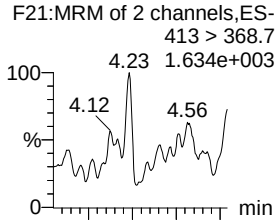


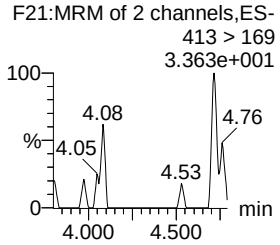
6:2 FTS



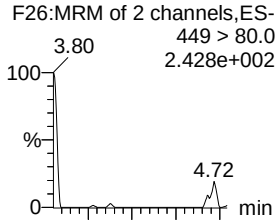


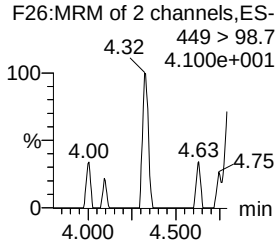
L-PFOA





PFHpS





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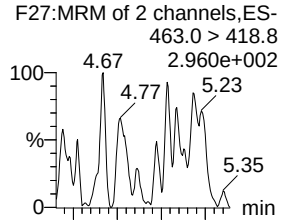
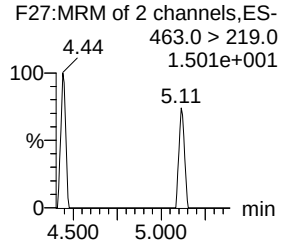
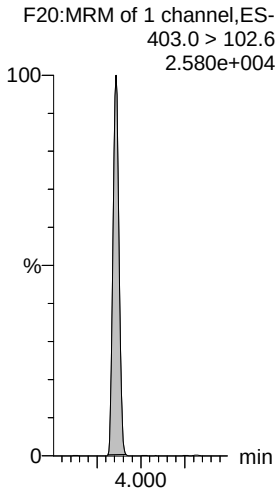
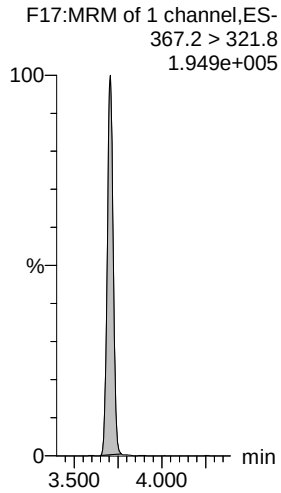




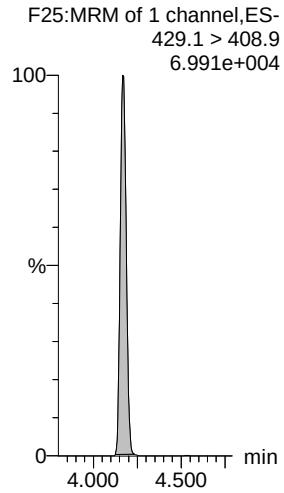
18O2-PFHxS



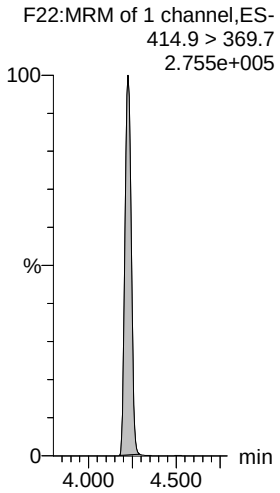
13C4-PFHpA



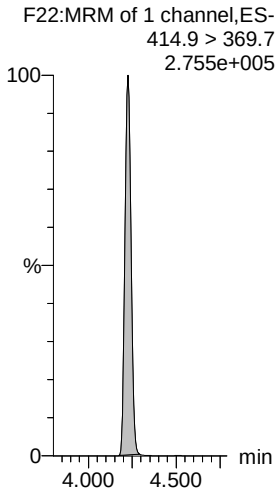
13C2-6:2 FTS



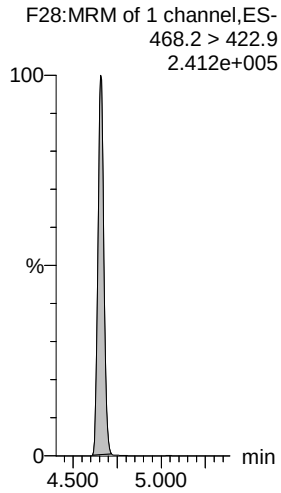
13C2-PFOA



13C2-PFOA



13C5-PFNA



AR 6/6/2018

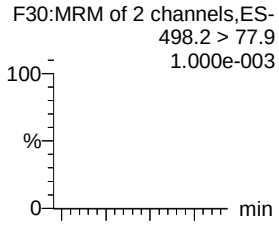
MM 6/6/2018

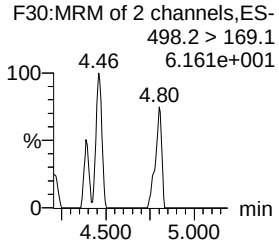
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

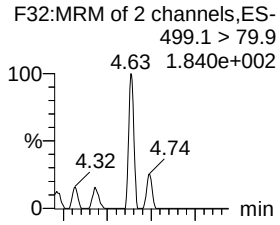
Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

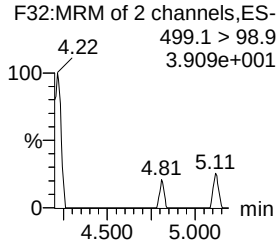
PFOSA



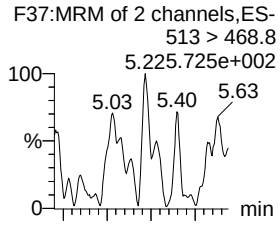


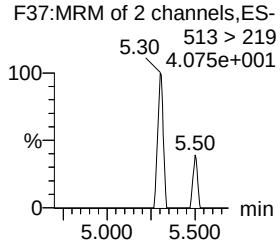
L-PFOS



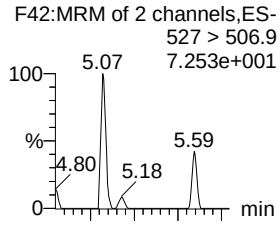


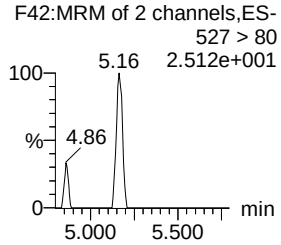
PFDA



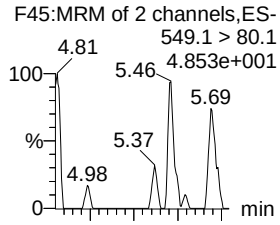


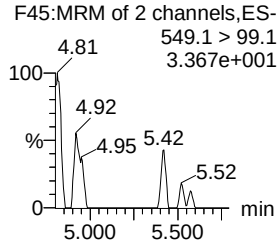
8:2 FTS



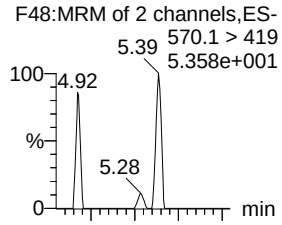


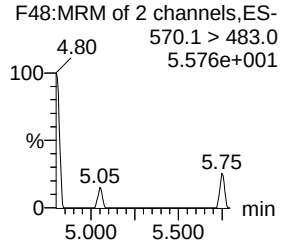
PFNS



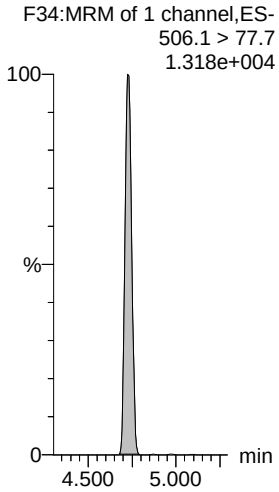


L-MeFOSAA

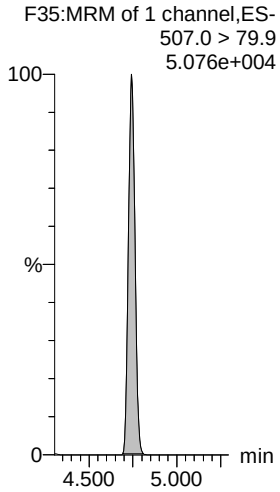




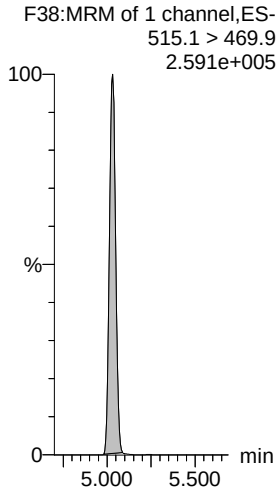
13C8-PFOSA



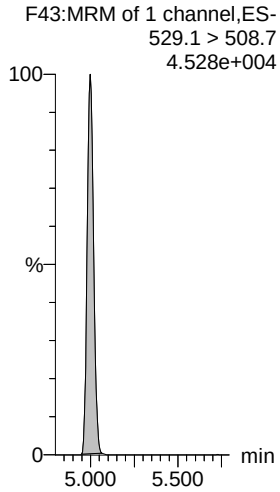
13C8-PFOS



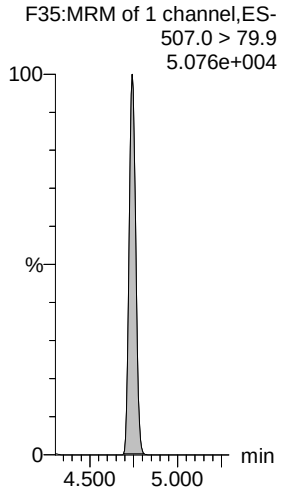
13C2-PFDA



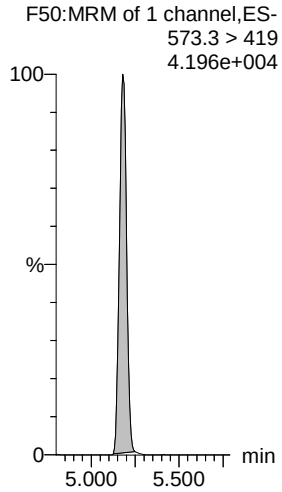
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



AR 6/6/2018

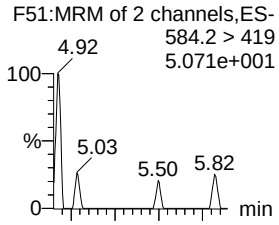
MM 6/6/2018

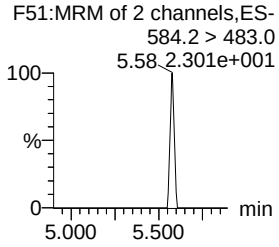
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

L-EtFOSAA





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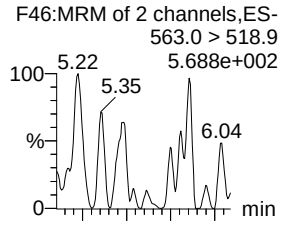
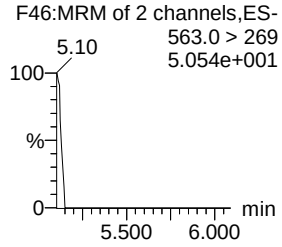
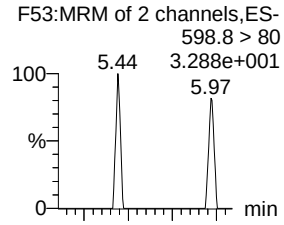
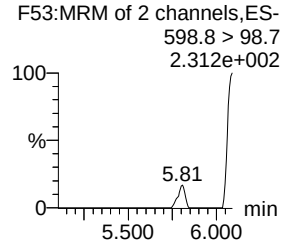


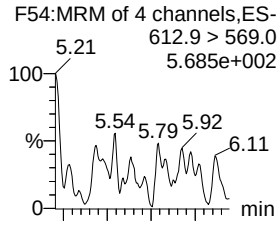


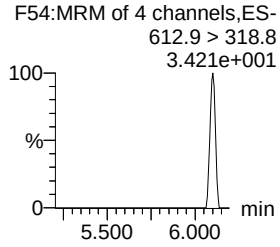
PFDS



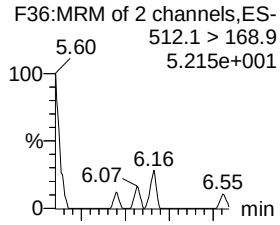


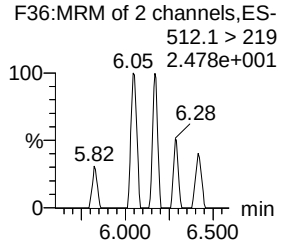
PFDoA



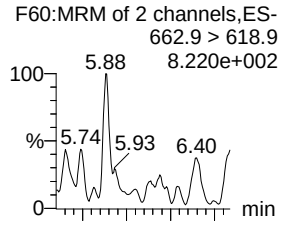


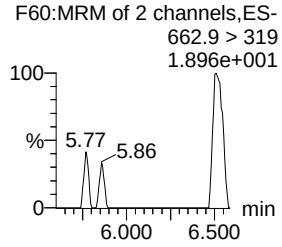
N-MeFOSA



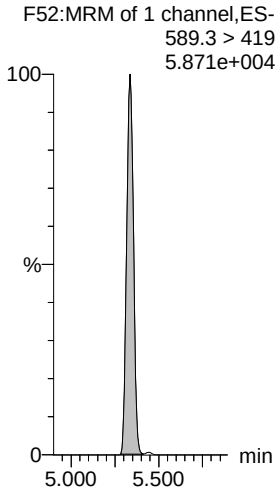


PFTrDA

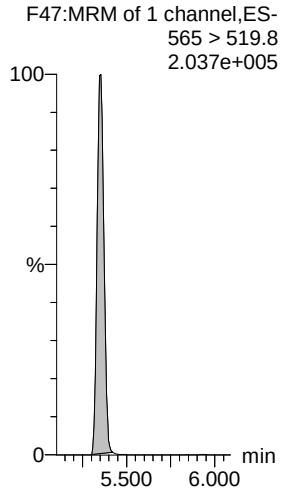




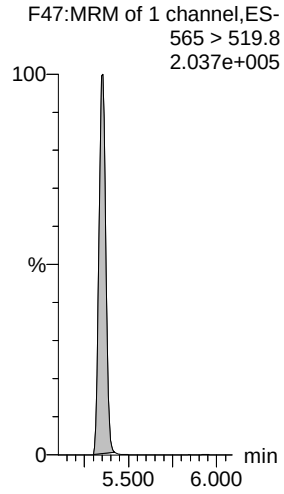
d5-N-EtFOSAA



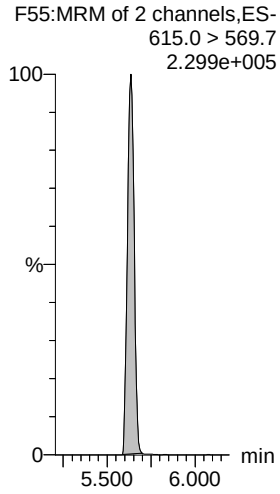
13C2-PFUdA



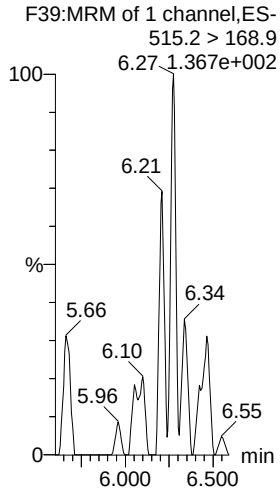
13C2-PFUdA



13C2-PFDoA



d3-N-MeFOSA



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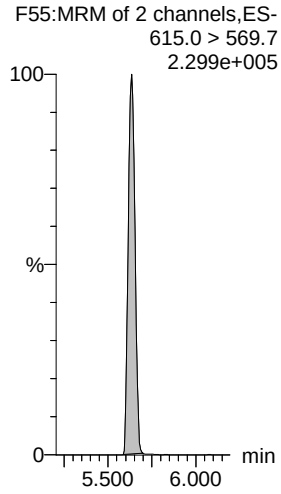

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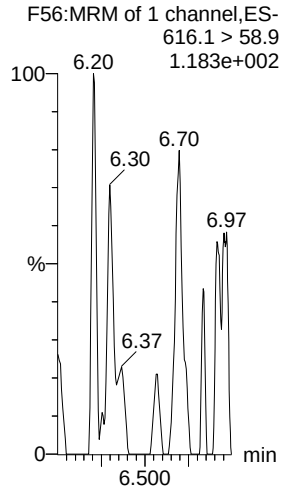
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

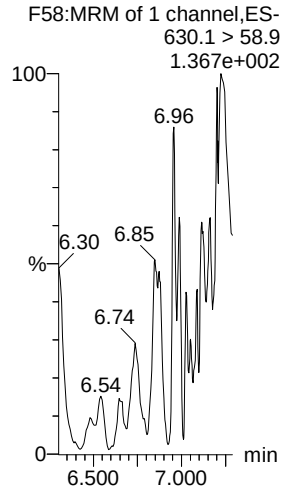
Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

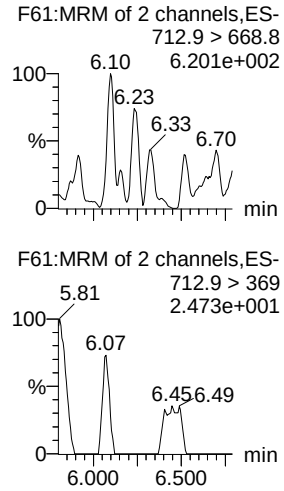
N-MeFOSE



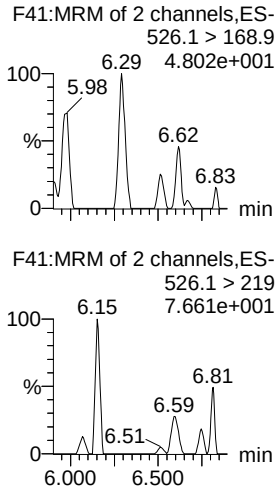
N-EtFOSE



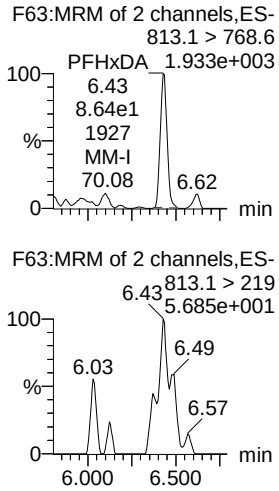
PFTeDA



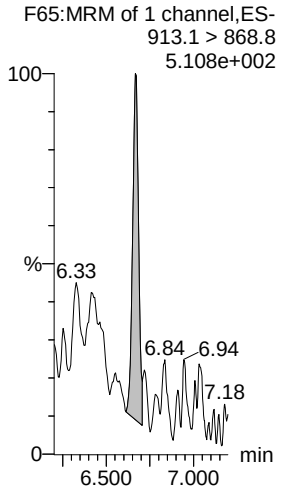
N-EtFOSA



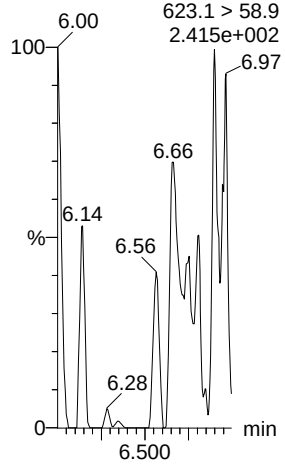
PFHxDA



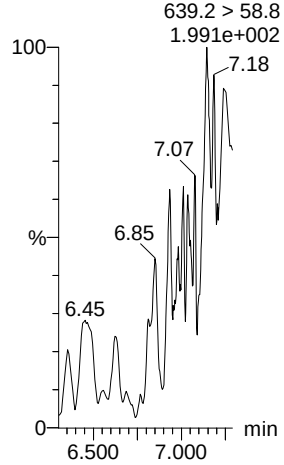
PFODA



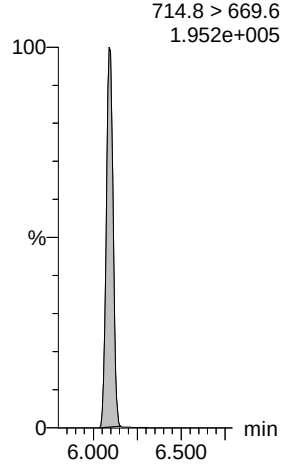
d7-N-MeFOSE



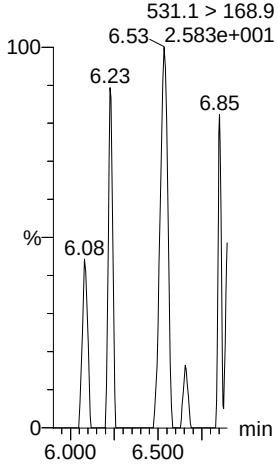
d9-N-EtFOSE



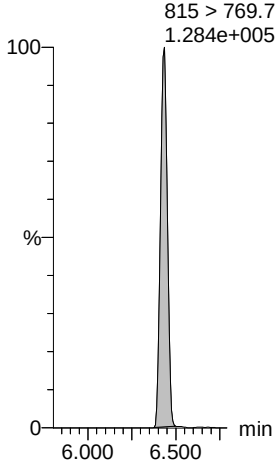
13C2-PFTeDA



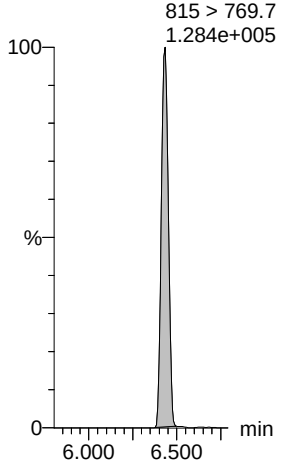
d5-N-ETFOSA



13C2-PFHxDA



13C2-PFHxDA



AR 6/6/2018

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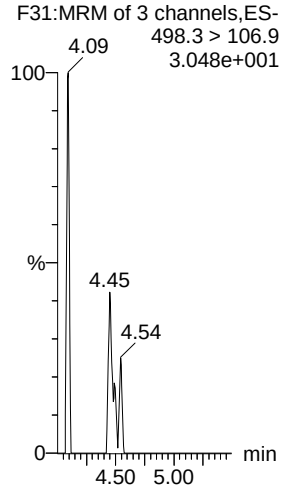
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-24.qld

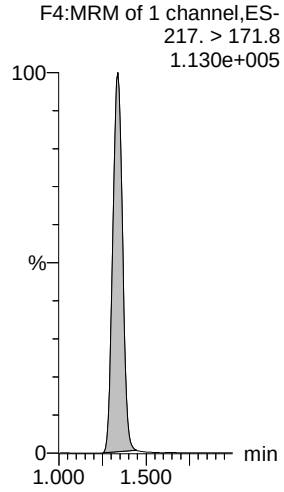
Last Altered: Wednesday, June 06, 2018 14:22:55 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:23:59 Pacific Daylight Time

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

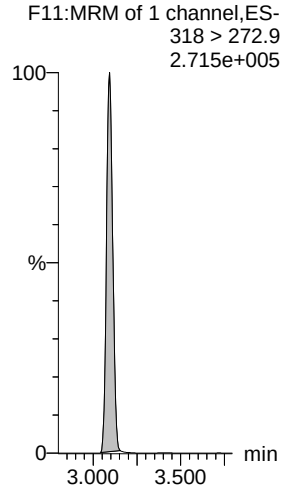
TCDA



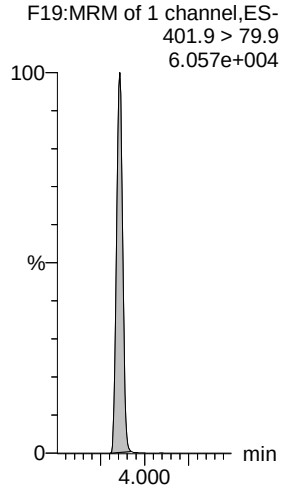
13C4-PFBA



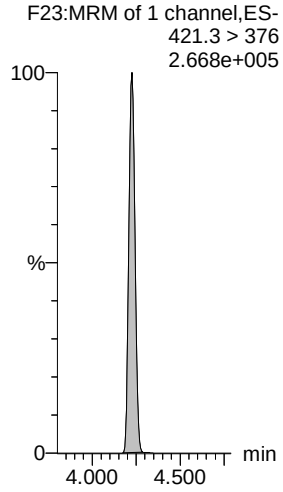
13C5-PFHxA



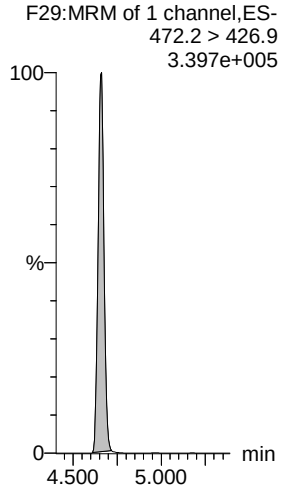
13C3-PFHxS



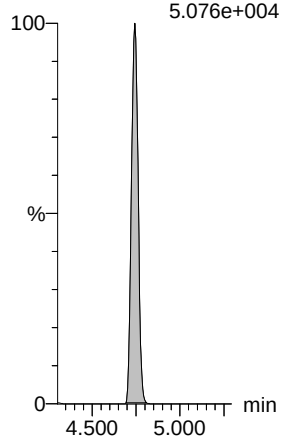
13C8-PFOA



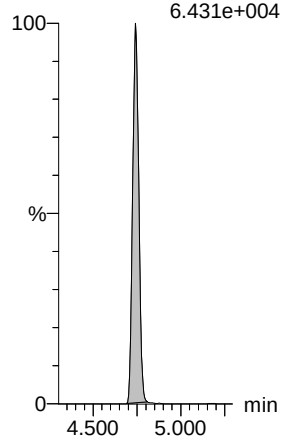
13C9-PFNA



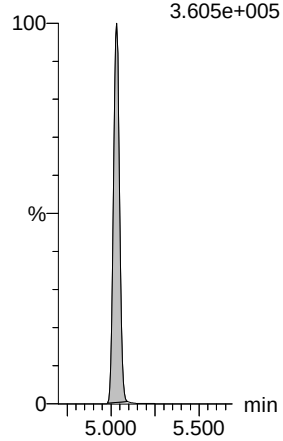
13C8-PFOS



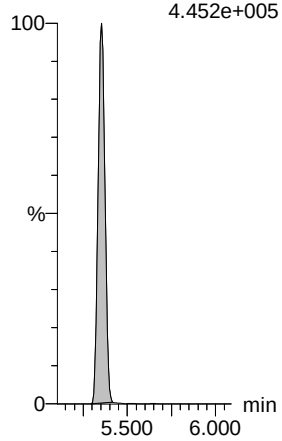
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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Vista Analytical Laboratory

MM 6/8/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:38 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	1	PFBA	213.0 > 168.8	7.05e3	7.18e3	0.1250		1.33	1.34	12.3	88.420	110.5		
2	2	PFPeA	263.1 > 218.9	8.33e3	9.67e3	0.1250		2.31	2.31	10.8	83.902	104.9		
3	3	PFBS	299.0 > 79.7	2.17e3	1.32e3	0.1250		2.60	2.60	20.5	82.598	103.2	2.578	NO
4	4	4:2 FTS	327.2>307.2	2.61e3	2.81e3	0.1250		3.00	3.00	11.6	86.576	108.2	1.844	NO
5	5	PFHxA	313.2 > 268.9	1.03e4	3.27e3	0.1250		3.09	3.09	15.7	78.618	98.3	252.992	NO
6	6	PFPeS	349.1>80.1	2.17e3	1.32e3	0.1250		3.29	3.29	20.6	91.185	114.0	1.699	NO
7	7	PFHpA	363.0 > 318.9	1.01e4	9.14e3	0.1250		3.70	3.70	13.8	94.882	118.6	19.751	NO
8	8	L-PFHxS	398.9 > 79.6	1.96e3	1.10e3	0.1250		3.85	3.85	22.2	92.469	115.6	1.852	NO
9	10	6:2 FTS	427.1 > 407	3.18e3	2.93e3	0.1250		4.17	4.17	13.6	87.907	109.9	3.056	NO
10	11	L-PFOA	413 > 368.7	1.15e4	1.48e4	0.1250		4.25	4.22	9.74	86.281	107.9	4.359	NO
11	13	PFHpS	449 > 80.0	1.87e3	1.48e4	0.1250		4.33	4.33	1.58	80.169	100.2	1.742	NO
12	14	PFNA	463.0 > 418.8	1.38e4	1.16e4	0.1250		4.66	4.66	14.8	92.360	115.5	4.698	NO
13	15	PFOSA	498.2 > 77.9	8.89e2	1.19e3	0.1250		4.73	4.73	9.36	78.844	98.6	15.308	NO
14	16	L-PFOS	499.1 > 79.9	2.18e3	2.66e3	0.1250		4.74	4.74	10.3	88.360	110.4	2.110	NO
15	18	PFDA	513 > 468.8	1.18e4	1.25e4	0.1250		5.03	5.03	11.7	91.354	114.2	5.714	NO
16	19	8:2 FTS	527 > 506.9	2.75e3	2.52e3	0.1250		5.00	5.00	13.6	75.866	94.8	2.673	NO
17	20	PFNS	549.1>80.1	1.68e3	2.66e3	0.1250		5.09	5.09	7.92	75.888	94.9	1.614	NO
18	21	L-MeFOSAA	570.1 > 419	4.33e3	2.74e3	0.1250		5.18	5.18	19.8	83.578	104.5	16.441	NO

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?	
1	23	L-EtFOSAA	584.2 > 419	3.12e3	3.49e3	0.1250		5.37	5.34	11.2	78.186	97.7	13.561	NO	
2	25	PFUdA	563.0 > 518.9	1.05e4	1.29e4	0.1250		5.35	5.35	10.2	84.217	105.3	14.153	NO	
3	26	PFDS	598.8 > 80	2.00e3	1.29e4	0.1250		5.40	5.40	1.94	107.636	134.5	2.065	NO	
4	27	PFDoA	612.9 > 569.0	1.46e4	1.33e4	0.1250		5.63	5.63	13.7	98.354	122.9	9.482	NO	
5	28	N-MeFOSA	512.1 > 168.9	6.64e2		0.1250		5.82	5.82				1.453	NO	
6	29	PFTrDA	662.9 > 618.9	1.60e4	1.33e4	0.1250		5.88	5.88	15.0	110.583	138.2	30.807	NO	H
7	30	PFTeDA	712.9 > 668.8	1.28e4	1.14e4	0.1250		6.10	6.09	14.1	86.699	108.4	11.495	NO	
8	31	N-EtFOSA	526.1 > 168.9	7.87e2		0.1250		6.23	6.22				1.350	NO	
9	32	PFHxDA	813.1 > 768.6	9.05e3	6.77e3	0.1250		6.43	6.43	6.68	88.253	110.3	34.954	NO	
10	33	PFODA	913.1 > 868.8	1.59e3	6.77e3	0.1250		6.67	6.67	1.17	10.680	13.3			
11	34	N-MeFOSE	616.1 > 58.9	1.04e3		0.1250		6.37	6.37						
12	35	N-EtFOSE	630.1 > 58.9	1.21e3		0.1250		6.52	6.52						
13	36	13C3-PFBA	216.1 > 171.8	7.18e3	8.47e3	0.1250	0.885	1.34	1.34	10.6	95.781	95.8			
14	37	13C3-PFPeA	266. > 221.8	9.67e3	1.21e4	0.1250	0.849	2.31	2.31	10.0	94.241	94.2			
15	38	13C3-PFBS	302. > 98.8	1.32e3	1.21e4	0.1250	0.104	2.60	2.60	1.37	105.171	105.2			
16	39	13C2-4:2 FTS	329.2>308.9	2.81e3	1.21e4	0.1250	0.248	3.01	3.00	2.91	93.974	94.0			
17	40	13C2-PFHxA	315 > 269.8	3.27e3	1.21e4	0.1250	0.729	3.09	3.09	3.38	37.134	92.8			
18	41	13C4-PFHpA	367.2 > 321.8	9.14e3	1.21e4	0.1250	0.836	3.71	3.70	9.46	90.494	90.5			
19	42	18O2-PFHxS	403.0 > 102.6	1.10e3	2.93e3	0.1250	0.443	3.86	3.85	4.70	84.976	85.0			
20	43	13C2-6:2 FTS	429.1 > 408.9	2.93e3	1.20e4	0.1250	0.249	4.17	4.17	3.04	97.651	97.7			
21	44	13C2-PFOA	414.9 > 369.7	1.48e4	1.20e4	0.1250	1.332	4.23	4.22	15.3	92.154	92.2			
22	45	13C5-PFNA	468.2 > 422.9	1.16e4	1.54e4	0.1250	0.951	4.66	4.66	9.47	79.682	79.7			
23	46	13C8-PFOSA	506.1 > 77.7	1.19e3	2.03e4	0.1250	0.140	4.73	4.72	0.729	41.824	41.8			
24	47	13C8-PFOS	507.0 > 79.9	2.66e3	2.85e3	0.1250	1.060	4.74	4.74	11.6	87.903	87.9			
25	48	13C2-PFDA	515.1 > 469.9	1.25e4	1.52e4	0.1250	1.130	5.03	5.03	10.3	72.953	73.0			
26	49	13C2-8:2 FTS	529.1 > 508.7	2.52e3	1.21e4	0.1250	0.217	5.00	5.00	2.61	95.957	96.0			
27	50	d3-N-MeFOSAA	573.3 > 419	2.74e3	2.03e4	0.1250	0.184	5.18	5.18	1.68	73.296	73.3			
28	51	d5-N-EtFOSAA	589.3 > 419	3.49e3	2.03e4	0.1250	0.223	5.34	5.34	2.14	76.869	76.9			
29	52	13C2-PFUdA	565 > 519.8	1.29e4	2.03e4	0.1250	0.936	5.35	5.35	7.91	67.608	67.6			
30	53	13C2-PFDoA	615.0 > 569.7	1.33e4	1.52e4	0.1250	1.168	5.63	5.63	10.9	74.902	74.9			
31	54	d3-N-MeFOSA	515.2 > 168.9		2.03e4	0.1250	0.051	5.85							
32	55	13C2-PFTeDA	714.8 > 669.6	1.14e4	2.03e4	0.1250	0.706	6.09	6.09	7.00	79.367	79.4			AR 6/6/2018

Vista Analytical Laboratory

MM 6/8/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	56	d5-N-ETFOSA	531.1 > 168.9		2.03e4	0.1250	0.071	6.24						
34	57	13C2-PFHxDA	815 > 769.7	6.77e3	2.03e4	0.1250	1.079	6.43	6.43	4.16	30.859	77.1		
35	58	d7-N-MeFOSE	623.1 > 58.9		2.03e4	0.1250	0.041	6.37						
36	59	d9-N-EtFOSE	639.2 > 58.8		2.03e4	0.1250	0.038	6.51						
37	60	13C4-PFBA	217. > 171.8	8.47e3	8.47e3	0.1250	1.000	1.35	1.34	12.5	100.000	100.0		
38	61	13C5-PFHxA	318 > 272.9	1.21e4	1.21e4	0.1250	1.000	3.09	3.09	12.5	100.000	100.0		
39	62	13C3-PFHxS	401.9 > 79.9	2.93e3	2.93e3	0.1250	1.000	3.86	3.85	12.5	100.000	100.0		
40	63	13C8-PFOA	421.3 > 376	1.20e4	1.20e4	0.1250	1.000	4.23	4.22	12.5	100.000	100.0		
41	64	13C9-PFNA	472.2 > 426.9	1.54e4	1.54e4	0.1250	1.000	4.66	4.66	12.5	100.000	100.0		
42	65	13C4-PFOS	503 > 79.9	2.85e3	2.85e3	0.1250	1.000	4.74	4.74	12.5	100.000	100.0		
43	66	13C6-PFDA	519.1 > 473.7	1.52e4	1.52e4	0.1250	1.000	5.03	5.03	12.5	100.000	100.0		
44	67	13C7-PFUdA	570.1 > 524.8	2.03e4	2.03e4	0.1250	1.000	5.35	5.35	12.5	100.000	100.0		
45	68	Total PFHxS	398.9 > 79.6	1.96e3	1.10e3	0.1250		4.05		22.2	92.469			
46	69	Total PFOA	413 > 368.7	1.15e4	1.48e4	0.1250		4.30		9.74	86.281			
47	70	Total PFOS	499.1 > 79.9	2.18e3	2.66e3	0.1250		4.90		10.3	88.360			
48	71	Total N-MeFOSAA	570.1 > 419	4.33e3	2.74e3	0.1250		5.55		19.8	83.578			
49	72	Total N-EtFOSAA	584.2 > 419	3.12e3	3.49e3	0.1250		5.70		11.2	78.186			

AR 6/6/2018

Vista Analytical Laboratory

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

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Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

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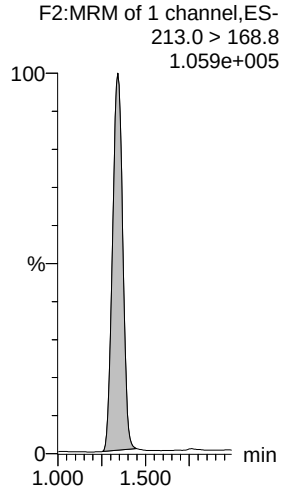

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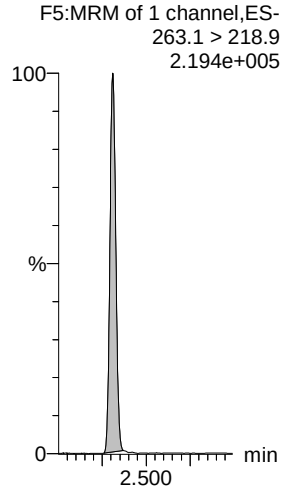

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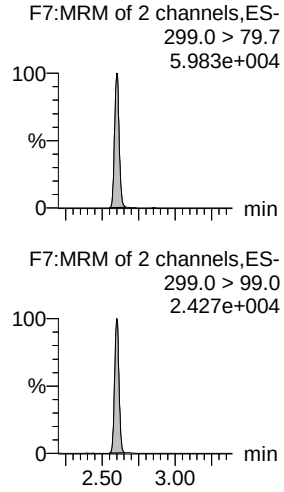

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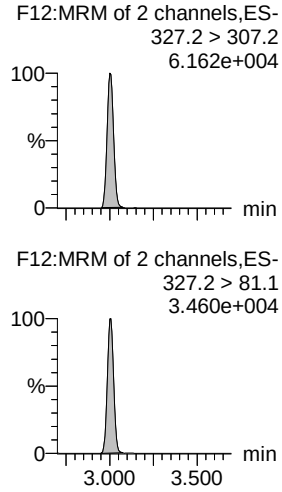

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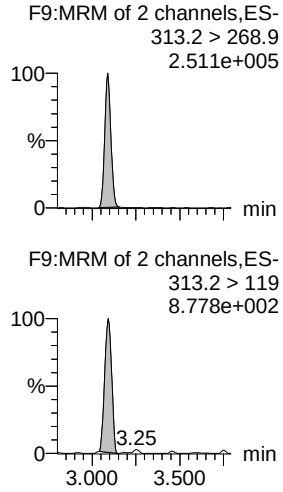

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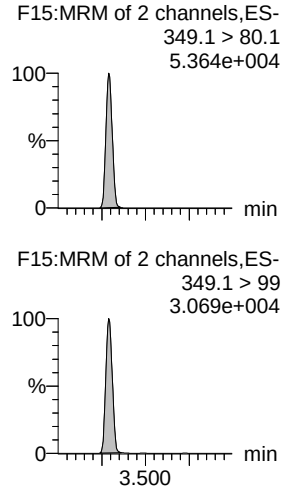

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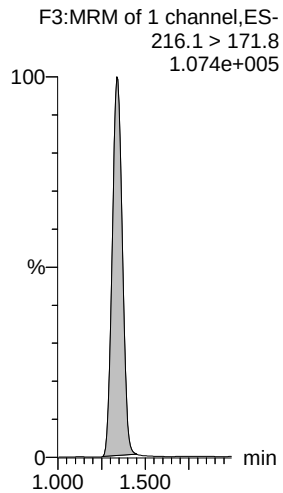

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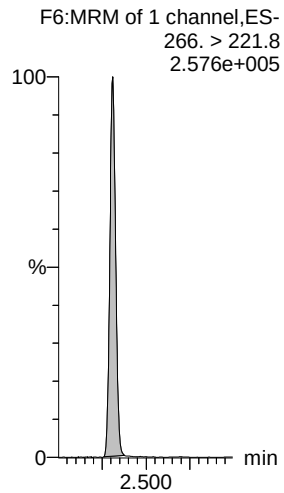

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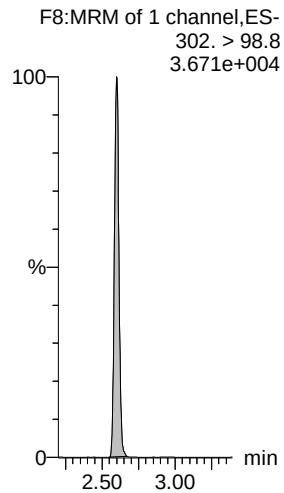

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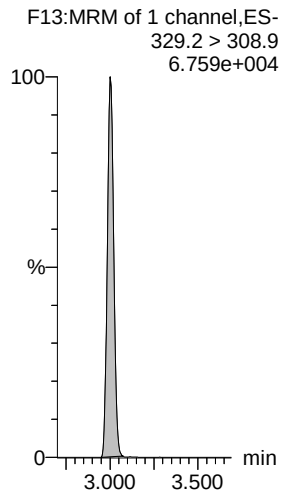

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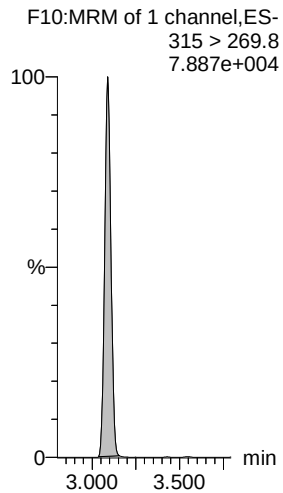

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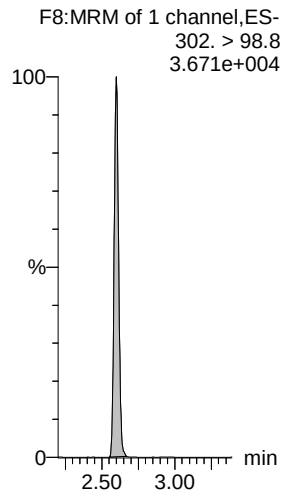


AR 6/6/2018

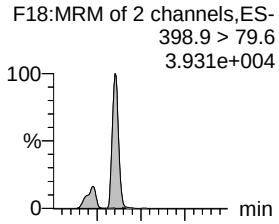
MM 6/8/2018

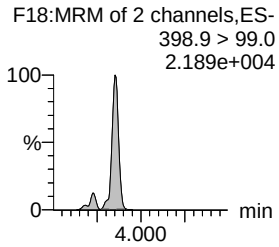
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

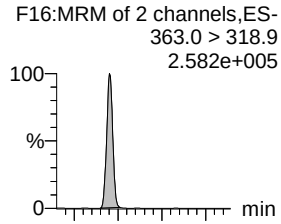
Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

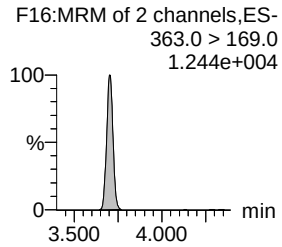
L-PFHxS



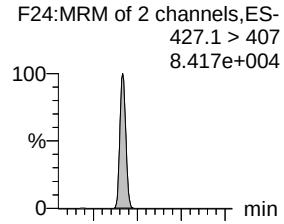


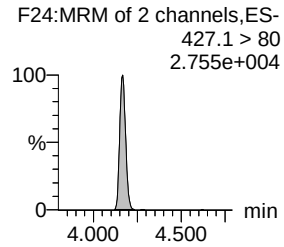
PFHpA





6:2 FTS





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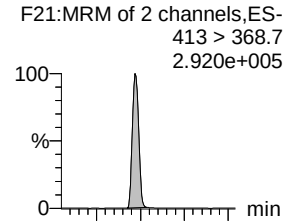

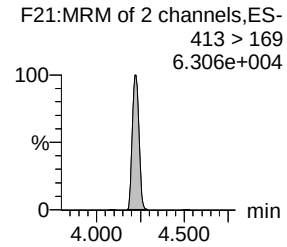

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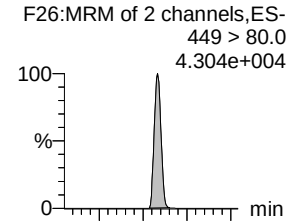

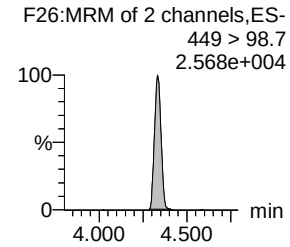

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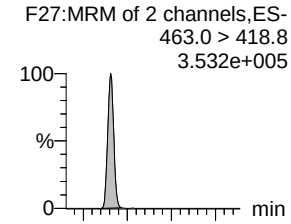

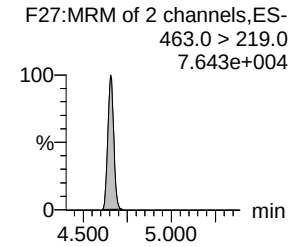

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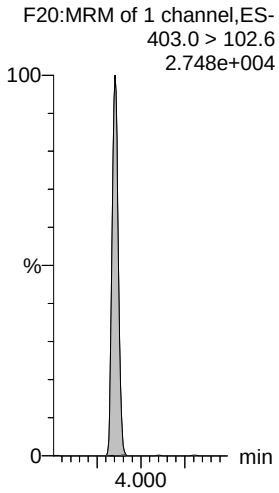

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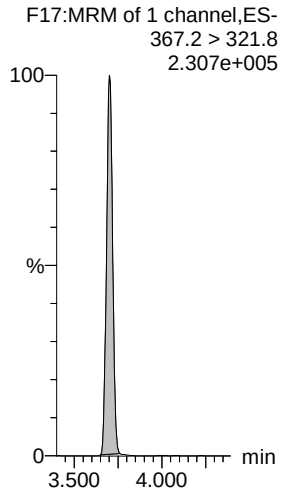
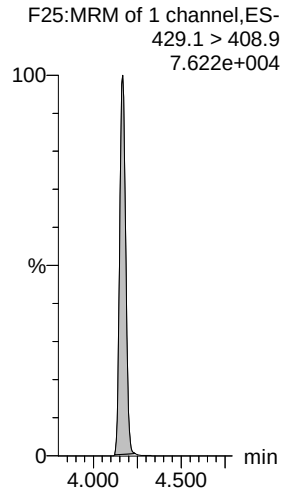


13C2-6:2 FTS



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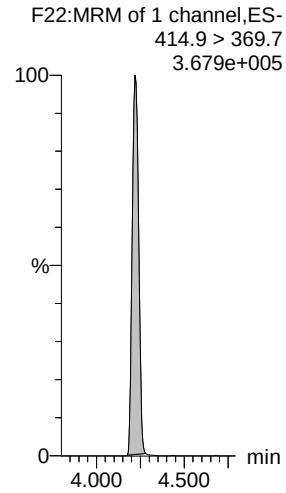

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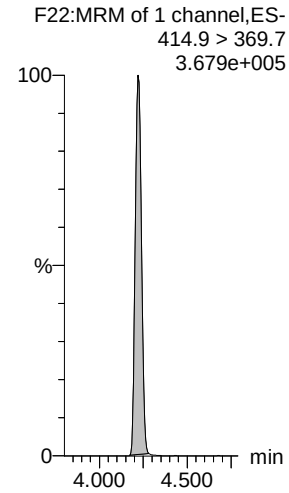

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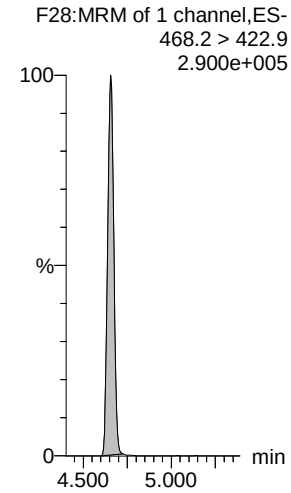


AR 6/6/2018

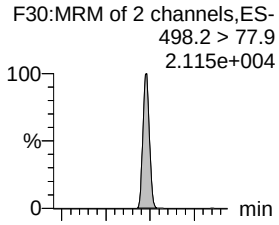
MM 6/8/2018

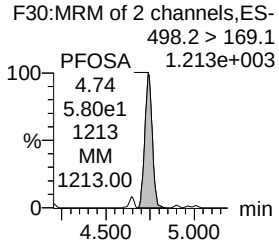
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

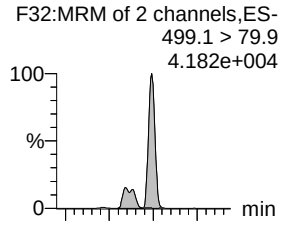
Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

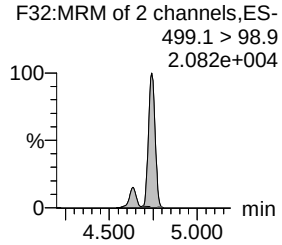
PFOSA





L-PFOS





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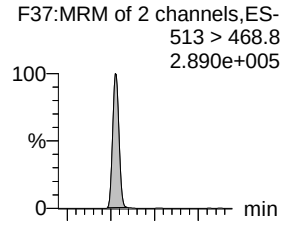

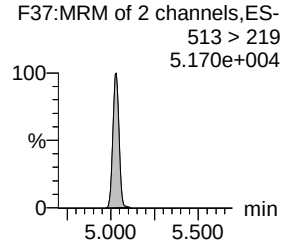

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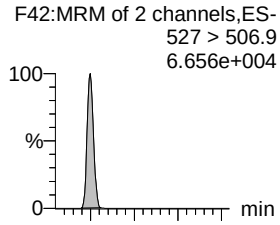
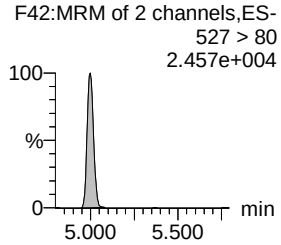
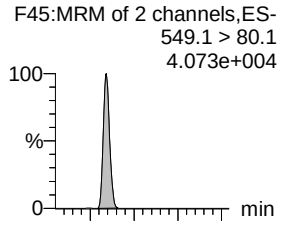
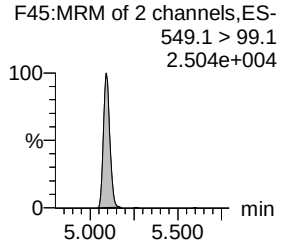


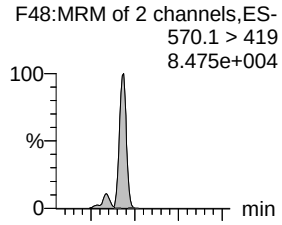


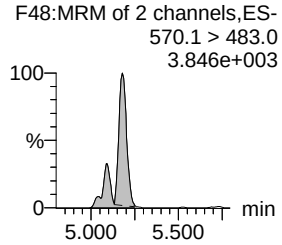
PFNS



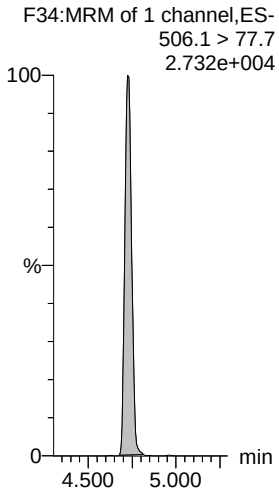


L-MeFOSAA

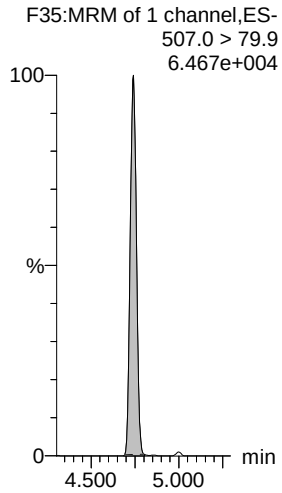




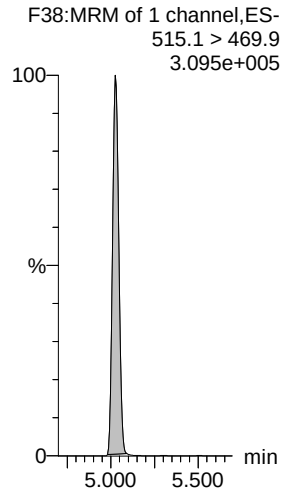
13C8-PFOSA



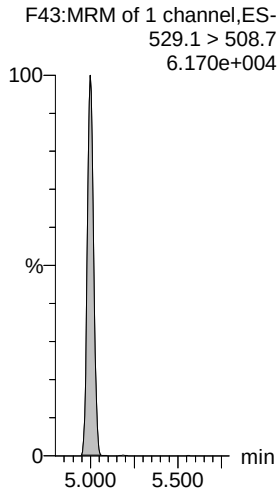
13C8-PFOS



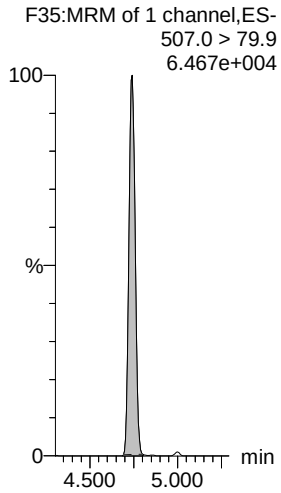
13C2-PFDA



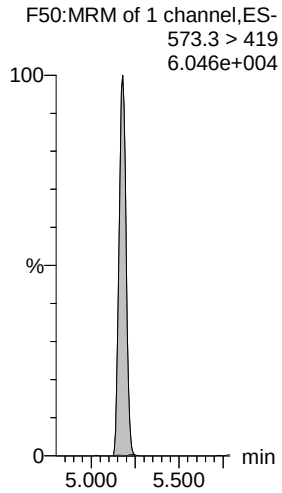
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

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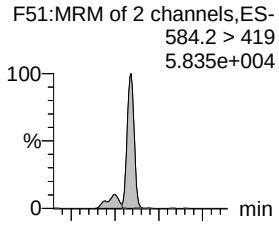
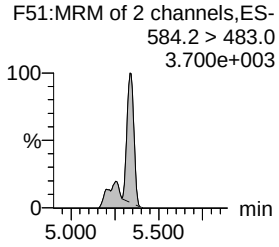
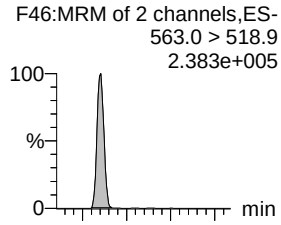
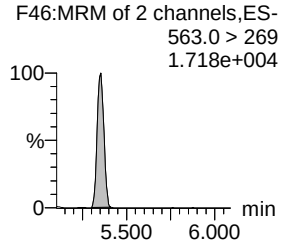


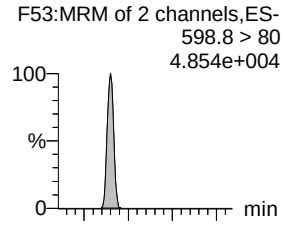


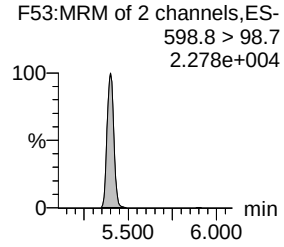
PFUdA



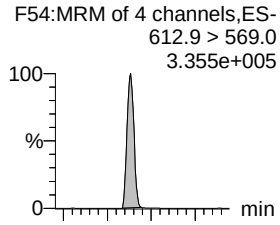


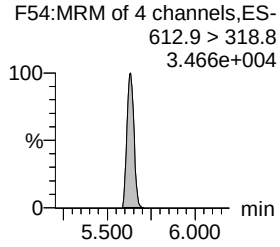
PFDS



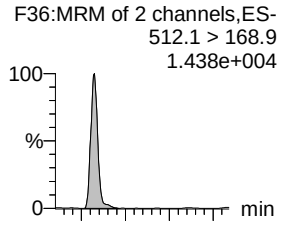


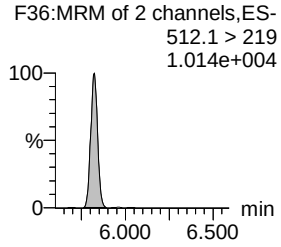
PFDoA



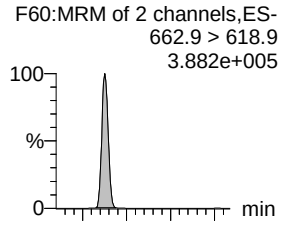


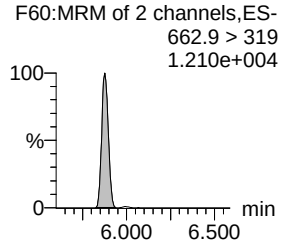
N-MeFOSA



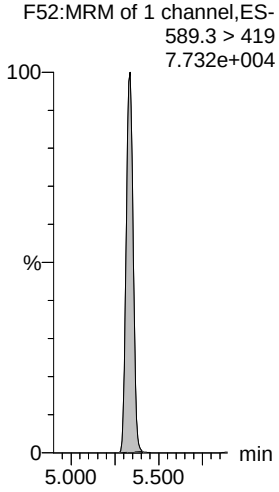


PFTrDA

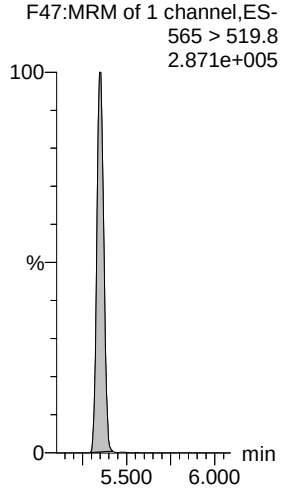




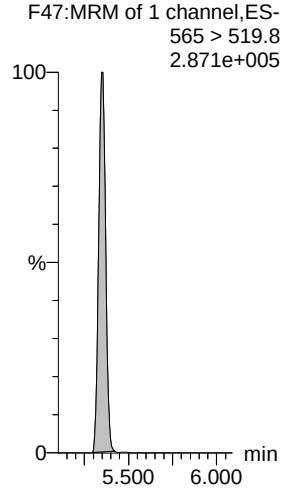
d5-N-EtFOSAA



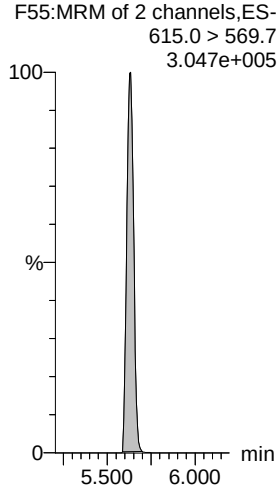
13C2-PFUdA



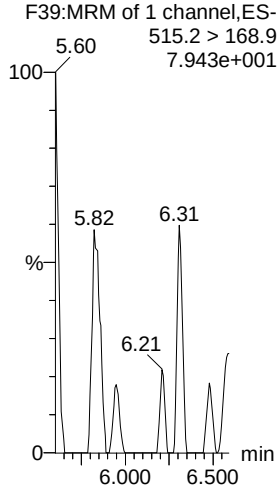
13C2-PFUdA



13C2-PFDoA



d3-N-MeFOSA



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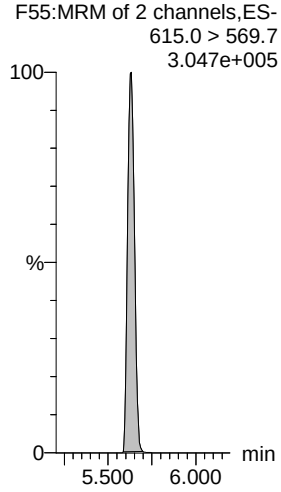

AR 6/6/2018

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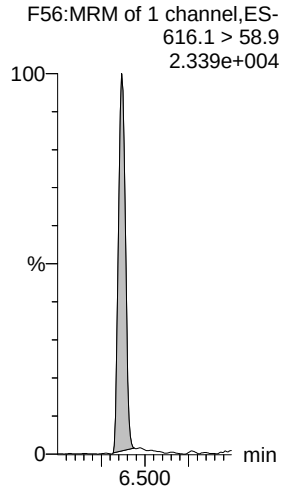
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

N-MeFOSE



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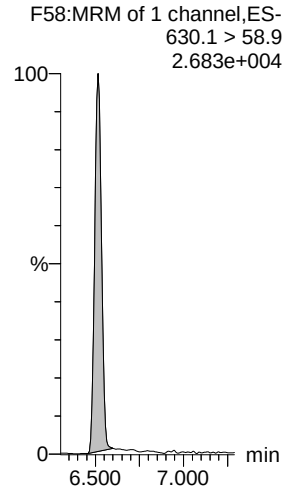
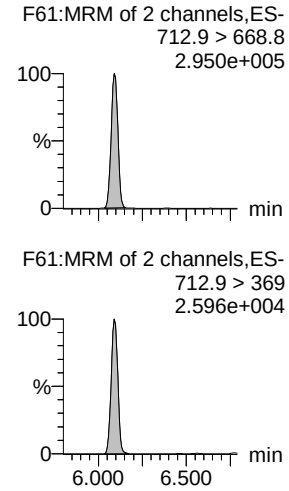
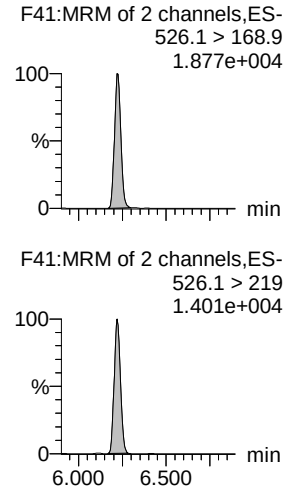


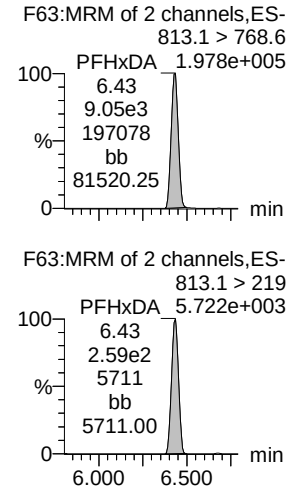
PFTeDA



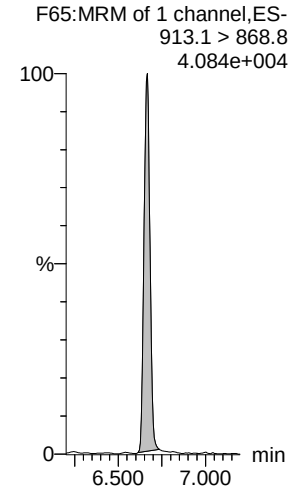
N-EtFOSA



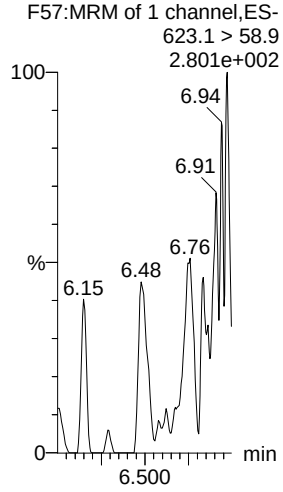
PFHxDA



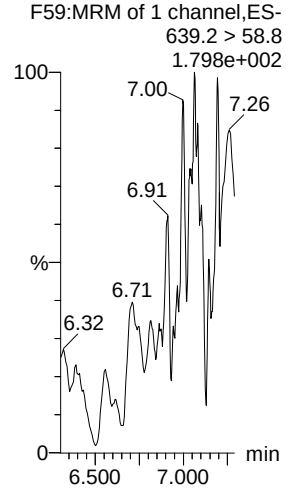
PFODA



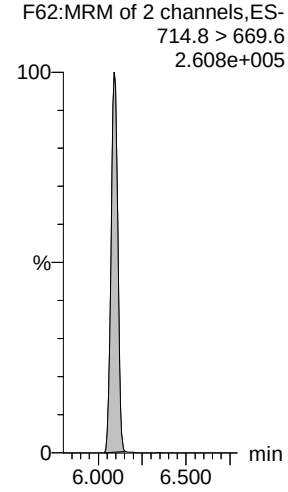
d7-N-MeFOSE



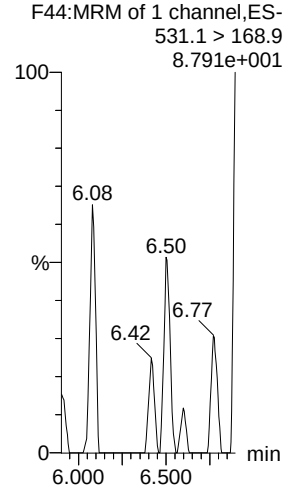
d9-N-EtFOSE



13C2-PFTeDA



d5-N-ETFOSA



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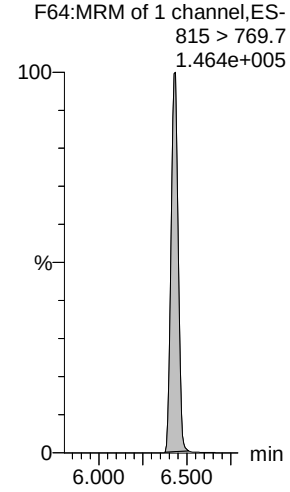

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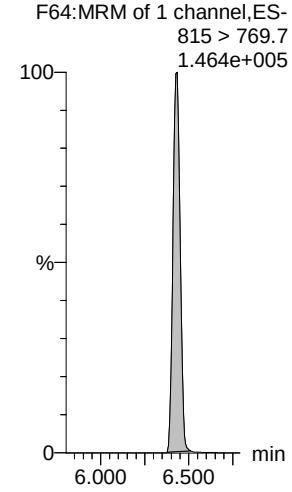

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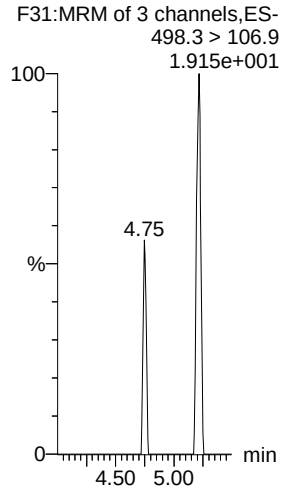
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-22.qld

Last Altered: Wednesday, June 06, 2018 14:28:53 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:29:50 Pacific Daylight Time

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

TCDA



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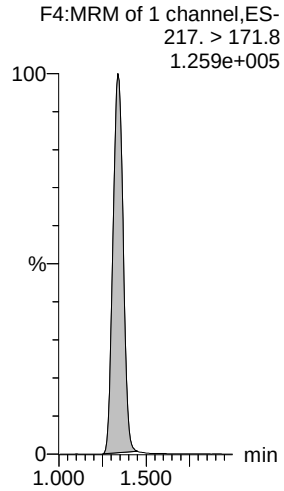
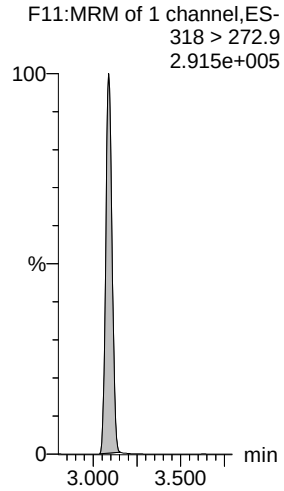


13C5-PFHxA



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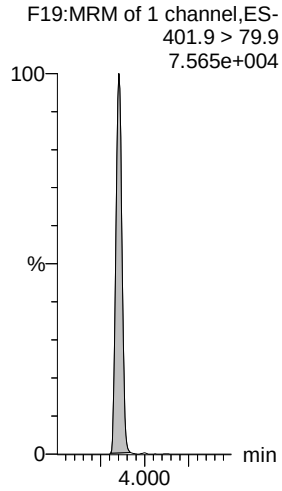
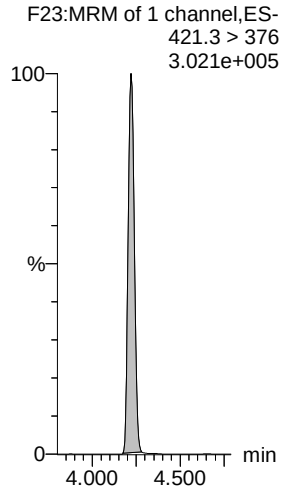
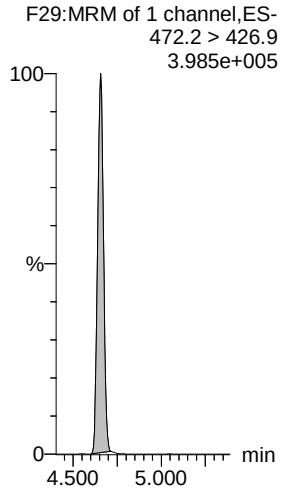


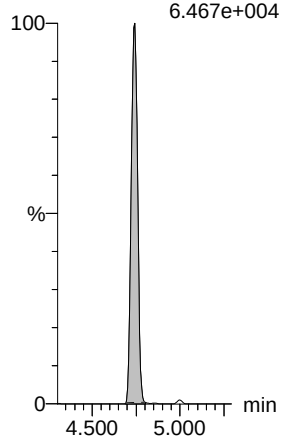
13C8-PFOA



13C9-PFNA



13C8-PFOS



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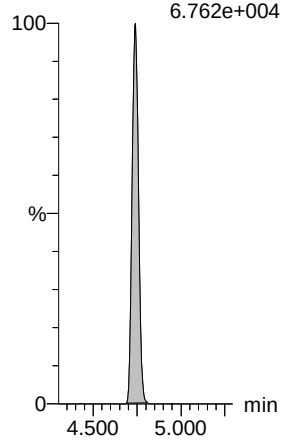
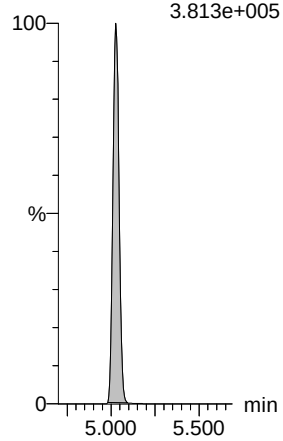
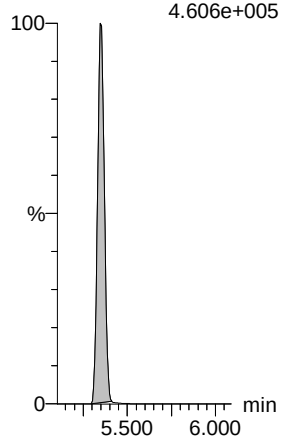


13C6-PFDA



13C7-PFUdA



AR 6/6/2018

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:26 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

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1	1	PFBA	213.0 > 168.8	6.56e3	6.81e3	0.1250		1.33	1.33	12.0	86.757	108.4		
2	2	PFPeA	263.1 > 218.9	7.96e3	8.88e3	0.1250		2.31	2.31	11.2	87.245	109.1		
3	3	PFBS	299.0 > 79.7	2.31e3	1.27e3	0.1250		2.60	2.60	22.8	91.562	114.5	2.888	NO
4	4	4:2 FTS	327.2>307.2	2.59e3	2.86e3	0.1250		3.00	3.01	11.3	84.272	105.3	1.959	NO
5	5	PFHxA	313.2 > 268.9	1.09e4	3.10e3	0.1250		3.09	3.09	17.5	87.889	109.9	222.949	NO
6	6	PFPeS	349.1>80.1	1.99e3	1.27e3	0.1250		3.29	3.29	19.6	86.734	108.4	1.679	NO
7	7	PFHpA	363.0 > 318.9	9.02e3	8.60e3	0.1250		3.70	3.71	13.1	89.841	112.3	20.168	NO
8	8	L-PFHxS	398.9 > 79.6	1.75e3	1.11e3	0.1250		3.85	3.86	19.7	81.920	102.4	1.630	NO
9	10	6:2 FTS	427.1 > 407	3.37e3	3.10e3	0.1250		4.17	4.17	13.6	87.959	109.9	3.240	NO
10	11	L-PFOA	413 > 368.7	9.82e3	1.16e4	0.1250		4.25	4.23	10.6	94.017	117.5	4.546	NO
11	13	PFHpS	449 > 80.0	2.08e3	1.16e4	0.1250		4.33	4.33	2.24	113.876	142.3	1.943	NO
12	14	PFNA	463.0 > 418.8	1.14e4	1.11e4	0.1250		4.66	4.66	12.8	79.850	99.8	4.476	NO
13	15	PFOSA	498.2 > 77.9	7.18e2	8.11e2	0.1250		4.73	4.73	11.1	93.278	116.6	32.936	YES
14	16	L-PFOS	499.1 > 79.9	1.93e3	2.55e3	0.1250		4.74	4.74	9.46	81.522	101.9	2.263	NO
15	18	PFDA	513 > 468.8	1.18e4	1.13e4	0.1250		5.03	5.03	13.0	100.871	126.1	6.501	NO
16	19	8:2 FTS	527 > 506.9	2.67e3	2.12e3	0.1250		5.00	5.00	15.7	87.899	109.9	2.677	NO
17	20	PFNS	549.1>80.1	1.59e3	2.55e3	0.1250		5.09	5.09	7.77	74.475	93.1	1.625	NO
18	21	L-MeFOSAA	570.1 > 419	3.81e3	2.42e3	0.1250		5.18	5.18	19.6	82.990	103.7	17.731	NO

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	23	L-EtFOSAA	584.2 > 419	2.88e3	3.18e3	0.1250		5.37	5.34	11.3	79.351	99.2	14.595	NO
2	25	PFUdA	563.0 > 518.9	1.00e4	1.11e4	0.1250		5.35	5.35	11.3	92.876	116.1	11.706	NO
3	26	PFDS	598.8 > 80	2.02e3	1.11e4	0.1250		5.40	5.40	2.27	125.781	157.2	2.188	NO
4	27	PFDoA	612.9 > 569.0	1.17e4	1.28e4	0.1250		5.63	5.63	11.4	81.998	102.5	9.358	NO
5	28	N-MeFOSA	512.1 > 168.9	3.45e2		0.1250		5.82	5.82				1.467	NO
6	29	PFTrDA	662.9 > 618.9	1.28e4	1.28e4	0.1250		5.88	5.88	12.5	92.319	115.4	28.058	NO
7	30	PFTeDA	712.9 > 668.8	1.29e4	1.07e4	0.1250		6.10	6.09	15.0	92.711	115.9	13.024	NO
8	31	N-EtFOSA	526.1 > 168.9	3.62e2		0.1250		6.23	6.22				1.406	NO
9	32	PFHxDA	813.1 > 768.6	7.88e3	6.95e3	0.1250		6.43	6.43	5.67	74.702	93.4	36.145	NO
10	33	PFODA	913.1 > 868.8	3.25e1	6.95e3	0.1250		6.67	6.67	0.0233	0.408	0.5		
11	34	N-MeFOSE	616.1 > 58.9	7.04e2		0.1250		6.37	6.37					
12	35	N-EtFOSE	630.1 > 58.9	8.36e2		0.1250		6.52	6.52					
13	36	13C3-PFBA	216.1 > 171.8	6.81e3	8.05e3	0.1250	0.885	1.34	1.34	10.6	95.537	95.5		
14	37	13C3-PFPeA	266. > 221.8	8.88e3	1.17e4	0.1250	0.849	2.31	2.31	9.51	89.580	89.6		
15	38	13C3-PFBS	302. > 98.8	1.27e3	1.17e4	0.1250	0.104	2.60	2.60	1.36	104.842	104.8		
16	39	13C2-4:2 FTS	329.2>308.9	2.86e3	1.17e4	0.1250	0.248	3.01	3.00	3.06	98.850	98.9		
17	40	13C2-PFHxA	315 > 269.8	3.10e3	1.17e4	0.1250	0.729	3.09	3.09	3.32	36.447	91.1		
18	41	13C4-PFHpA	367.2 > 321.8	8.60e3	1.17e4	0.1250	0.836	3.71	3.70	9.22	88.188	88.2		
19	42	18O2-PFHxS	403.0 > 102.6	1.11e3	2.64e3	0.1250	0.443	3.86	3.85	5.26	95.093	95.1		
20	43	13C2-6:2 FTS	429.1 > 408.9	3.10e3	1.19e4	0.1250	0.249	4.17	4.17	3.27	104.984	105.0		
21	44	13C2-PFOA	414.9 > 369.7	1.16e4	1.19e4	0.1250	1.332	4.23	4.22	12.2	73.212	73.2		
22	45	13C5-PFNA	468.2 > 422.9	1.11e4	1.38e4	0.1250	0.951	4.66	4.66	10.1	85.158	85.2		
23	46	13C8-PFOSA	506.1 > 77.7	8.11e2	1.62e4	0.1250	0.140	4.73	4.72	0.625	35.825	35.8		
24	47	13C8-PFOS	507.0 > 79.9	2.55e3	2.76e3	0.1250	1.060	4.74	4.74	11.6	87.368	87.4		
25	48	13C2-PFDA	515.1 > 469.9	1.13e4	1.40e4	0.1250	1.130	5.03	5.03	10.1	71.653	71.7		
26	49	13C2-8:2 FTS	529.1 > 508.7	2.12e3	1.17e4	0.1250	0.217	5.00	5.00	2.28	83.744	83.7		
27	50	d3-N-MeFOSAA	573.3 > 419	2.42e3	1.62e4	0.1250	0.184	5.18	5.18	1.87	81.389	81.4		
28	51	d5-N-EtFOSAA	589.3 > 419	3.18e3	1.62e4	0.1250	0.223	5.34	5.34	2.45	87.871	87.9		
29	52	13C2-PFUdA	565 > 519.8	1.11e4	1.62e4	0.1250	0.936	5.35	5.35	8.56	73.162	73.2		
30	53	13C2-PFDoA	615.0 > 569.7	1.28e4	1.40e4	0.1250	1.168	5.63	5.63	11.4	78.041	78.0		
31	54	d3-N-MeFOSA	515.2 > 168.9		1.62e4	0.1250	0.051	5.85						
32	55	13C2-PFTeDA	714.8 > 669.6	1.07e4	1.62e4	0.1250	0.706	6.09	6.09	8.26	93.569	93.6		AR 6/6/2018

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

	#	Name	Trace	Area	IS Area	wt/vol	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
33	56	d5-N-ETFOSA	531.1 > 168.9		1.62e4	0.1250	0.071	6.24						
34	57	13C2-PFHxDA	815 > 769.7	6.95e3	1.62e4	0.1250	1.079	6.43	6.43	5.36	39.731	99.3		
35	58	d7-N-MeFOSE	623.1 > 58.9		1.62e4	0.1250	0.041	6.37						
36	59	d9-N-EtFOSE	639.2 > 58.8		1.62e4	0.1250	0.038	6.51						
37	60	13C4-PFBA	217. > 171.8	8.05e3	8.05e3	0.1250	1.000	1.35	1.34	12.5	100.000	100.0		
38	61	13C5-PFHxA	318 > 272.9	1.17e4	1.17e4	0.1250	1.000	3.09	3.09	12.5	100.000	100.0		
39	62	13C3-PFHxS	401.9 > 79.9	2.64e3	2.64e3	0.1250	1.000	3.86	3.85	12.5	100.000	100.0		
40	63	13C8-PFOA	421.3 > 376	1.19e4	1.19e4	0.1250	1.000	4.23	4.22	12.5	100.000	100.0		
41	64	13C9-PFNA	472.2 > 426.9	1.38e4	1.38e4	0.1250	1.000	4.66	4.66	12.5	100.000	100.0		
42	65	13C4-PFOS	503 > 79.9	2.76e3	2.76e3	0.1250	1.000	4.74	4.74	12.5	100.000	100.0		
43	66	13C6-PFDA	519.1 > 473.7	1.40e4	1.40e4	0.1250	1.000	5.03	5.03	12.5	100.000	100.0		
44	67	13C7-PFUdA	570.1 > 524.8	1.62e4	1.62e4	0.1250	1.000	5.35	5.35	12.5	100.000	100.0		
45	68	Total PFHxS	398.9 > 79.6	1.75e3	1.11e3	0.1250		4.05		19.7	81.920			
46	69	Total PFOA	413 > 368.7	9.82e3	1.16e4	0.1250		4.30		10.6	94.017			
47	70	Total PFOS	499.1 > 79.9	1.93e3	2.55e3	0.1250		4.90		9.46	81.522			
48	71	Total N-MeFOSAA	570.1 > 419	3.81e3	2.42e3	0.1250		5.55		19.6	82.990			
49	72	Total N-EtFOSAA	584.2 > 419	2.88e3	3.18e3	0.1250		5.70		11.3	79.351			

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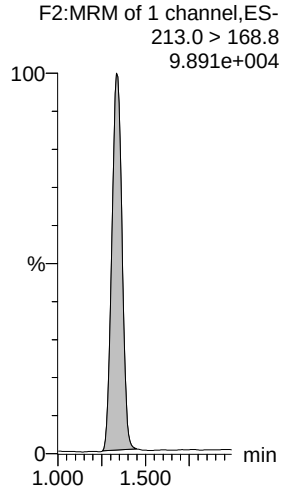
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

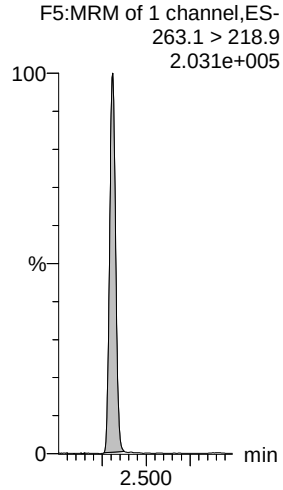
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

PFBA



PFPeA



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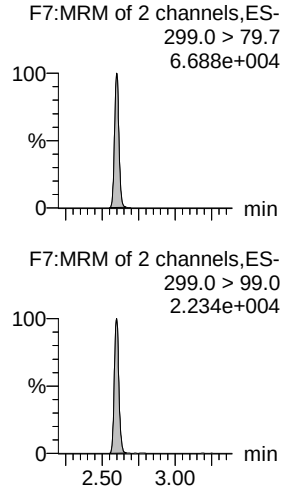
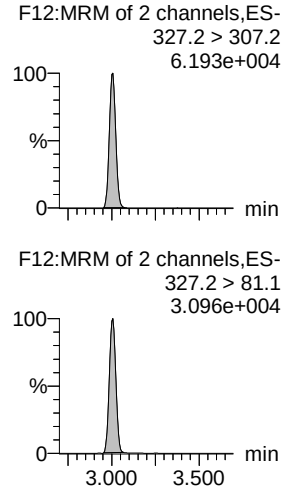
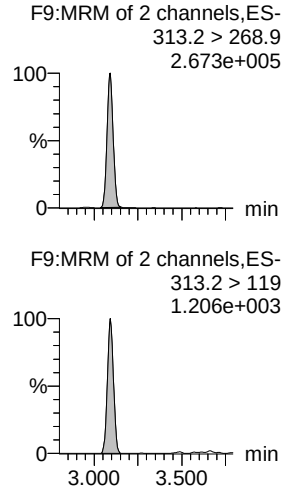


4:2 FTS



PFHxA



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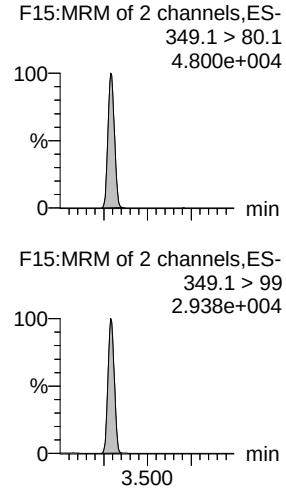
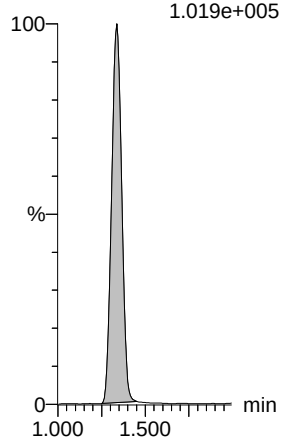


13C3-PFBA



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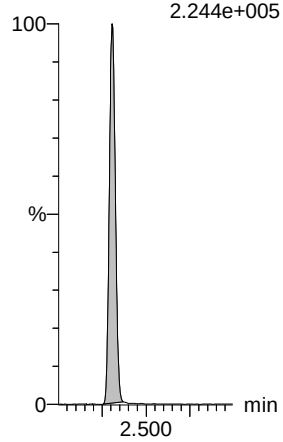

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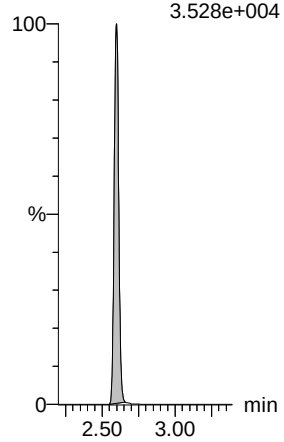

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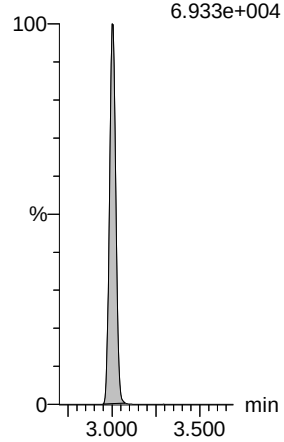
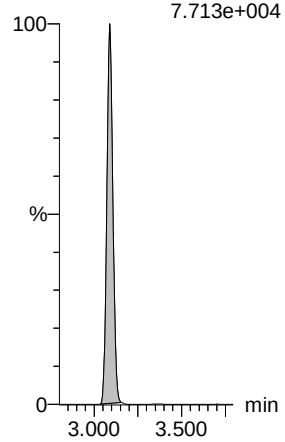


13C2-PFHxA



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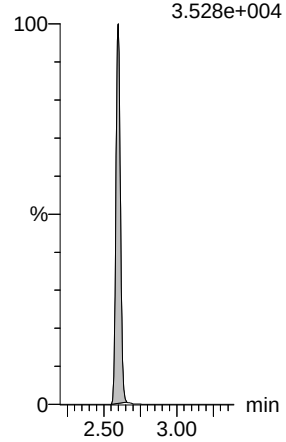


AR 6/6/2018

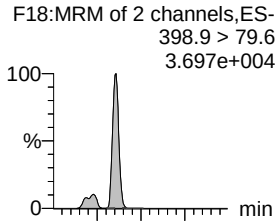
MM 6/6/2018

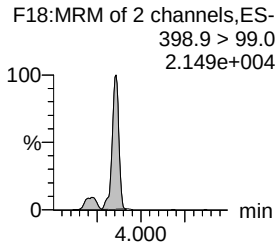
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

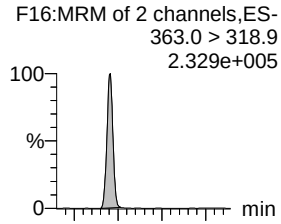
Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

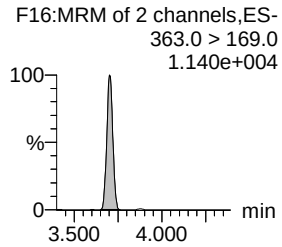
L-PFHxS



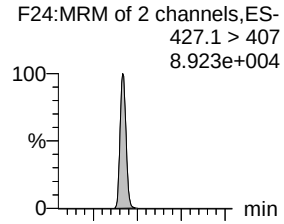


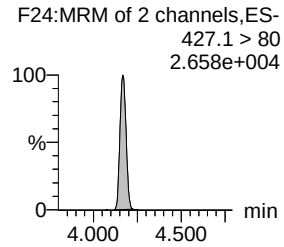
PFHpA



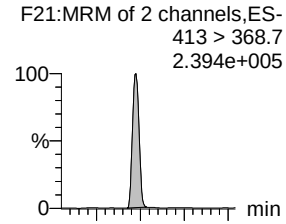


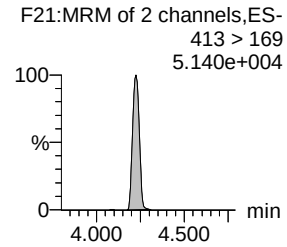
6:2 FTS





L-PFOA





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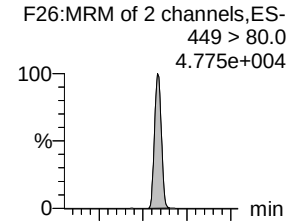

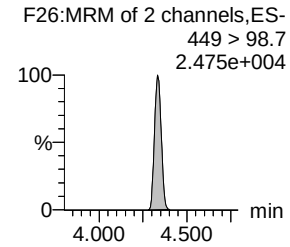

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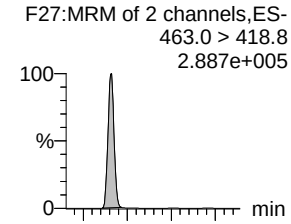
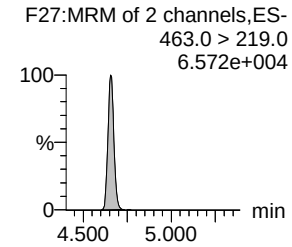
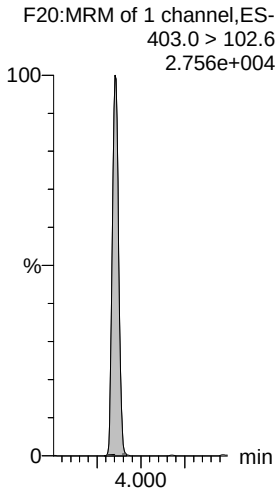
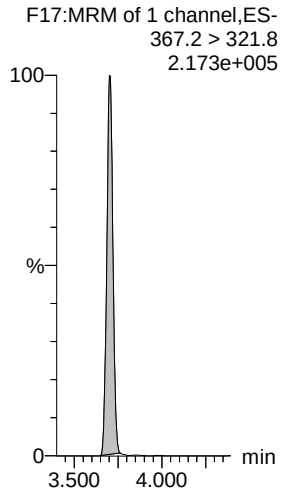




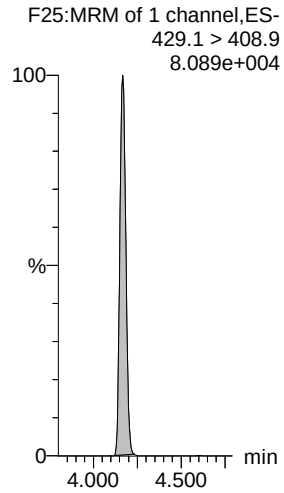
18O2-PFHxS



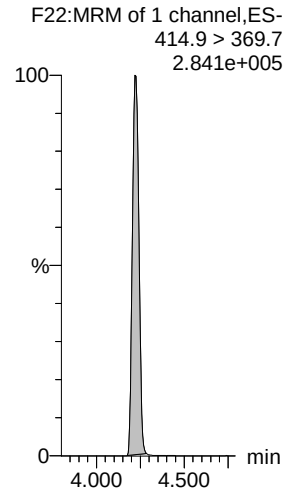
13C4-PFHpA



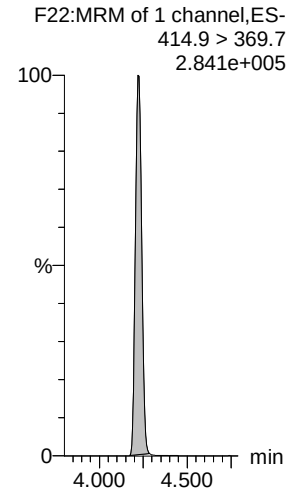
13C2-6:2 FTS



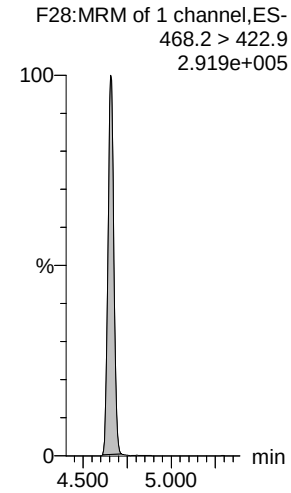
13C2-PFOA



13C2-PFOA



13C5-PFNA



AR 6/6/2018

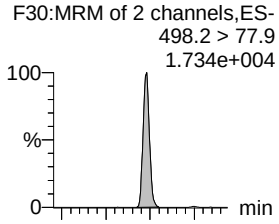
MM 6/6/2018

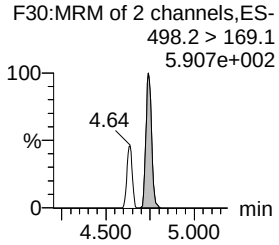
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

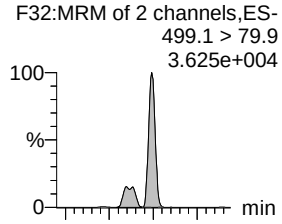
Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

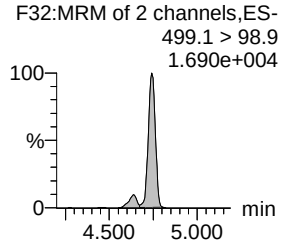
PFOSA



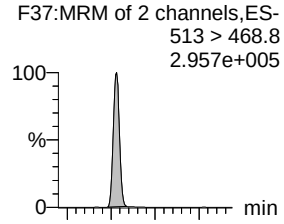


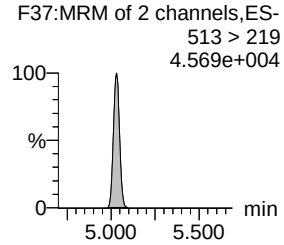
L-PFOS



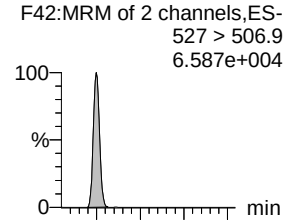


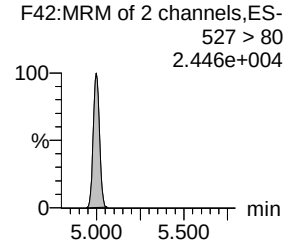
PFDA



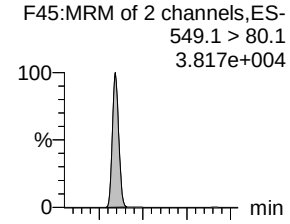


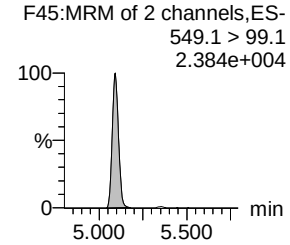
8:2 FTS



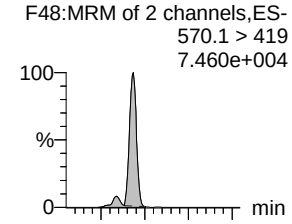


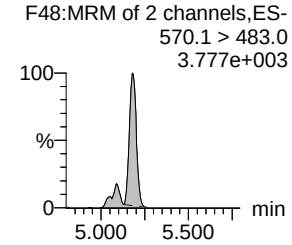
PFNS



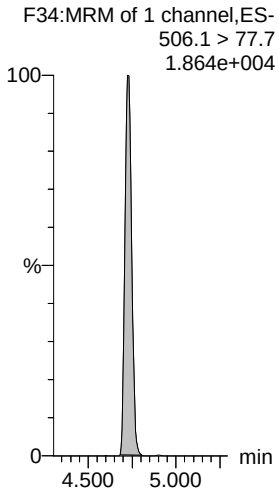


L-MeFOSAA

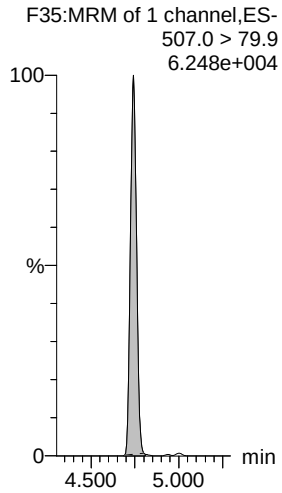




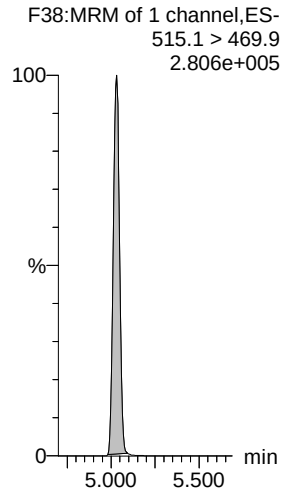
13C8-PFOSA



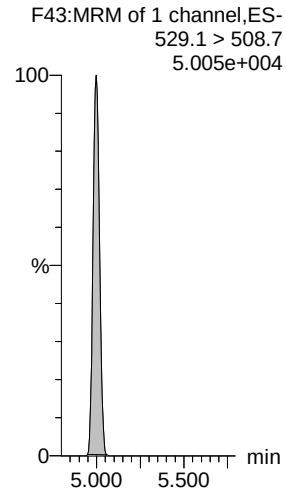
13C8-PFOS



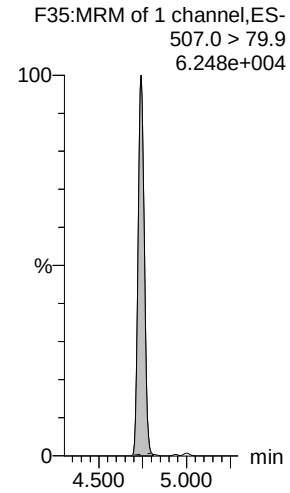
13C2-PFDA



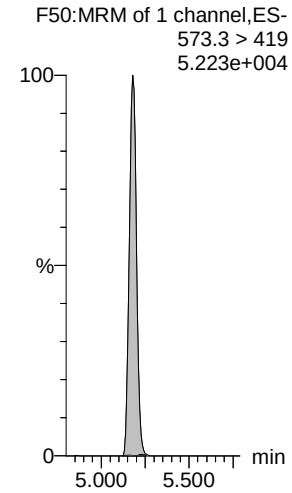
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



AR 6/6/2018

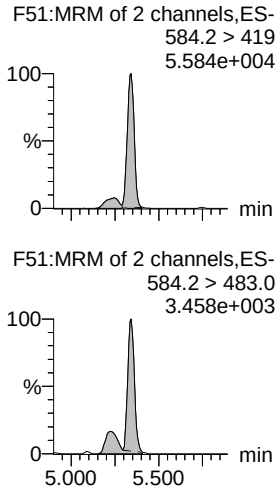
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

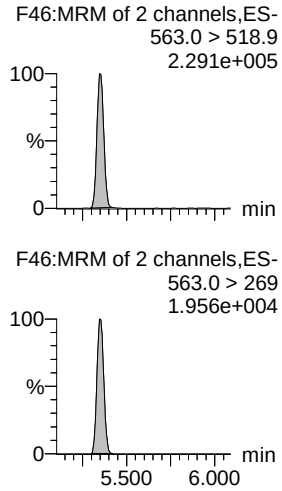
Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

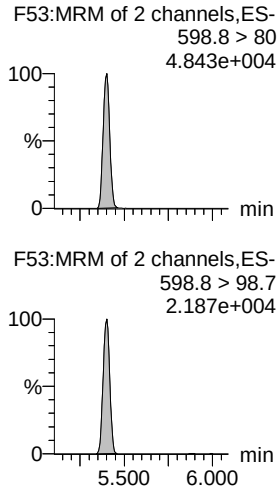
L-EtFOSAA



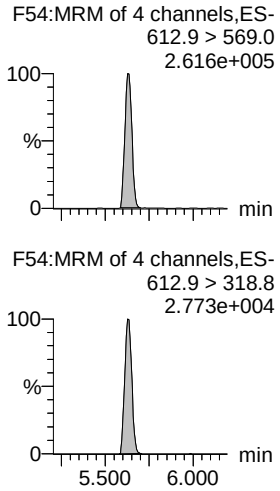
PFUdA



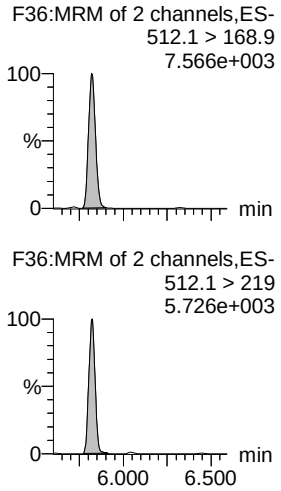
PFDS



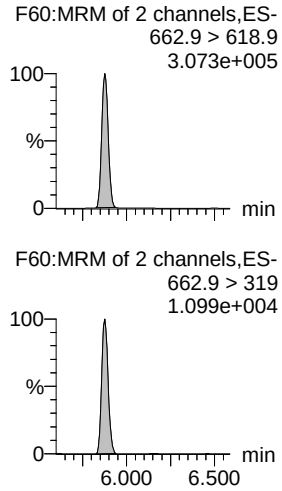
PFDoA



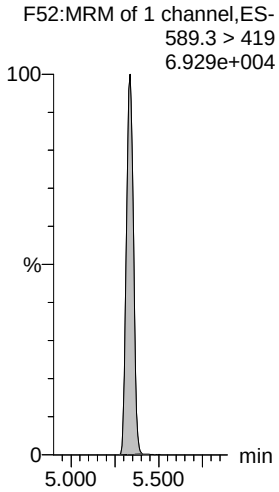
N-MeFOSA



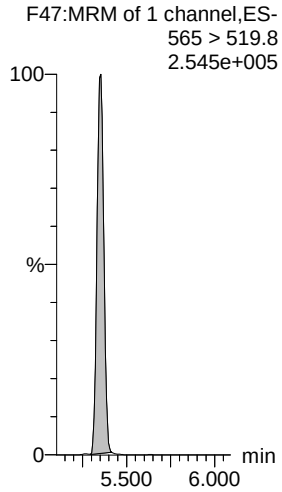
PFTrDA



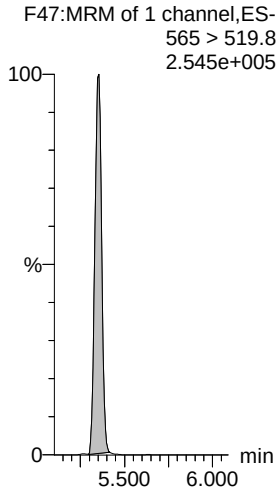
d5-N-EtFOSAA



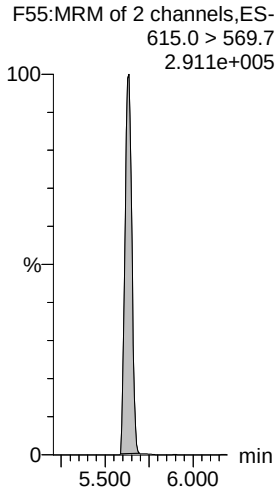
13C2-PFUdA



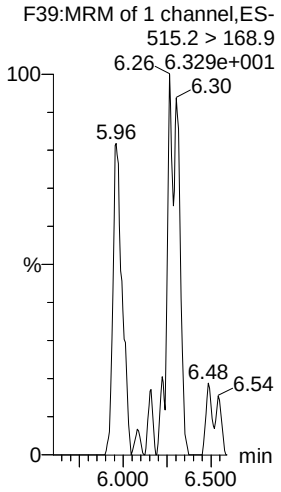
13C2-PFUdA



13C2-PFDoA



d3-N-MeFOSA



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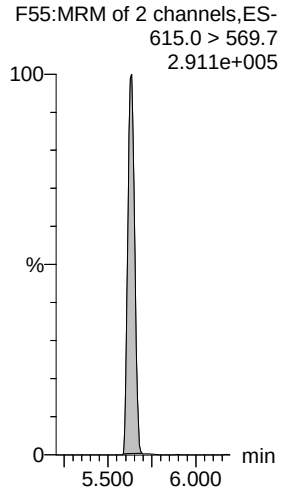


AR 6/6/2018

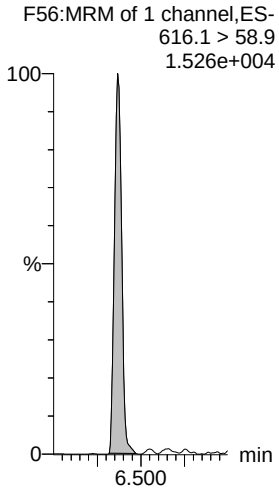
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

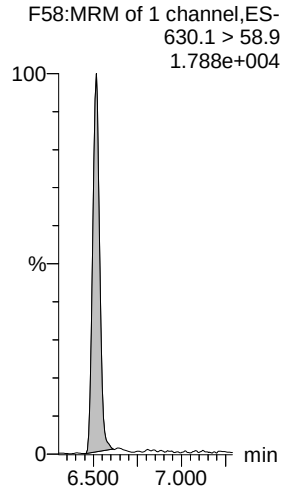
Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

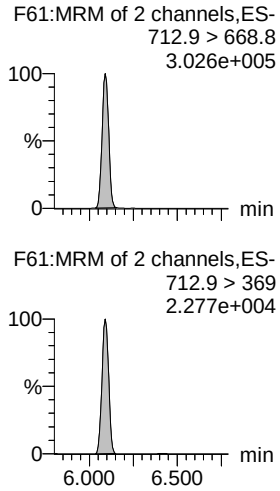
N-MeFOSE



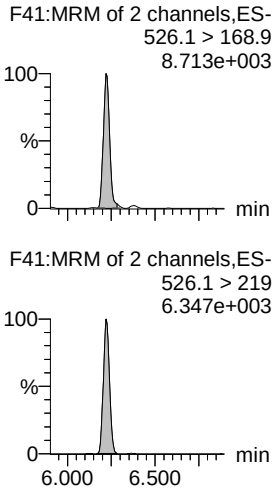
N-EtFOSE



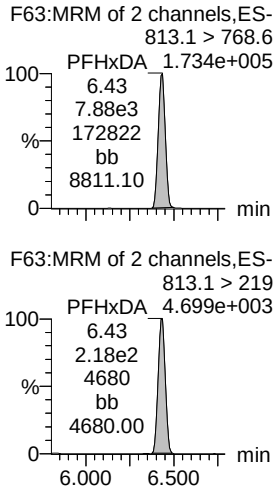
PFTeDA



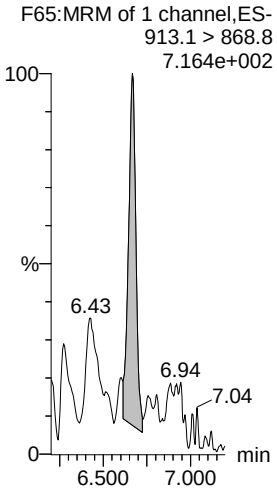
N-EtFOSA



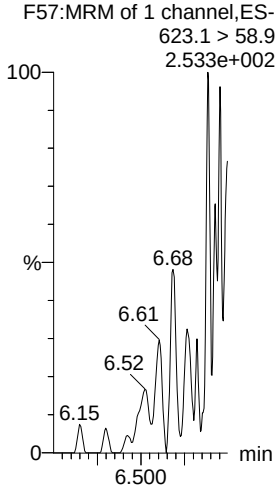
PFHxDA



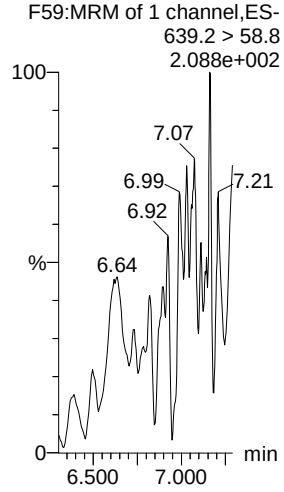
PFODA



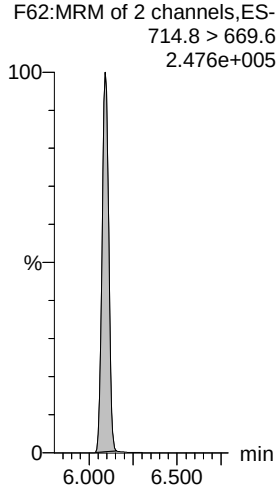
d7-N-MeFOSE



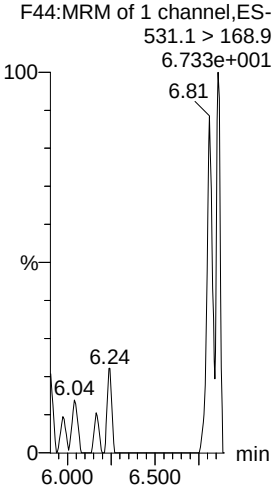
d9-N-EtFOSE



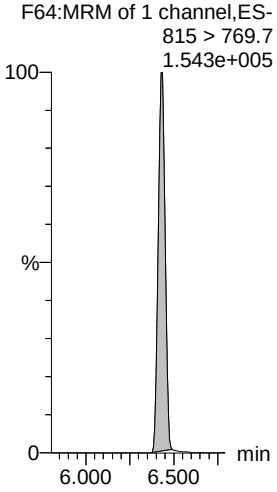
13C2-PFTeDA



d5-N-ETFOSA



13C2-PFHxDA



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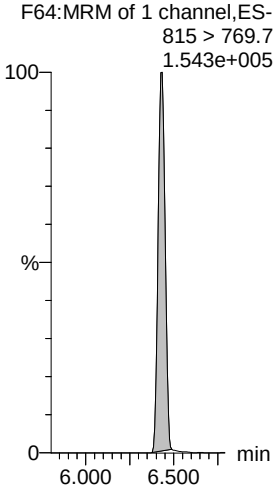


AR 6/6/2018

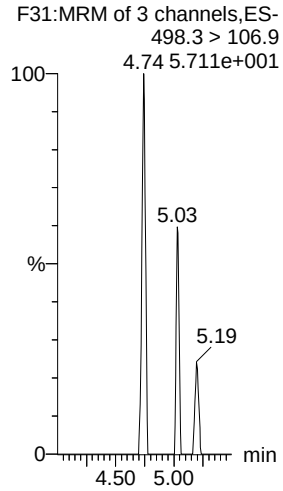
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-23.qld

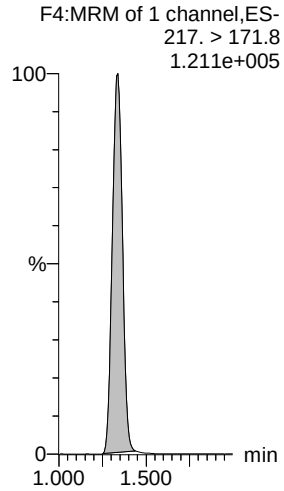
Last Altered: Wednesday, June 06, 2018 14:34:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:35:39 Pacific Daylight Time

Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

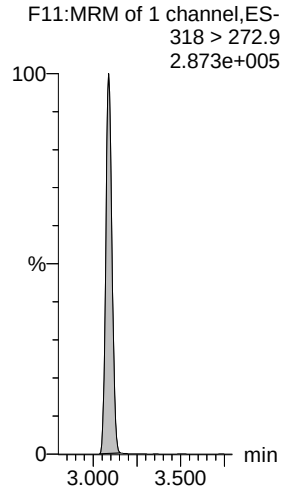
TCDA



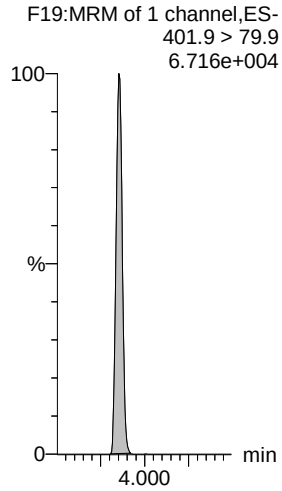
13C4-PFBA



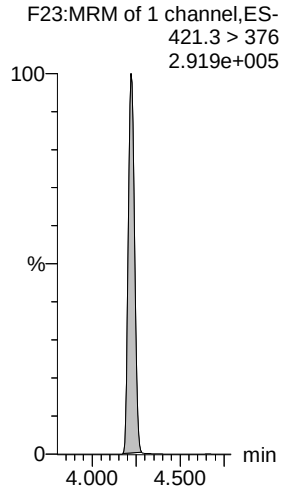
13C5-PFHxA



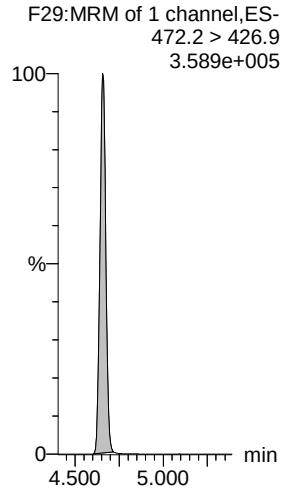
13C3-PFHxS



13C8-PFOA



13C9-PFNA



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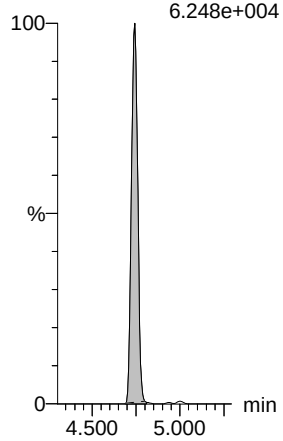

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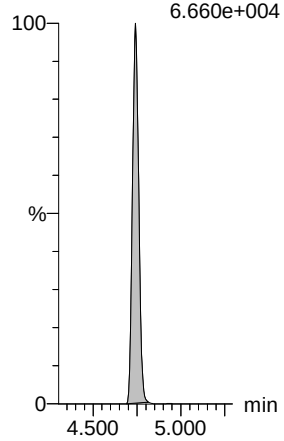
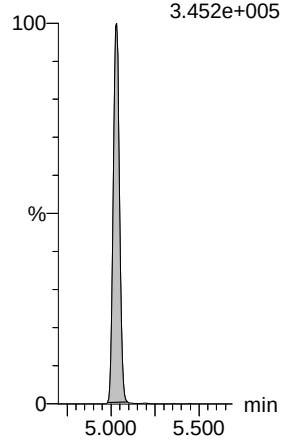
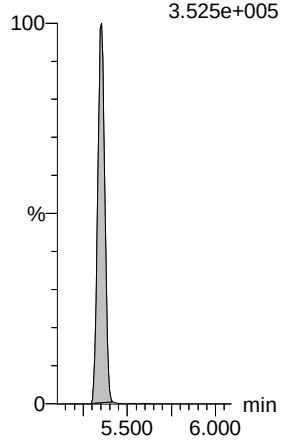


13C6-PFDA



13C7-PFUdA



AR 6/6/2018

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MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:02:29 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7	1.32e3	1.13e3	0.120		2.60	2.60	14.6	61.2933		2.830	NO
2	5	PFHxA	313.2 > 268.9	6.63e3	1.23e3	0.120		3.09	3.09	27.0	141.6125		365.817	NO
3	7	PFHpA	363.0 > 318.9	5.97e2	3.34e3	0.120		3.70	3.70	2.24	15.6119		24.760	YES
4	8	L-PFHxS	398.9 > 79.6	1.66e3	9.85e2	0.120		3.85	3.85	21.1	91.7603		1.946	NO
5	11	L-PFOA	413 > 368.7	5.95e2	5.00e3	0.120		4.25	4.22	1.49	13.1077		5.930	YES
6	14	PFNA	463.0 > 418.8		3.97e3	0.120		4.66						
7	16	L-PFOS	499.1 > 79.9	5.07e1	2.29e3	0.120		4.74	4.62	0.277	3.0255		5.266	YES
8	18	PFDA	513 > 468.8		5.96e3	0.120		5.03						
9	21	L-MeFOSAA	570.1 > 419		2.25e3	0.120		5.18						
10	23	L-EtFOSAA	584.2 > 419		2.81e3	0.120		5.37						

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:02:46 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		6.60e3	0.120		5.35						
2	27	PFDoA	612.9 > 569.0		5.89e3	0.120		5.63						
3	29	PFTrDA	662.9 > 618.9		5.89e3	0.120		5.88						
4	30	PFTeDA	712.9 > 668.8		5.74e3	0.120		6.10						
5	38	13C3-PFBS	302. > 98.8	1.13e3	4.40e3	0.120	0.104	2.60	2.60	3.20	257.9007	246.8		
6	40	13C2-PFHxA	315 > 269.8	1.23e3	4.40e3	0.120	0.729	3.09	3.09	3.49	40.0218	95.7		
7	41	13C4-PFHpA	367.2 > 321.8	3.34e3	4.40e3	0.120	0.836	3.71	3.70	9.48	94.7322	90.6		
8	42	18O2-PFHxS	403.0 > 102.6	9.85e2	2.26e3	0.120	0.443	3.86	3.85	5.44	102.7507	98.3		
9	44	13C2-PFOA	414.9 > 369.7	5.00e3	4.58e3	0.120	1.332	4.23	4.22	13.6	85.5713	81.9		

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	3.97e3	5.86e3	0.120	0.951	4.66	4.66	8.48	74.5644	71.3		
2	46	13C8-PFOSA	506.1 > 77.7	8.31e2	8.35e3	0.120	0.140	4.73	4.72	1.24	74.6000	71.4		
3	47	13C8-PFOS	507.0 > 79.9	2.29e3	2.45e3	0.120	1.060	4.74	4.74	11.7	92.1852	88.2		
4	48	13C2-PFDA	515.1 > 469.9	5.96e3	6.05e3	0.120	1.130	5.03	5.03	12.3	91.1520	87.2		
5	50	d3-N-MeFOSAA	573.3 > 419	2.25e3	8.35e3	0.120	0.184	5.18	5.18	3.36	153.2145	146.6		
6	51	d5-N-EtFOSAA	589.3 > 419	2.81e3	8.35e3	0.120	0.223	5.34	5.34	4.21	157.7231	150.9	H	
7	52	13C2-PFUdA	565 > 519.8	6.60e3	8.35e3	0.120	0.936	5.35	5.35	9.89	88.2797	84.5		
8	53	13C2-PFDoA	615.0 > 569.7	5.89e3	6.05e3	0.120	1.168	5.63	5.63	12.2	87.1245	83.4		
9	55	13C2-PFTeDA	714.8 > 669.6	5.74e3	8.35e3	0.120	0.706	6.09	6.09	8.60	101.8076	97.4		
10	57	13C2-PFHxDA	815 > 769.7	5.27e3	8.35e3	0.120	1.079	6.43	6.43	7.89	61.1547	146.3		
11	60	13C4-PFBA	217. > 171.8	3.32e3	3.32e3	0.120	1.000	1.35	1.35	12.5	104.5063	100.0		
12	61	13C5-PFHxA	318 > 272.9	4.40e3	4.40e3	0.120	1.000	3.09	3.09	12.5	104.5063	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	2.26e3	2.26e3	0.120	1.000	3.86	3.85	12.5	104.5063	100.0		
14	63	13C8-PFOA	421.3 > 376	4.58e3	4.58e3	0.120	1.000	4.23	4.22	12.5	104.5063	100.0		
15	64	13C9-PFNA	472.2 > 426.9	5.86e3	5.86e3	0.120	1.000	4.66	4.66	12.5	104.5063	100.0		
16	65	13C4-PFOS	503 > 79.9	2.45e3	2.45e3	0.120	1.000	4.74	4.74	12.5	104.5063	100.0		
17	66	13C6-PFDA	519.1 > 473.7	6.05e3	6.05e3	0.120	1.000	5.03	5.03	12.5	104.5063	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	8.35e3	8.35e3	0.120	1.000	5.35	5.35	12.5	104.5063	100.0		
19	68	Total PFHxS	398.9 > 79.6	1.66e3	9.85e2	0.120		4.05		21.1	91.7603			
20	69	Total PFOA	413 > 368.7	7.04e2	5.00e3	0.120		4.30		1.76	14.8449			
21	70	Total PFOS	499.1 > 79.9	5.07e1	2.29e3	0.120		4.90		0.277	3.0255			
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	2.25e3	0.120		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	2.81e3	0.120		5.70		0.000				

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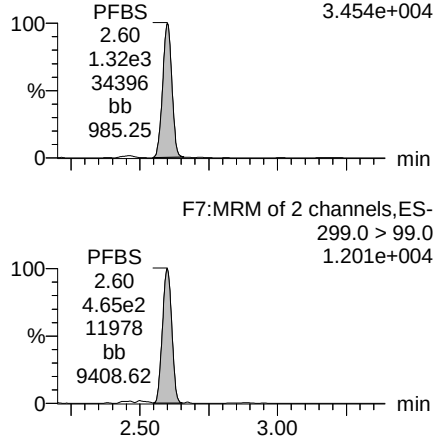
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

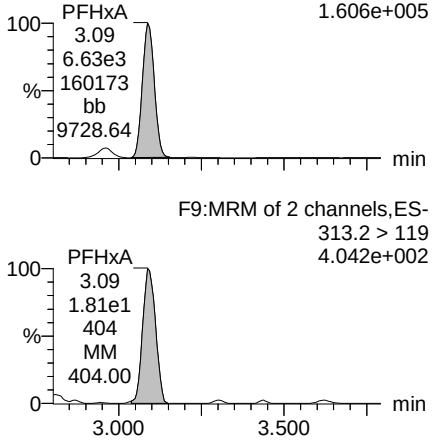
Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

PFBS



PFHxA



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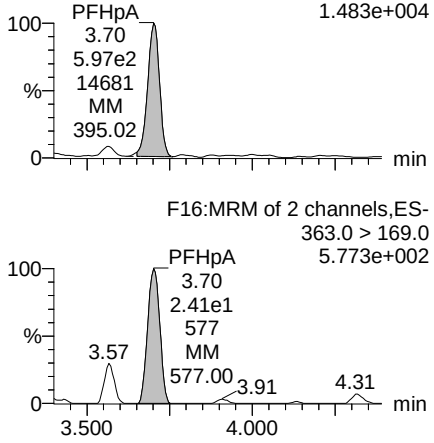

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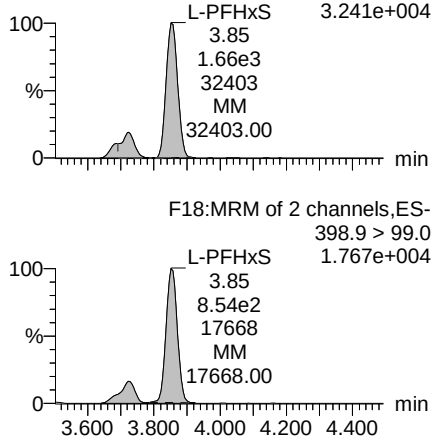
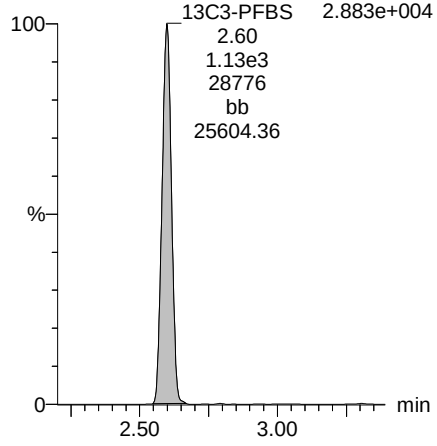
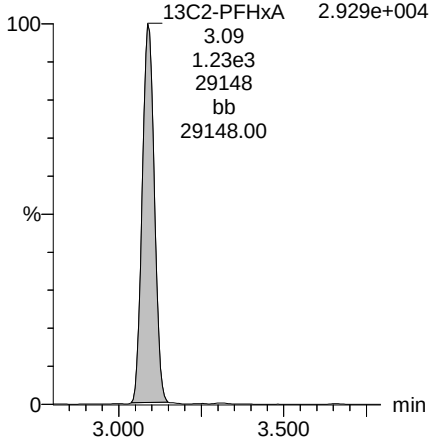


13C3-PFBS



13C2-PFHxA



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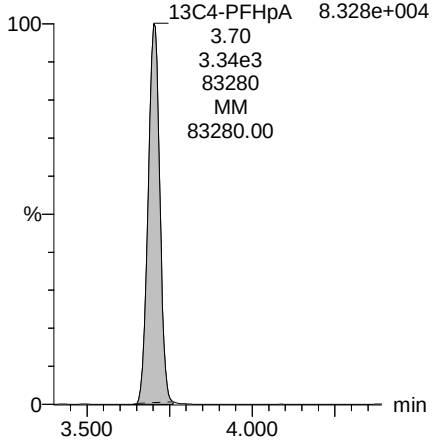

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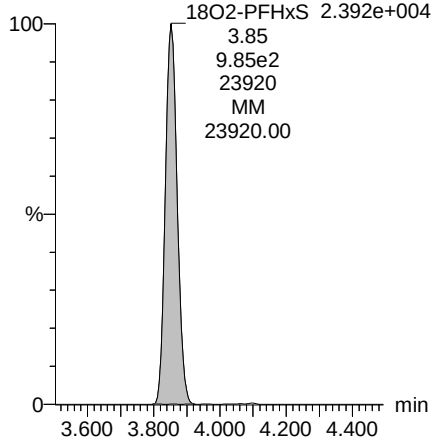


AR 6/6/2018

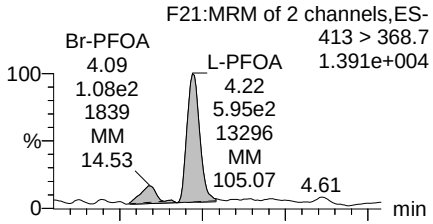
MM 6/6/2018

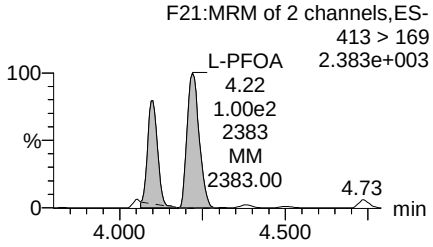
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

Total PFOA





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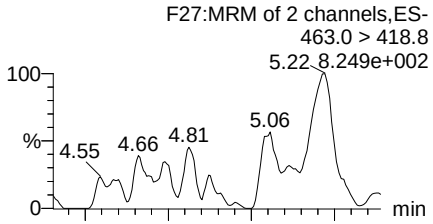
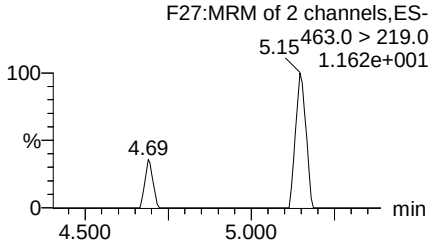
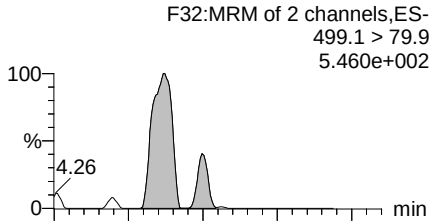
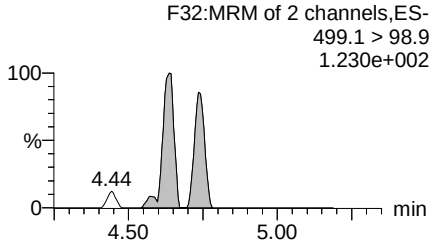




Total PFOS





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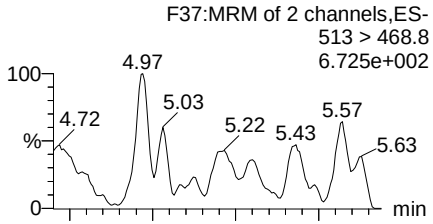

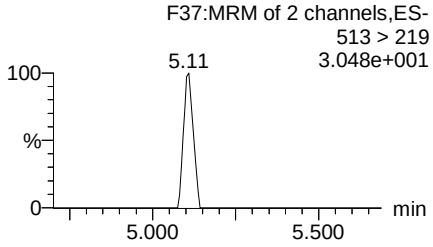

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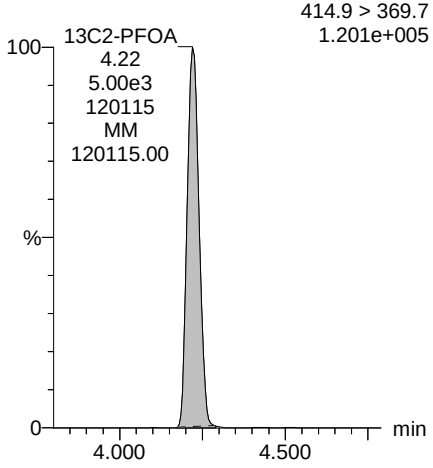
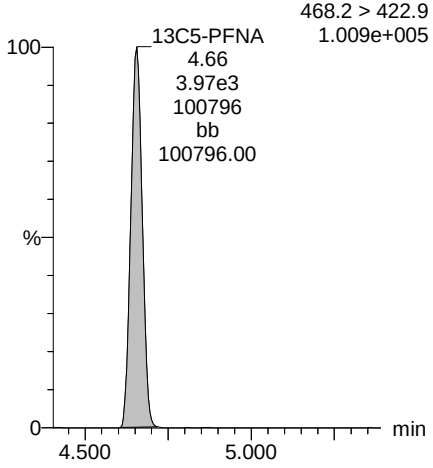
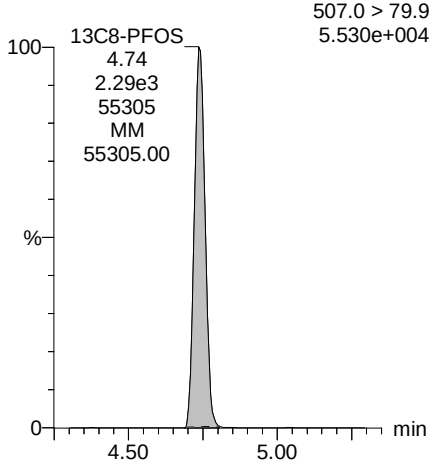


13C5-PFNA



13C8-PFOS



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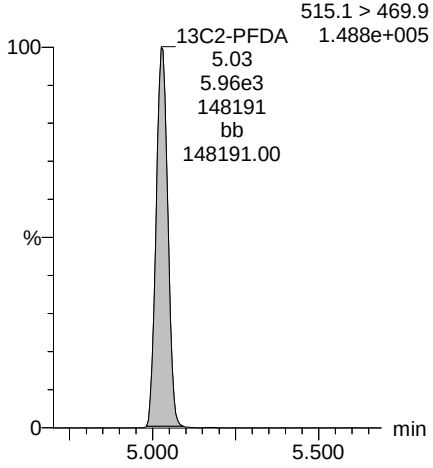

AR 6/6/2018

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

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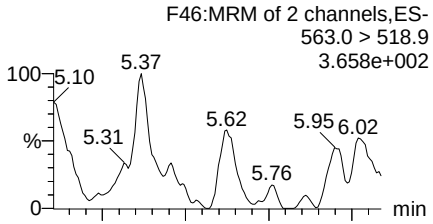
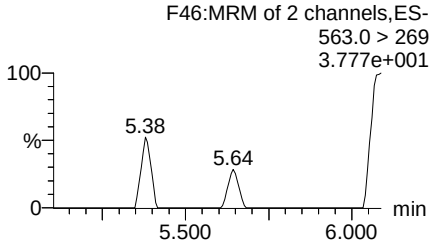
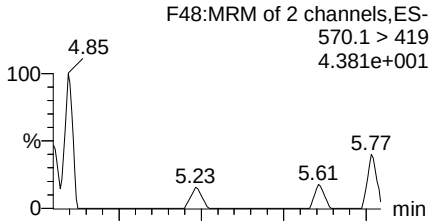
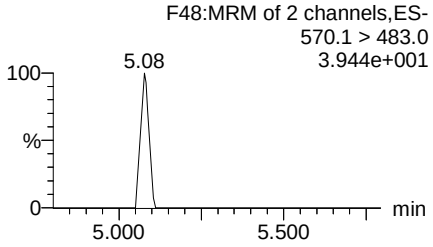


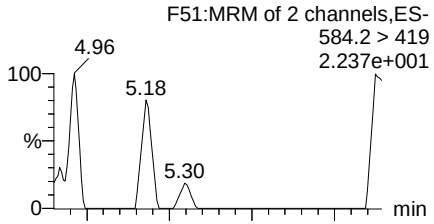


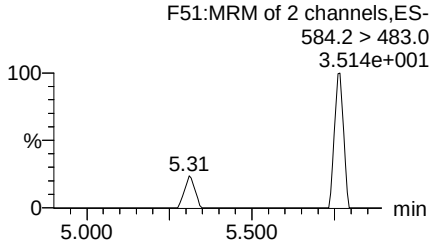
Total N-MeFOSAA



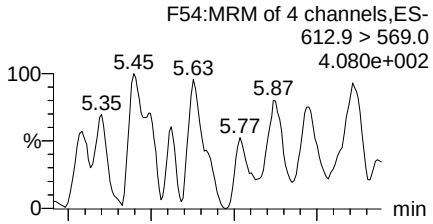


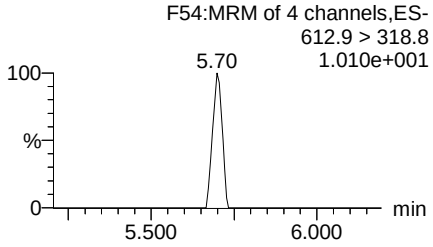
Total N-EtFOSAA



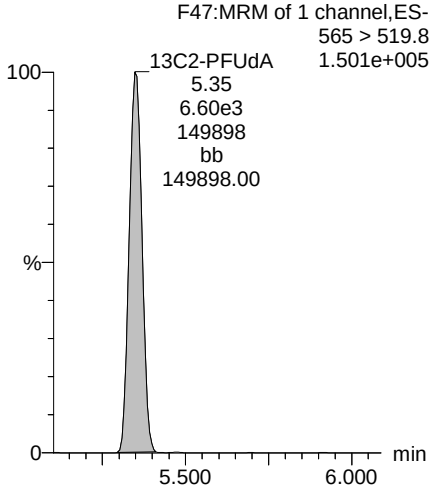


PFDoA

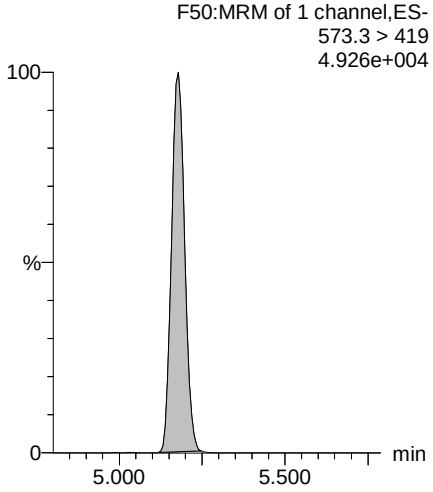




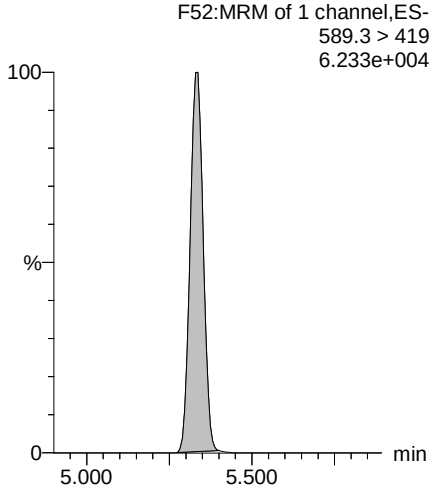
13C2-PFUdA



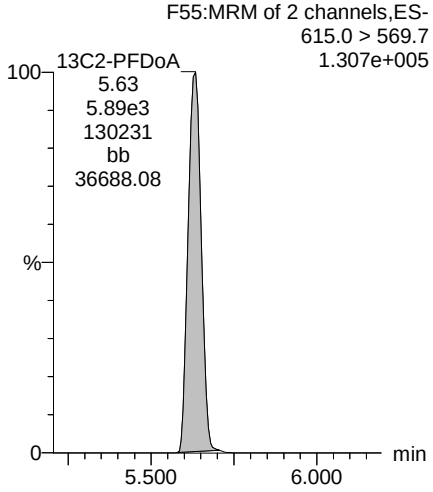
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



AR 6/6/2018

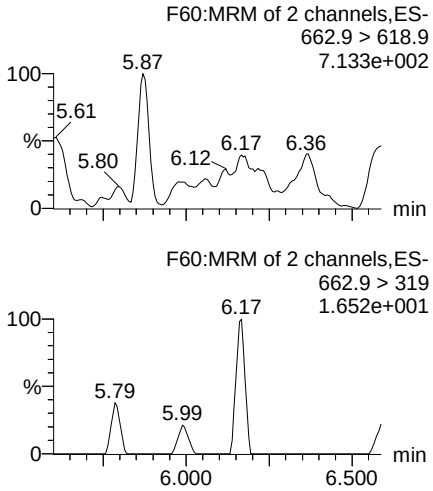
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

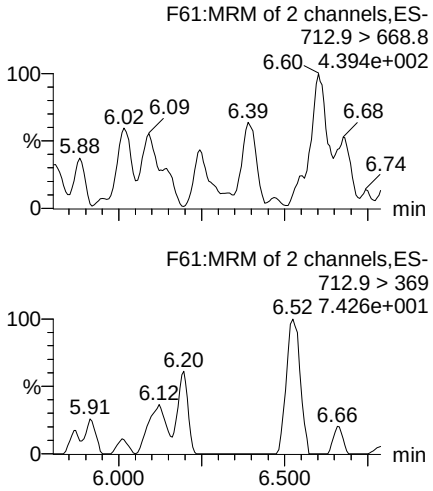
Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

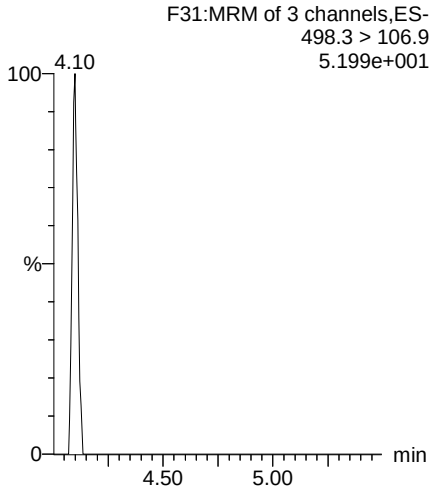
PFTrDA



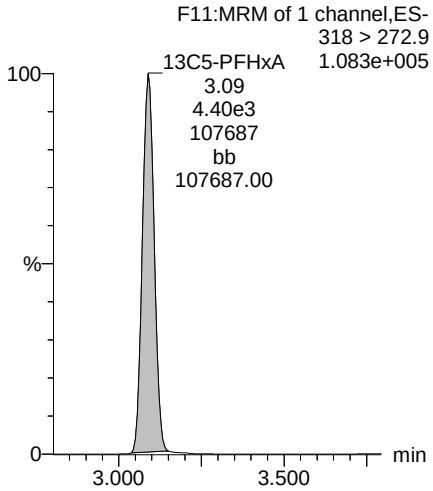
PFTeDA



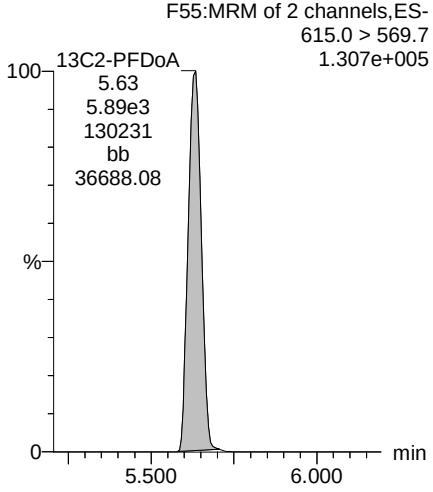
TCDA



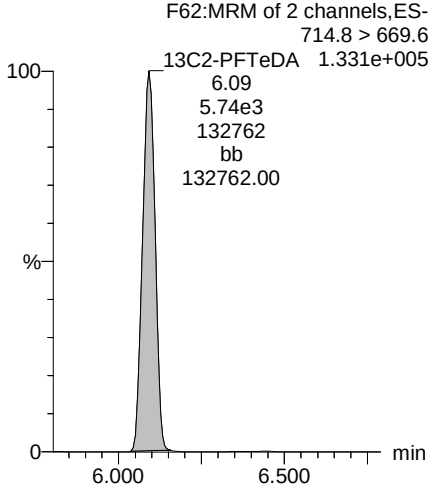
13C5-PFHxA



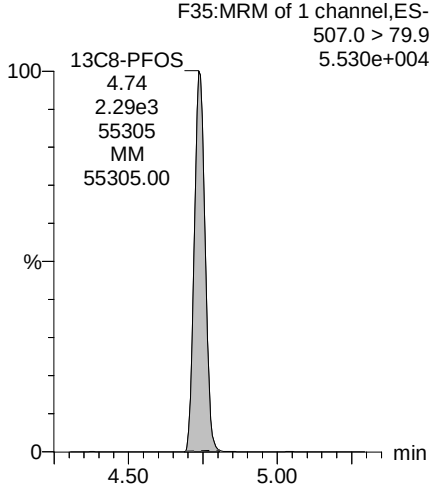
13C2-PFDoA



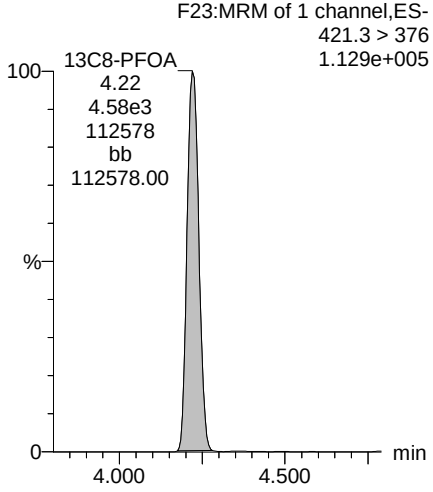
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



AR 6/6/2018

Vista Analytical Laboratory

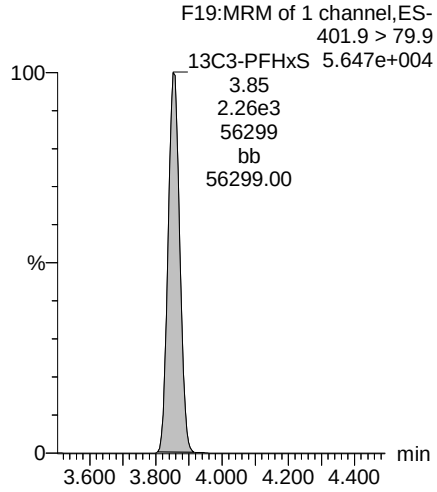
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-27.qld

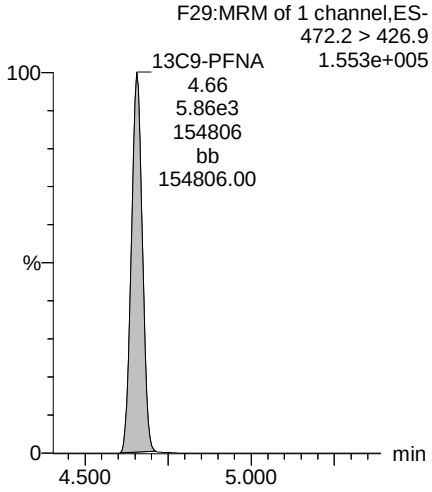
Last Altered: Wednesday, June 06, 2018 15:01:10 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:03:02 Pacific Daylight Time

Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

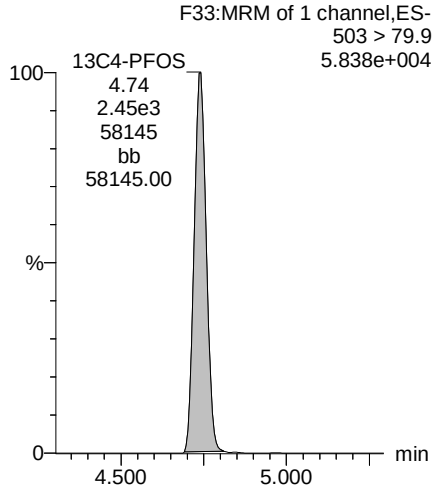
13C3-PFHxS



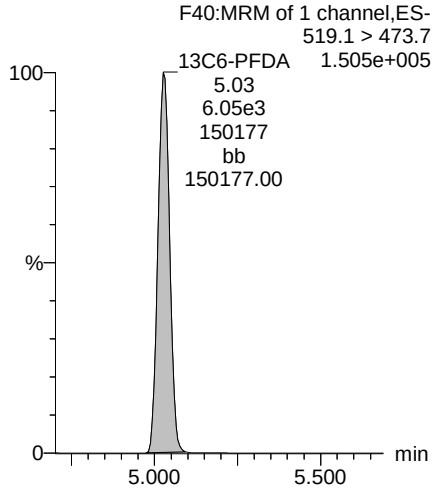
13C9-PFNA



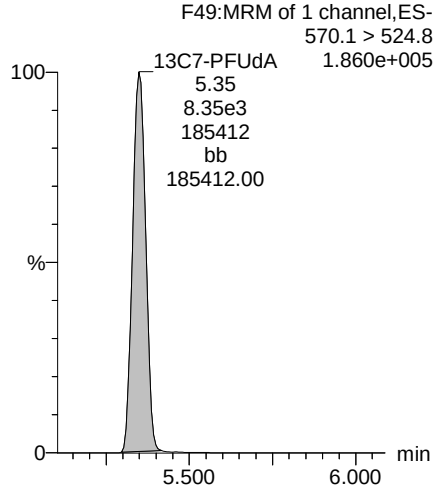
13C4-PFOS



13C6-PFDA



13C7-PFUdA



AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:35:46 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7		1.27e3	0.121		2.57						
2	5	PFHxA	313.2 > 268.9		2.89e3	0.121		3.06						
3	7	PFHpA	363.0 > 318.9		8.91e3	0.121		3.68						
4	8	L-PFHxS	398.9 > 79.6		1.04e3	0.121		3.83						
5	11	L-PFOA	413 > 368.7		1.41e4	0.121		4.25						
6	14	PFNA	463.0 > 418.8		1.16e4	0.121		4.66						
7	16	L-PFOS	499.1 > 79.9		2.20e3	0.121		4.74						
8	18	PFDA	513 > 468.8		1.20e4	0.121		5.03						
9	21	L-MeFOSAA	570.1 > 419		2.69e3	0.121		5.18						
10	23	L-EtFOSAA	584.2 > 419		3.69e3	0.121		5.37						

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:00 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		1.31e4	0.121		5.35						
2	27	PFDoA	612.9 > 569.0		1.23e4	0.121		5.63						
3	29	PFTrDA	662.9 > 618.9		1.23e4	0.121		5.88						
4	30	PFTeDA	712.9 > 668.8		1.22e4	0.121		6.10						
5	38	13C3-PFBS	302. > 98.8	1.27e3	1.15e4	0.121	0.104	2.60	2.57	1.37	109.3450	105.7		
6	40	13C2-PFHxA	315 > 269.8	2.89e3	1.15e4	0.121	0.729	3.09	3.06	3.14	35.6272	86.1		
7	41	13C4-PFHpA	367.2 > 321.8	8.91e3	1.15e4	0.121	0.836	3.71	3.68	9.66	95.6201	92.4		
8	42	18O2-PFHxS	403.0 > 102.6	1.04e3	2.74e3	0.121	0.443	3.86	3.83	4.73	88.3993	85.4		
9	44	13C2-PFOA	414.9 > 369.7	1.41e4	1.30e4	0.121	1.332	4.23	4.20	13.6	84.2990	81.5		

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	1.16e4	1.57e4	0.121	0.951	4.66	4.64	9.25	80.5289	77.8		
2	46	13C8-PFOSA	506.1 > 77.7	1.12e3	2.02e4	0.121	0.140	4.73	4.71	0.694	41.2047	39.8		
3	47	13C8-PFOS	507.0 > 79.9	2.20e3	2.59e3	0.121	1.060	4.74	4.72	10.6	83.1401	80.4		
4	48	13C2-PFDA	515.1 > 469.9	1.20e4	1.59e4	0.121	1.130	5.03	5.01	9.41	68.9020	66.6		
5	50	d3-N-MeFOSAA	573.3 > 419	2.69e3	2.02e4	0.121	0.184	5.18	5.16	1.66	75.0514	72.5		
6	51	d5-N-EtFOSAA	589.3 > 419	3.69e3	2.02e4	0.121	0.223	5.34	5.32	2.29	84.8651	82.0		
7	52	13C2-PFUdA	565 > 519.8	1.31e4	2.02e4	0.121	0.936	5.35	5.34	8.09	71.5378	69.1		
8	53	13C2-PFDoA	615.0 > 569.7	1.23e4	1.59e4	0.121	1.168	5.63	5.62	9.71	68.7650	66.5		
9	55	13C2-PFTeDA	714.8 > 669.6	1.22e4	2.02e4	0.121	0.706	6.09	6.08	7.54	88.4544	85.5		
10	57	13C2-PFHxDA	815 > 769.7	6.89e3	2.02e4	0.121	1.079	6.43	6.43	4.27	32.7540	79.1		
11	60	13C4-PFBA	217. > 171.8	8.68e3	8.68e3	0.121	1.000	1.35	1.30	12.5	103.4597	100.0		
12	61	13C5-PFHxA	318 > 272.9	1.15e4	1.15e4	0.121	1.000	3.09	3.06	12.5	103.4597	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	2.74e3	2.74e3	0.121	1.000	3.86	3.83	12.5	103.4597	100.0		
14	63	13C8-PFOA	421.3 > 376	1.30e4	1.30e4	0.121	1.000	4.23	4.20	12.5	103.4597	100.0		
15	64	13C9-PFNA	472.2 > 426.9	1.57e4	1.57e4	0.121	1.000	4.66	4.64	12.5	103.4597	100.0		
16	65	13C4-PFOS	503 > 79.9	2.59e3	2.59e3	0.121	1.000	4.74	4.72	12.5	103.4597	100.0		
17	66	13C6-PFDA	519.1 > 473.7	1.59e4	1.59e4	0.121	1.000	5.03	5.01	12.5	103.4597	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	2.02e4	2.02e4	0.121	1.000	5.35	5.34	12.5	103.4597	100.0		
19	68	Total PFHxS	398.9 > 79.6	0.00e0	1.04e3	0.121		4.05		0.000				
20	69	Total PFOA	413 > 368.7	0.00e0	1.41e4	0.121		4.30		0.000				
21	70	Total PFOS	499.1 > 79.9	0.00e0	2.20e3	0.121		4.90		0.000				
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	2.69e3	0.121		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	3.69e3	0.121		5.70		0.000				

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

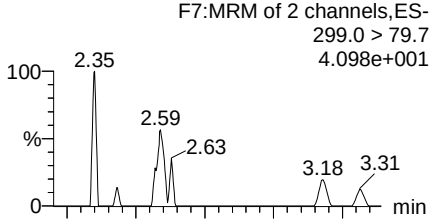
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

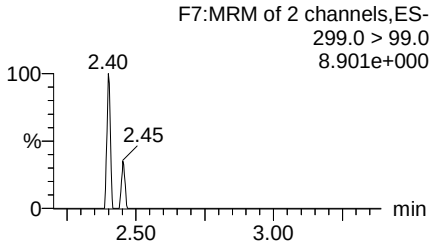
Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

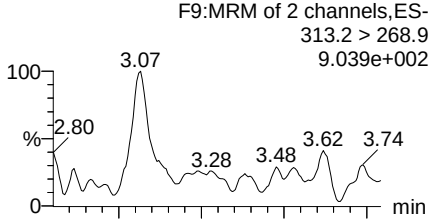
Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

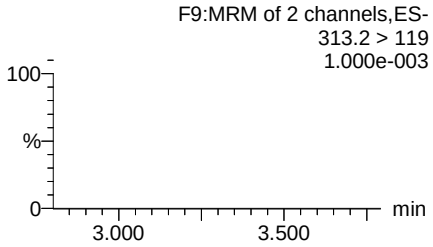
PFBS



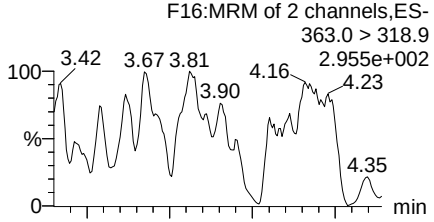


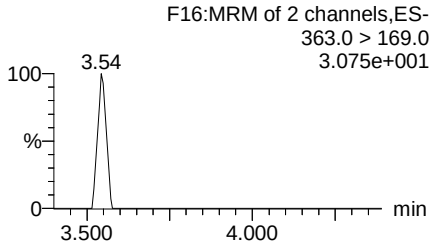
PFHxA



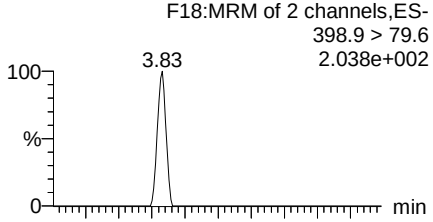


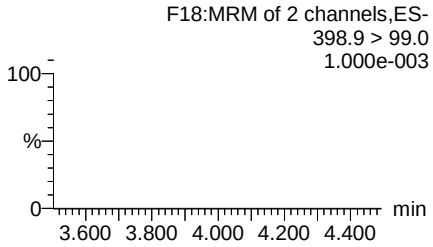
PFHpA



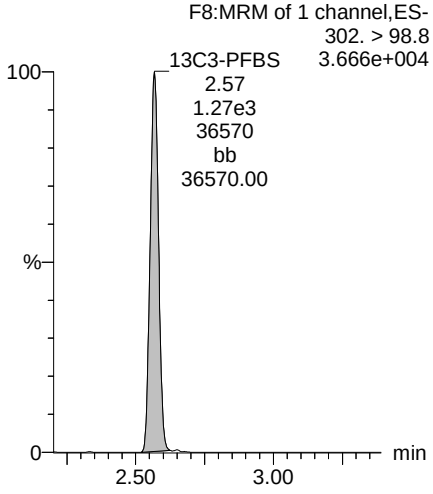


Total PFHxS

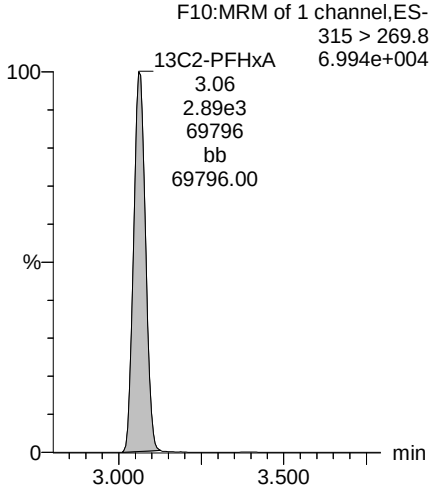




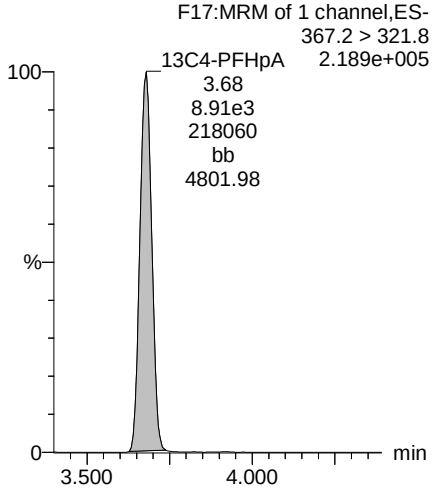
13C3-PFBS



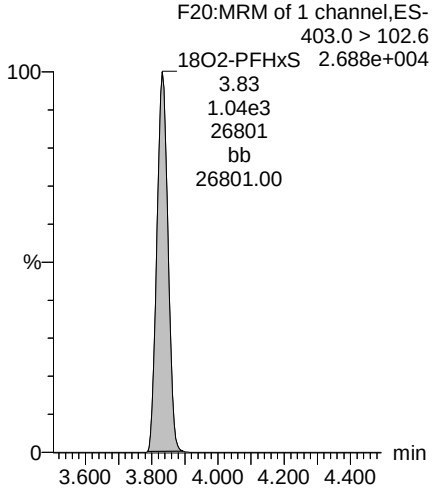
13C2-PFHxA



13C4-PFHpA



18O2-PFHxS



AR 6/6/2018

Vista Analytical Laboratory

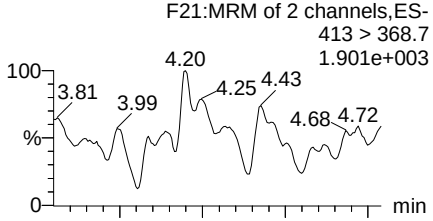
MM 6/6/2018

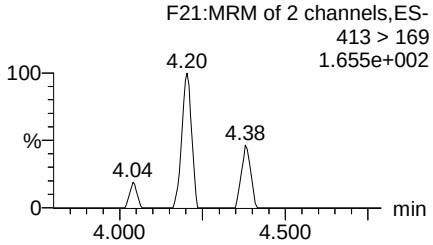
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

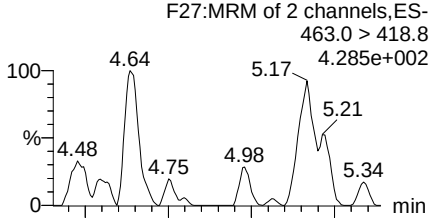
Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

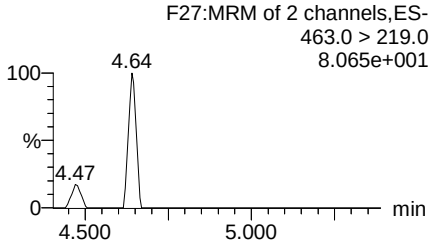
Total PFOA



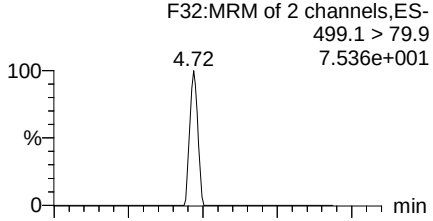


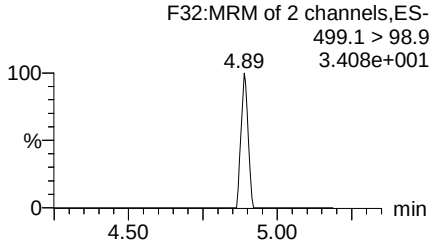
PFNA



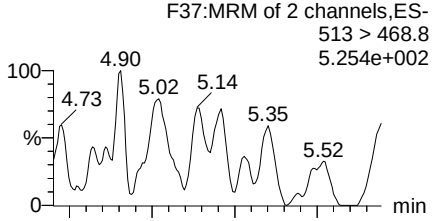


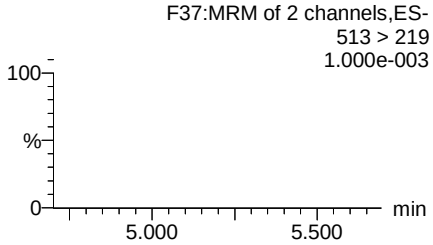
Total PFOS



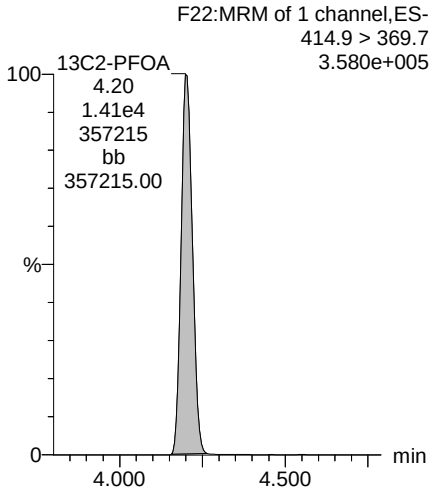


PFDA

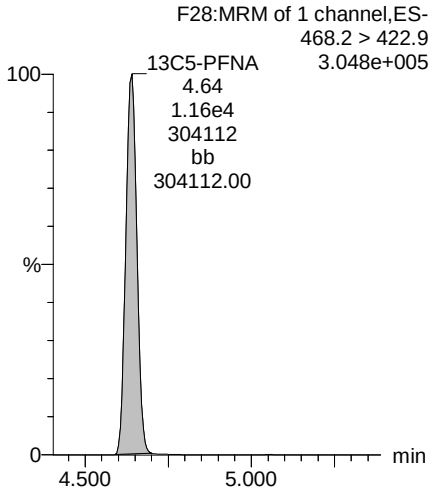




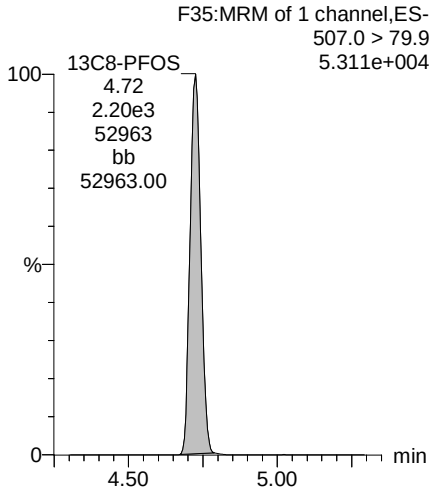
13C2-PFOA



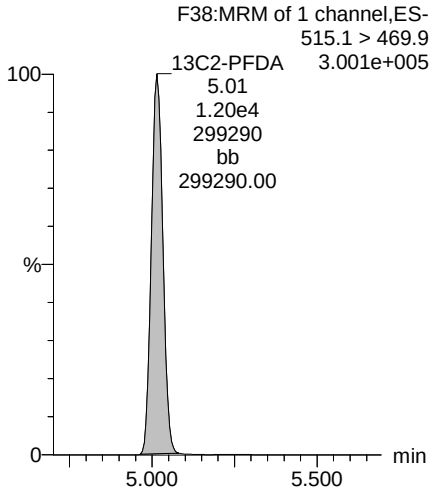
13C5-PFNA



13C8-PFOS



13C2-PFDA



AR 6/6/2018

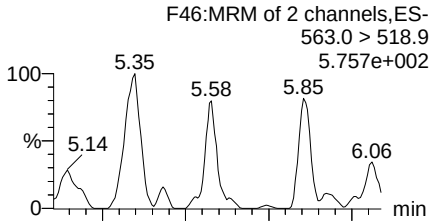
MM 6/6/2018

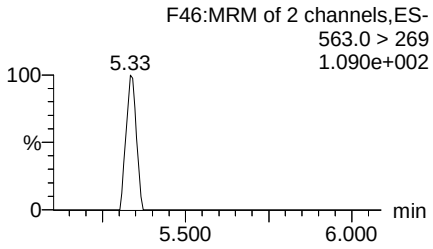
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

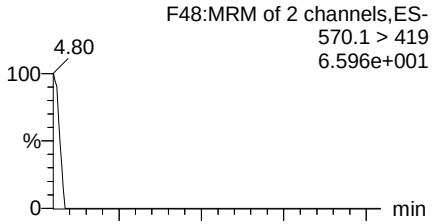
Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

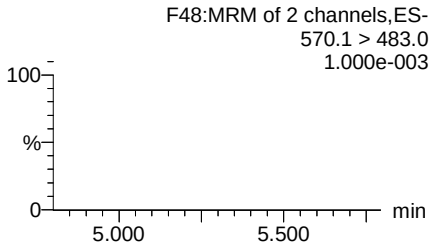
PFUdA



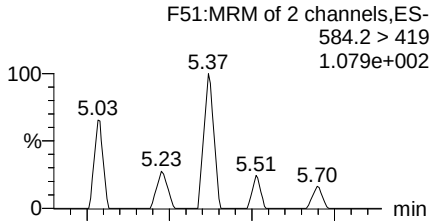


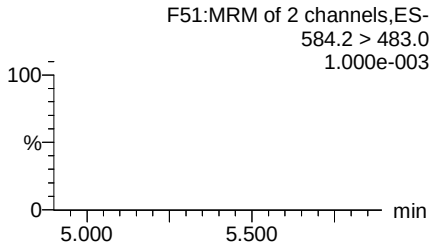
Total N-MeFOSAA



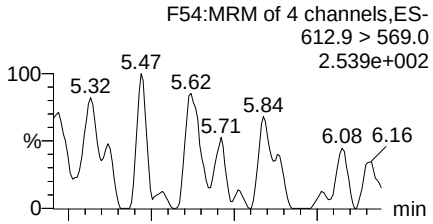


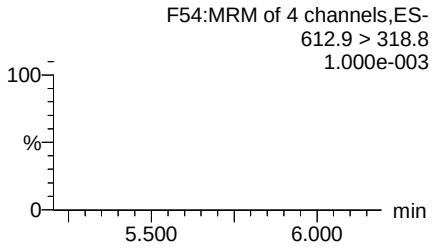
Total N-EtFOSAA



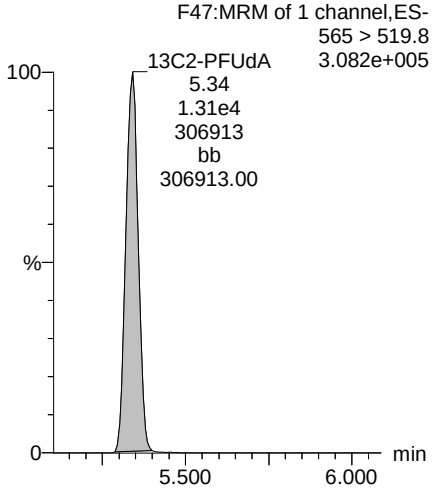


PFDoA

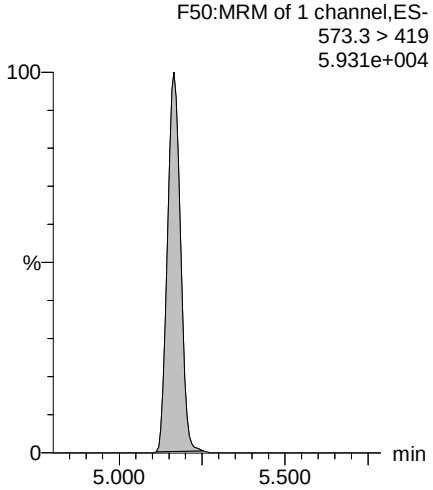




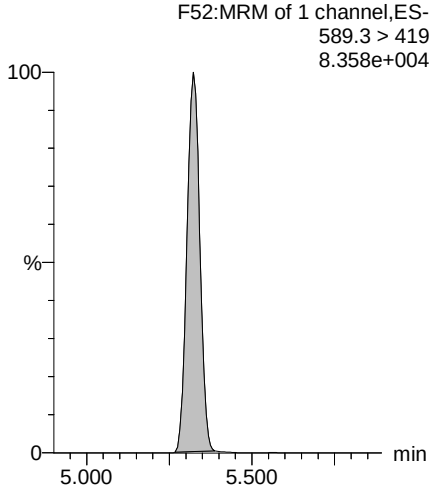
13C2-PFUdA



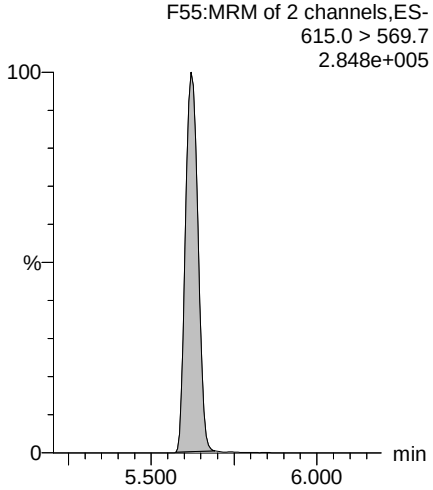
d3-N-MeFOSAA



d5-N-EtFOSAA



13C2-PFDoA



AR 6/6/2018

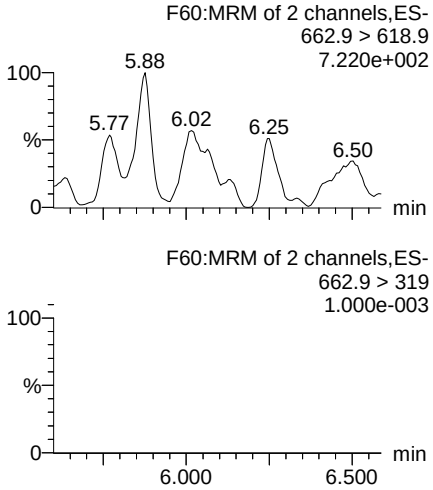
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

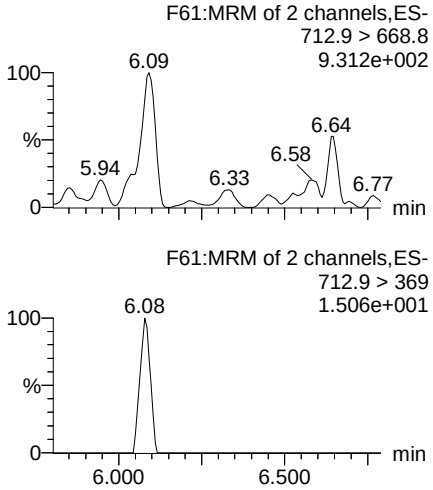
Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

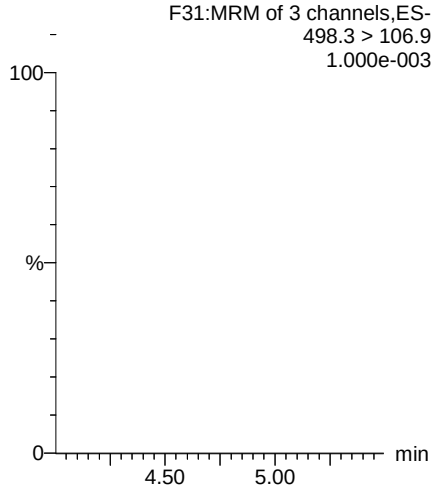
PFTrDA



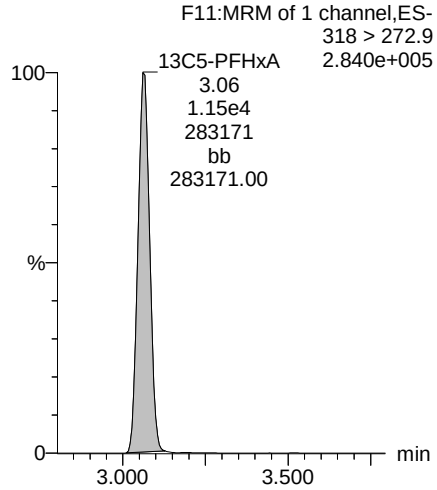
PFTeDA



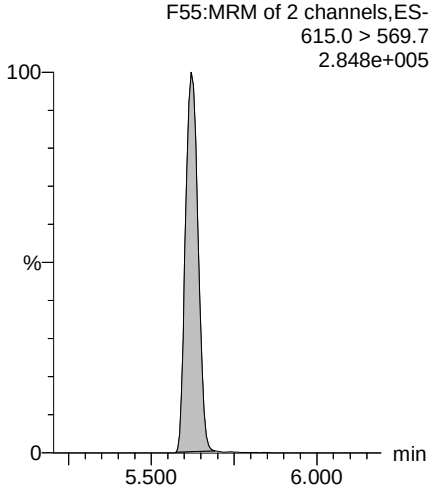
TCDA



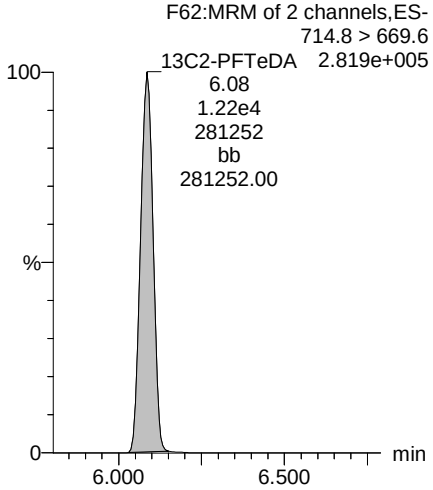
13C5-PFHxA



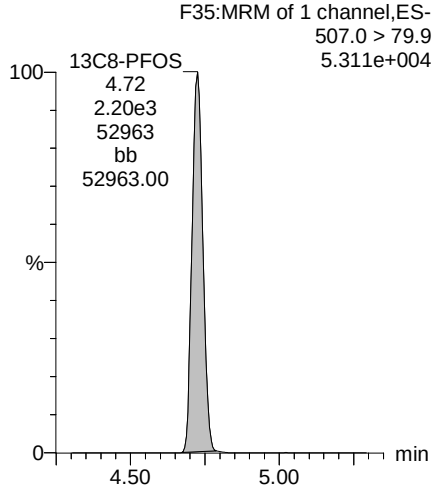
13C2-PFDoA



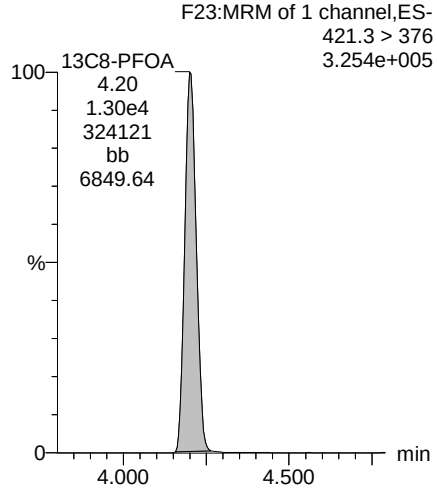
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



AR 6/6/2018

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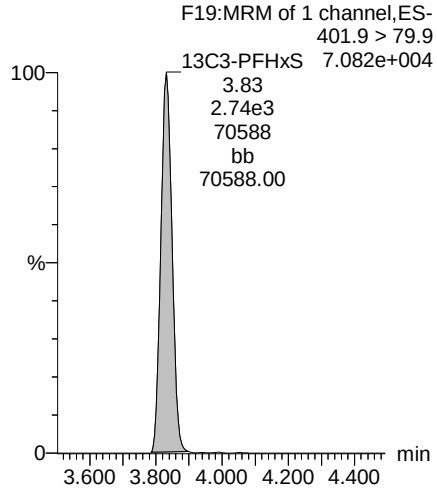
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-35.qld

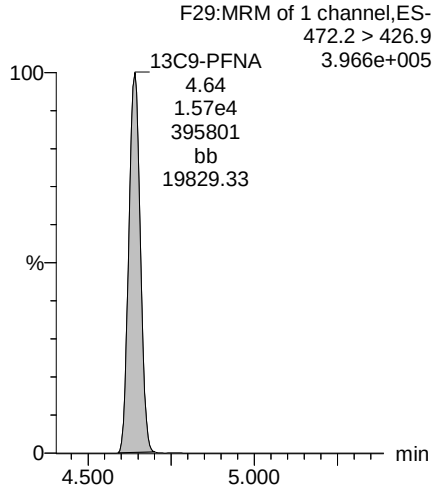
Last Altered: Wednesday, June 06, 2018 15:35:03 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:36:14 Pacific Daylight Time

Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

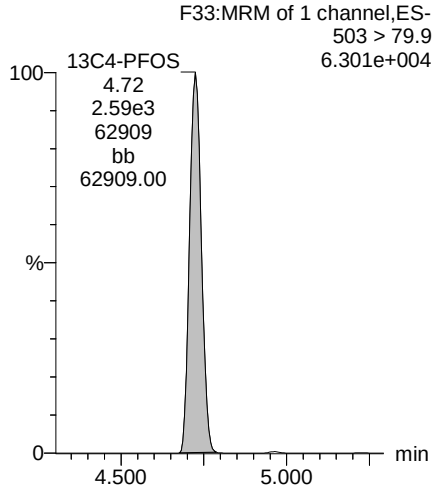
13C3-PFHxS



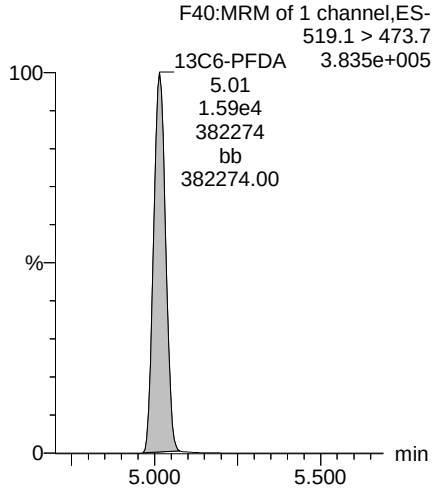
13C9-PFNA



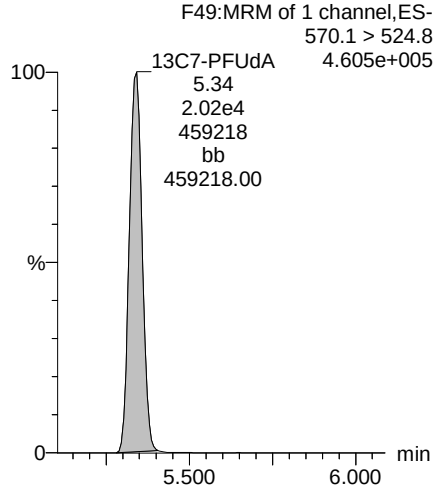
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:15:28 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7	1.59e2	1.30e3	0.123		2.60	2.60	1.53	6.2719		2.907	NO
2	5	PFHxA	313.2 > 268.9		3.12e3	0.123		3.09						
3	7	PFHpA	363.0 > 318.9		8.49e3	0.123		3.71						
4	8	L-PFHxS	398.9 > 79.6	6.03e2	1.15e3	0.123		3.85	3.86	6.56	27.7407		1.834	NO
5	11	L-PFOA	413 > 368.7		1.25e4	0.123		4.25						
6	14	PFNA	463.0 > 418.8		9.82e3	0.123		4.66						
7	16	L-PFOS	499.1 > 79.9		2.74e3	0.123		4.74						
8	18	PFDA	513 > 468.8		1.09e4	0.123		5.03						
9	21	L-MeFOSAA	570.1 > 419		2.67e3	0.123		5.18						
10	23	L-EtFOSAA	584.2 > 419		3.55e3	0.123		5.37						

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:15:43 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		1.23e4	0.123		5.35						
2	27	PFDoA	612.9 > 569.0		1.04e4	0.123		5.63						
3	29	PFTrDA	662.9 > 618.9		1.04e4	0.123		5.88						
4	30	PFTeDA	712.9 > 668.8		8.30e3	0.123		6.10						
5	38	13C3-PFBS	302. > 98.8	1.30e3	1.11e4	0.123	0.104	2.60	2.60	1.46	114.1847	112.5		
6	40	13C2-PFHxA	315 > 269.8	3.12e3	1.11e4	0.123	0.729	3.09	3.09	3.51	39.0990	96.3		
7	41	13C4-PFHpA	367.2 > 321.8	8.49e3	1.11e4	0.123	0.836	3.71	3.71	9.54	92.5784	91.2		
8	42	18O2-PFHxS	403.0 > 102.6	1.15e3	2.75e3	0.123	0.443	3.86	3.85	5.23	95.9365	94.5		
9	44	13C2-PFOA	414.9 > 369.7	1.25e4	1.05e4	0.123	1.332	4.23	4.22	14.9	90.7220	89.4		

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MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	9.82e3	1.35e4	0.123	0.951	4.66	4.66	9.13	77.9260	76.8		
2	46	13C8-PFOSA	506.1 > 77.7	1.71e3	1.79e4	0.123	0.140	4.73	4.72	1.20	69.6176	68.6		
3	47	13C8-PFOS	507.0 > 79.9	2.74e3	2.76e3	0.123	1.060	4.74	4.74	12.4	95.0639	93.7		
4	48	13C2-PFDA	515.1 > 469.9	1.09e4	1.30e4	0.123	1.130	5.03	5.03	10.5	75.3658	74.3		
5	50	d3-N-MeFOSAA	573.3 > 419	2.67e3	1.79e4	0.123	0.184	5.18	5.18	1.87	82.6782	81.5		
6	51	d5-N-EtFOSAA	589.3 > 419	3.55e3	1.79e4	0.123	0.223	5.34	5.33	2.48	90.1537	88.8		
7	52	13C2-PFUdA	565 > 519.8	1.23e4	1.79e4	0.123	0.936	5.35	5.35	8.61	74.6638	73.6		
8	53	13C2-PFDoA	615.0 > 569.7	1.04e4	1.30e4	0.123	1.168	5.63	5.63	10.0	69.7848	68.8		
9	55	13C2-PFTeDA	714.8 > 669.6	8.30e3	1.79e4	0.123	0.706	6.09	6.09	5.80	66.6798	65.7		
10	57	13C2-PFHxDA	815 > 769.7	6.93e3	1.79e4	0.123	1.079	6.43	6.43	4.85	36.4737	89.8		
11	60	13C4-PFBA	217. > 171.8	7.80e3	7.80e3	0.123	1.000	1.35	1.35	12.5	101.4858	100.0		
12	61	13C5-PFHxA	318 > 272.9	1.11e4	1.11e4	0.123	1.000	3.09	3.09	12.5	101.4858	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	2.75e3	2.75e3	0.123	1.000	3.86	3.85	12.5	101.4858	100.0		
14	63	13C8-PFOA	421.3 > 376	1.05e4	1.05e4	0.123	1.000	4.23	4.22	12.5	101.4858	100.0		
15	64	13C9-PFNA	472.2 > 426.9	1.35e4	1.35e4	0.123	1.000	4.66	4.66	12.5	101.4858	100.0		
16	65	13C4-PFOS	503 > 79.9	2.76e3	2.76e3	0.123	1.000	4.74	4.74	12.5	101.4858	100.0		
17	66	13C6-PFDA	519.1 > 473.7	1.30e4	1.30e4	0.123	1.000	5.03	5.02	12.5	101.4858	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	1.79e4	1.79e4	0.123	1.000	5.35	5.35	12.5	101.4858	100.0		
19	68	Total PFHxS	398.9 > 79.6	6.03e2	1.15e3	0.123		4.05		6.56	27.7407			
20	69	Total PFOA	413 > 368.7	0.00e0	1.25e4	0.123		4.30		0.000				
21	70	Total PFOS	499.1 > 79.9	0.00e0	2.74e3	0.123		4.90		0.000				
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	2.67e3	0.123		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	3.55e3	0.123		5.70		0.000				

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

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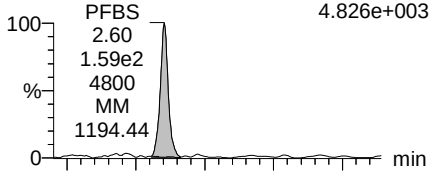
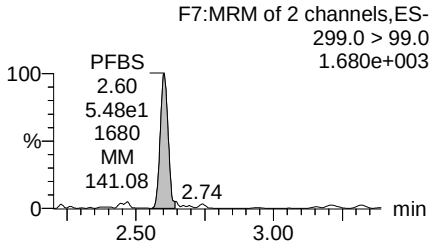
Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

PFBS





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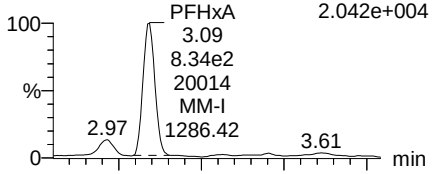
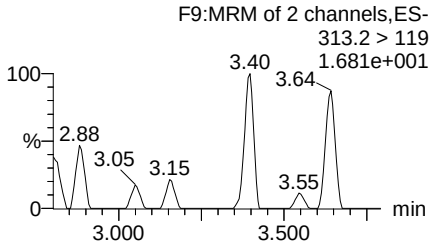
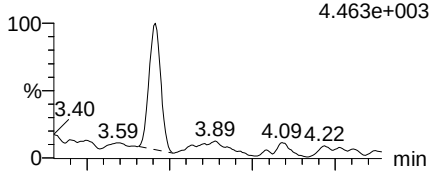
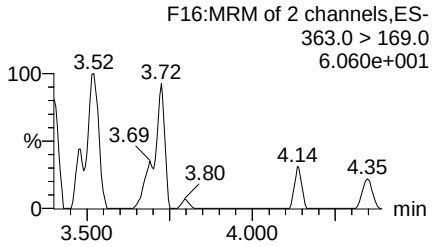




PFHpA





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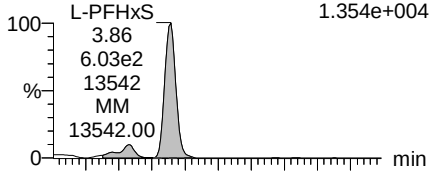

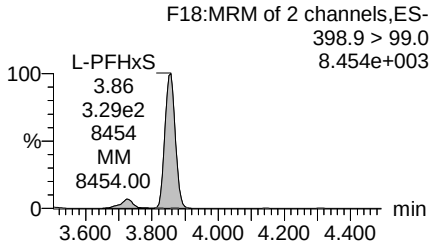

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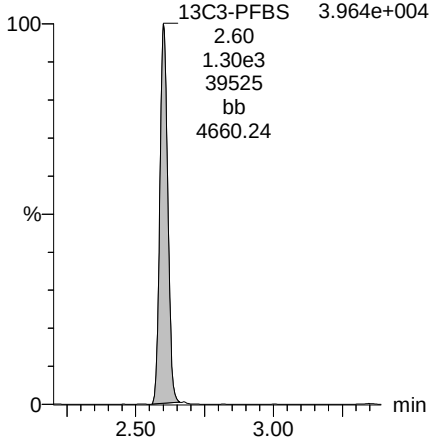

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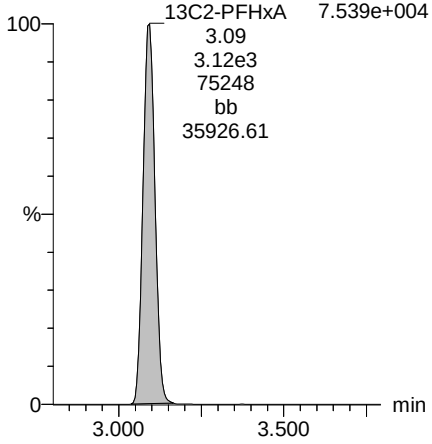

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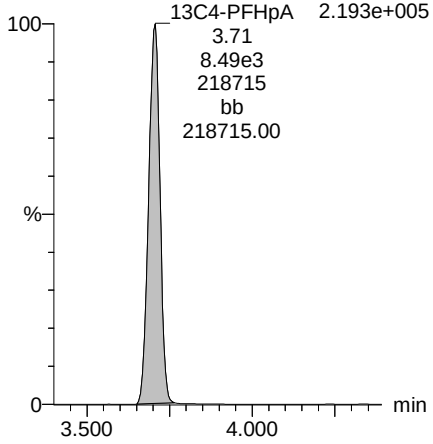

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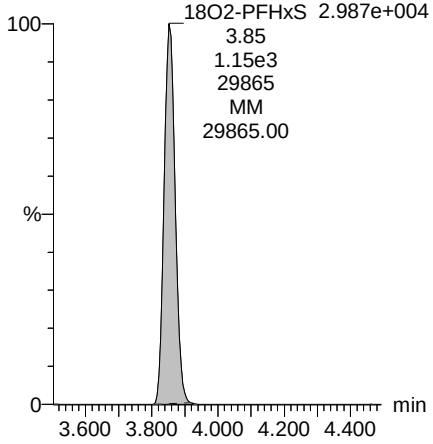

AR 6/6/2018

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

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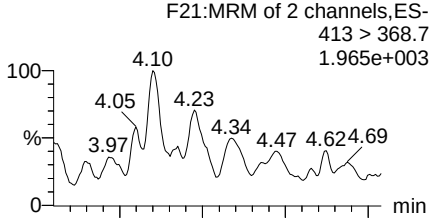

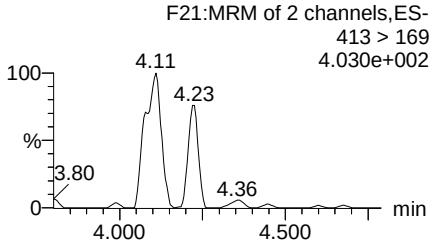

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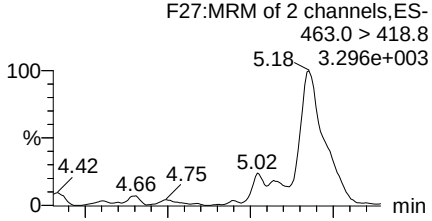

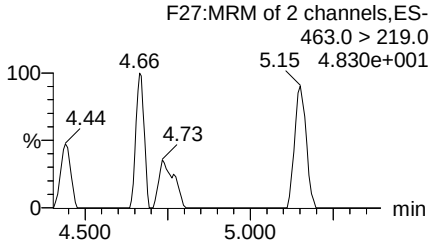

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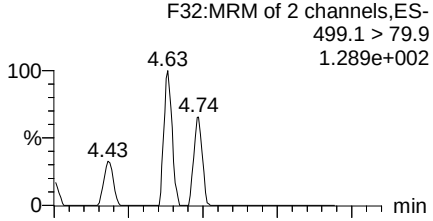

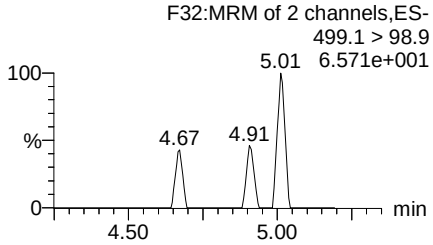

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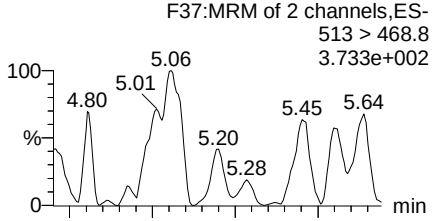

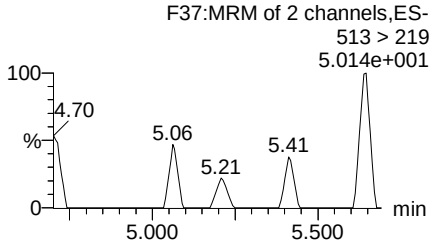

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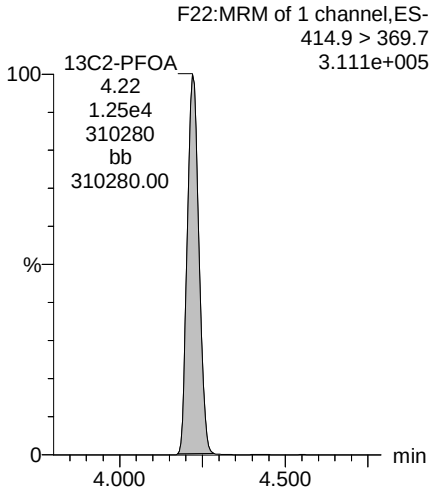

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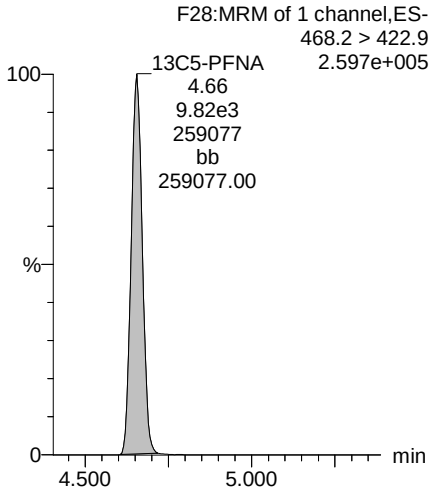

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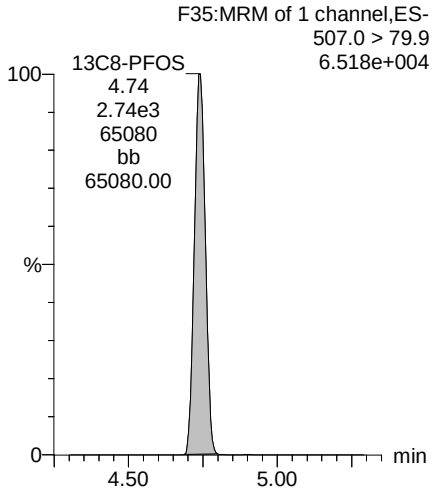

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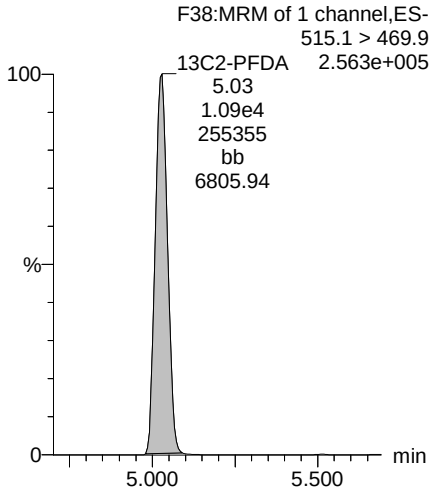

AR 6/6/2018

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

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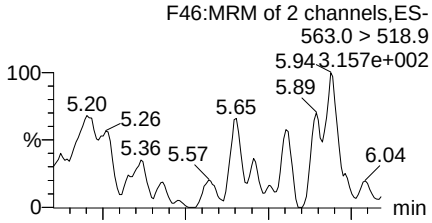
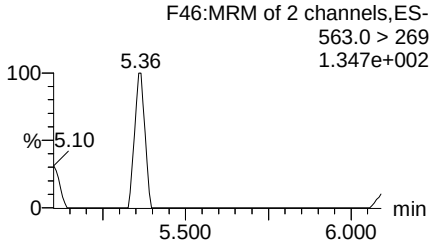
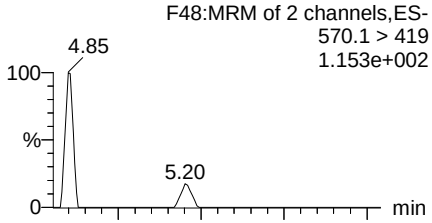
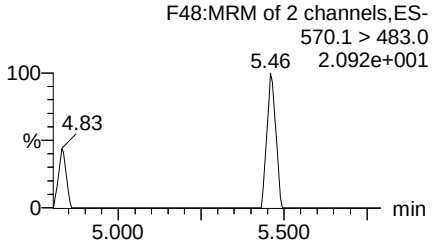




Total N-MeFOSAA





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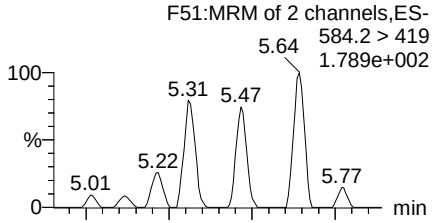

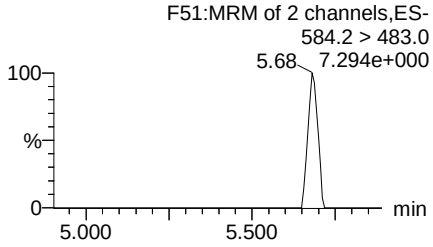

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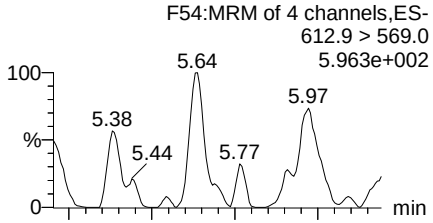

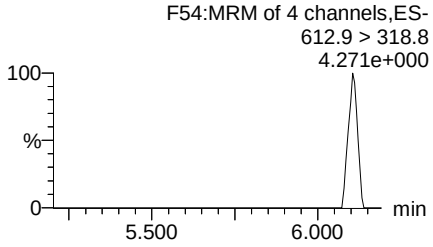

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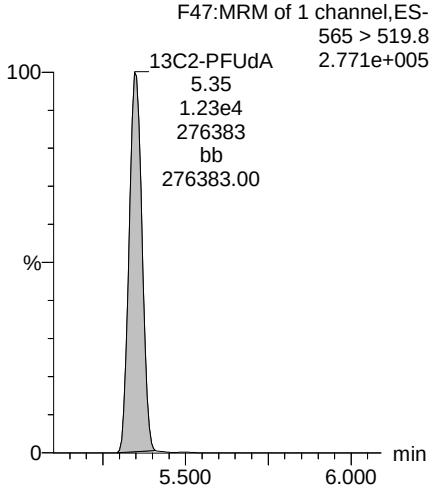
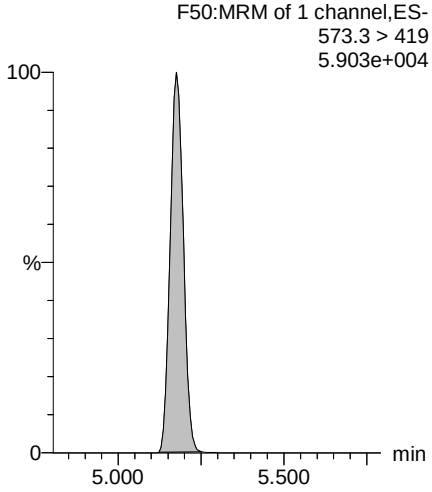


d3-N-MeFOSAA



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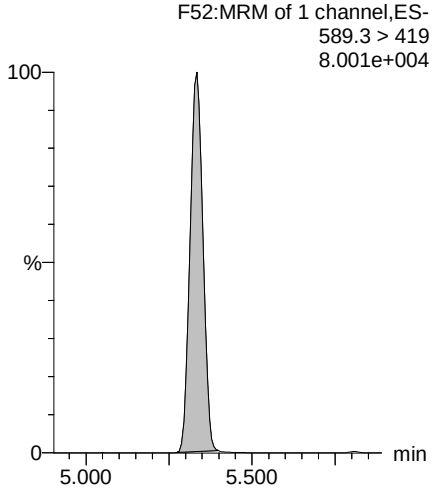

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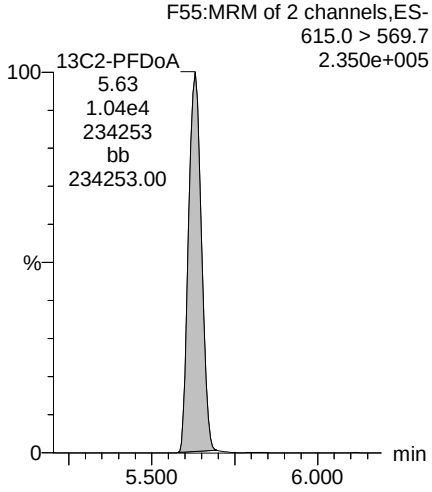


AR 6/6/2018

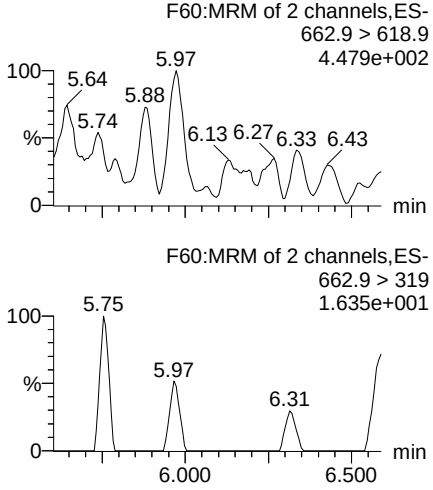
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

PFTrDA



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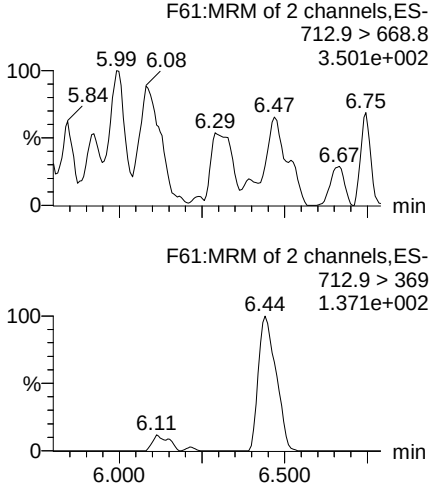

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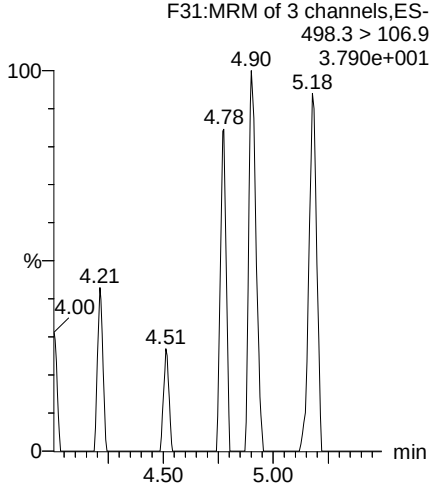

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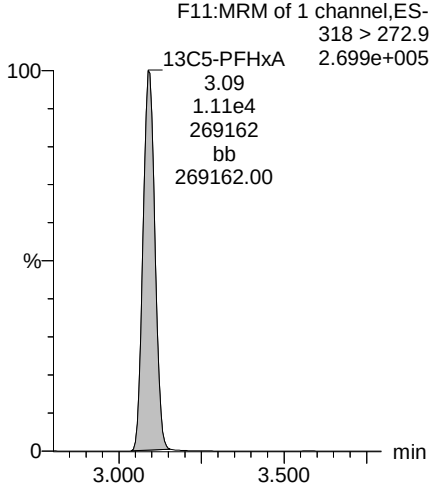

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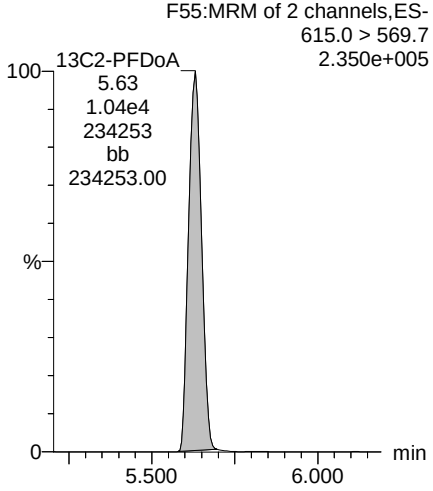
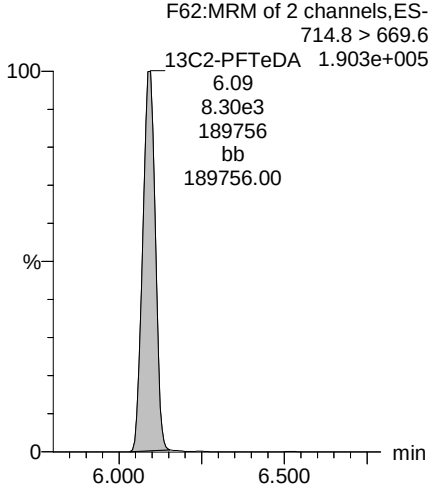
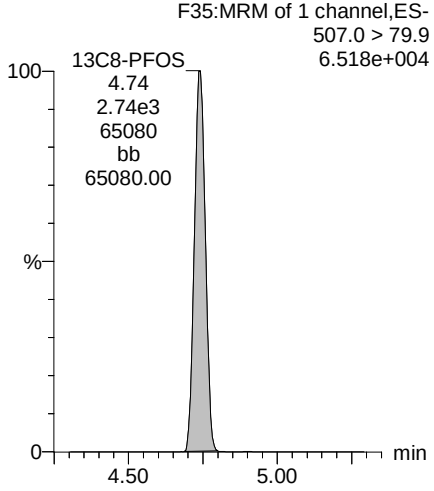


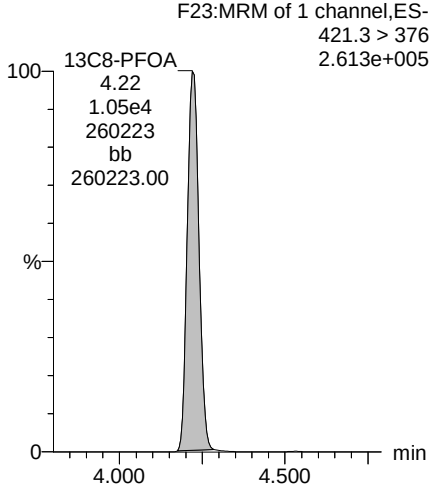
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



AR 6/6/2018

Vista Analytical Laboratory

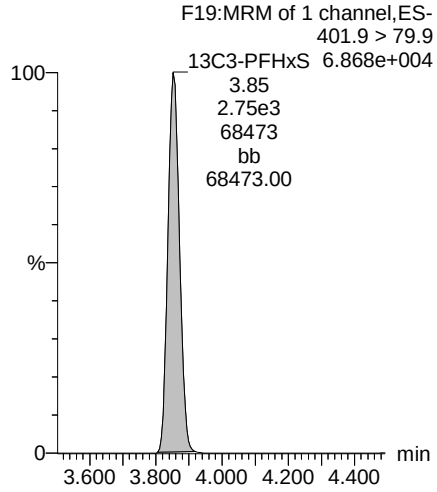
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-29.qld

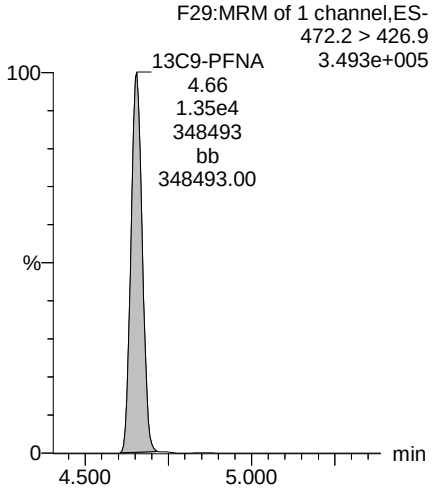
Last Altered: Wednesday, June 06, 2018 15:15:02 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:16:00 Pacific Daylight Time

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

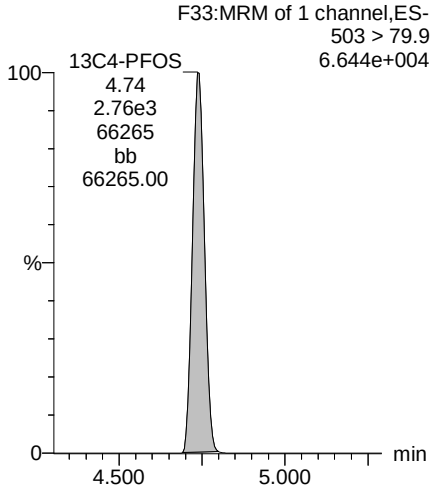
13C3-PFHxS



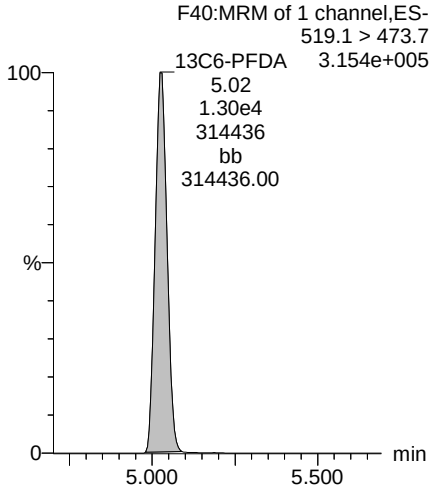
13C9-PFNA



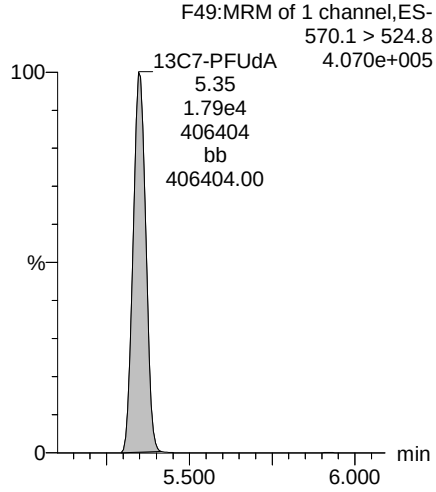
13C4-PFOS



13C6-PFDA



13C7-PFUdA



AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:22:44 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7	7.29e2	1.36e3	0.119		2.60	2.60	6.71	28.4194		2.707	NO
2	5	PFHxA	313.2 > 268.9	1.05e4	3.21e3	0.119		3.09	3.09	16.4	86.6270		282.425	NO
3	7	PFHpA	363.0 > 318.9	1.45e2	9.17e3	0.119		3.70	3.71	0.198	0.9174		12.139	YES
4	8	L-PFHxS	398.9 > 79.6	5.66e1	1.13e3	0.119		3.85	3.73	0.626	2.7847		2.104	NO
5	11	L-PFOA	413 > 368.7		1.46e4	0.119		4.25						
6	14	PFNA	463.0 > 418.8		1.22e4	0.119		4.66						
7	16	L-PFOS	499.1 > 79.9		2.84e3	0.119		4.74						
8	18	PFDA	513 > 468.8		1.32e4	0.119		5.03						
9	21	L-MeFOSAA	570.1 > 419		2.91e3	0.119		5.18						
10	23	L-EtFOSAA	584.2 > 419		4.02e3	0.119		5.37						

AR 6/6/2018

Vista Analytical Laboratory

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:22:57 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		1.37e4	0.119		5.35						
2	27	PFDoA	612.9 > 569.0		1.12e4	0.119		5.63						
3	29	PFTrDA	662.9 > 618.9		1.12e4	0.119		5.88						
4	30	PFTeDA	712.9 > 668.8		9.83e3	0.119		6.10						
5	38	13C3-PFBS	302. > 98.8	1.36e3	1.22e4	0.119	0.104	2.60	2.60	1.39	112.6646	107.0		
6	40	13C2-PFHxA	315 > 269.8	3.21e3	1.22e4	0.119	0.729	3.09	3.09	3.28	37.9348	90.1		
7	41	13C4-PFHpA	367.2 > 321.8	9.17e3	1.22e4	0.119	0.836	3.71	3.70	9.38	94.4855	89.8		
8	42	18O2-PFHxS	403.0 > 102.6	1.13e3	2.65e3	0.119	0.443	3.86	3.85	5.32	101.2915	96.2		
9	44	13C2-PFOA	414.9 > 369.7	1.46e4	1.32e4	0.119	1.332	4.23	4.22	13.9	87.9501	83.6		

AR 6/6/2018

Vista Analytical Laboratory

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	1.22e4	1.48e4	0.119	0.951	4.66	4.66	10.3	91.2051	86.6		
2	46	13C8-PFOSA	506.1 > 77.7	1.84e3	2.07e4	0.119	0.140	4.73	4.72	1.11	67.2652	63.9		
3	47	13C8-PFOS	507.0 > 79.9	2.84e3	2.89e3	0.119	1.060	4.74	4.74	12.3	97.7016	92.8		
4	48	13C2-PFDA	515.1 > 469.9	1.32e4	1.57e4	0.119	1.130	5.03	5.03	10.5	78.4560	74.5		
5	50	d3-N-MeFOSAA	573.3 > 419	2.91e3	2.07e4	0.119	0.184	5.18	5.18	1.76	80.7783	76.7		
6	51	d5-N-EtFOSAA	589.3 > 419	4.02e3	2.07e4	0.119	0.223	5.34	5.34	2.43	91.7415	87.2		
7	52	13C2-PFUdA	565 > 519.8	1.37e4	2.07e4	0.119	0.936	5.35	5.35	8.25	74.2123	70.5		
8	53	13C2-PFDoA	615.0 > 569.7	1.12e4	1.57e4	0.119	1.168	5.63	5.63	8.94	64.4401	61.2		
9	55	13C2-PFTeDA	714.8 > 669.6	9.83e3	2.07e4	0.119	0.706	6.09	6.09	5.94	70.8260	67.3		
10	57	13C2-PFHxDA	815 > 769.7	6.87e3	2.07e4	0.119	1.079	6.43	6.43	4.15	32.3963	76.9		
11	60	13C4-PFBA	217. > 171.8	8.23e3	8.23e3	0.119	1.000	1.35	1.34	12.5	105.2632	100.0		
12	61	13C5-PFHxA	318 > 272.9	1.22e4	1.22e4	0.119	1.000	3.09	3.09	12.5	105.2632	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	2.65e3	2.65e3	0.119	1.000	3.86	3.85	12.5	105.2632	100.0		
14	63	13C8-PFOA	421.3 > 376	1.32e4	1.32e4	0.119	1.000	4.23	4.22	12.5	105.2632	100.0		
15	64	13C9-PFNA	472.2 > 426.9	1.48e4	1.48e4	0.119	1.000	4.66	4.66	12.5	105.2632	100.0		
16	65	13C4-PFOS	503 > 79.9	2.89e3	2.89e3	0.119	1.000	4.74	4.74	12.5	105.2632	100.0		
17	66	13C6-PFDA	519.1 > 473.7	1.57e4	1.57e4	0.119	1.000	5.03	5.03	12.5	105.2632	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	2.07e4	2.07e4	0.119	1.000	5.35	5.35	12.5	105.2632	100.0		
19	68	Total PFHxS	398.9 > 79.6	5.66e1	1.13e3	0.119		4.05		0.626	2.7847			
20	69	Total PFOA	413 > 368.7	0.00e0	1.46e4	0.119		4.30		0.000				
21	70	Total PFOS	499.1 > 79.9	0.00e0	2.84e3	0.119		4.90		0.000				
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	2.91e3	0.119		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.02e3	0.119		5.70		0.000				

AR 6/6/2018

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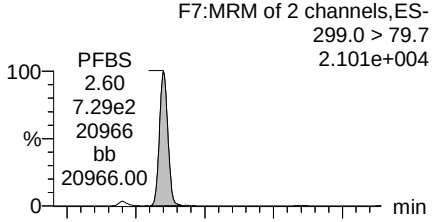
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

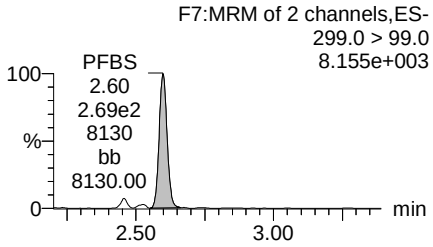
Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

PFBS





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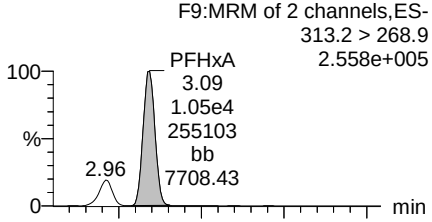
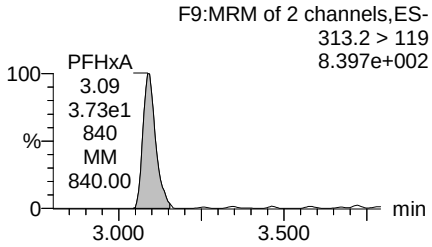
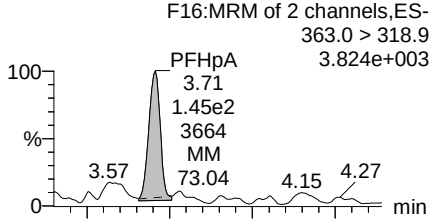
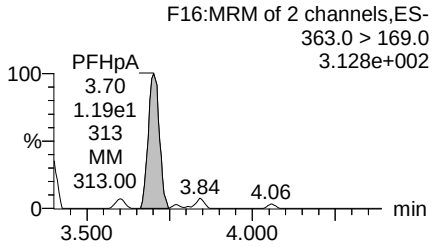




PFHpA





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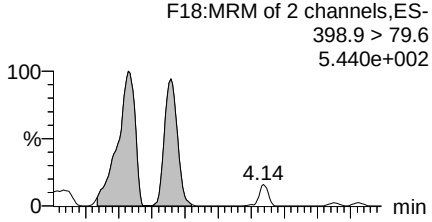

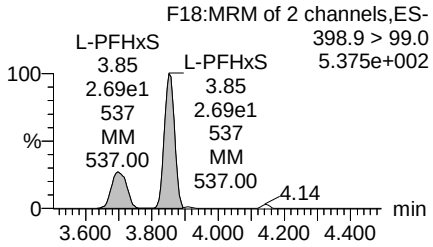

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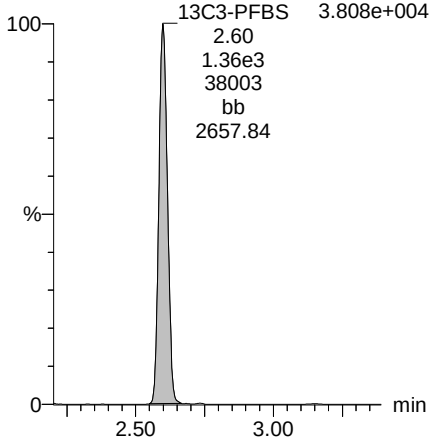

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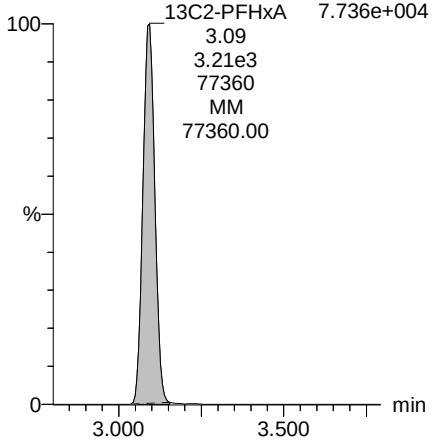
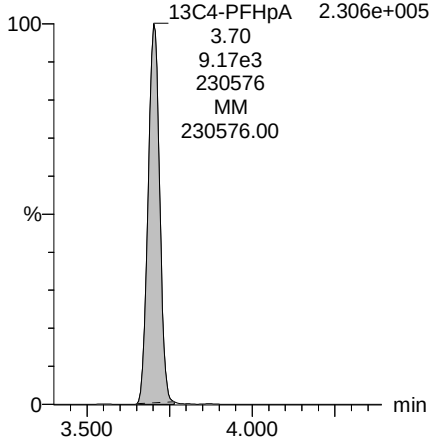
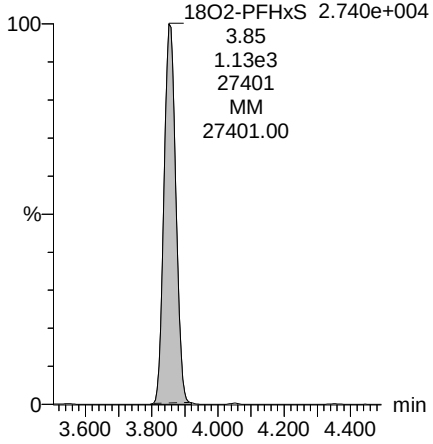


13C4-PFHpA



18O2-PFHxS



AR 6/6/2018

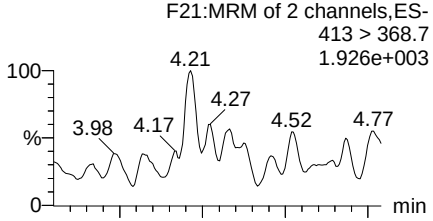
MM 6/6/2018

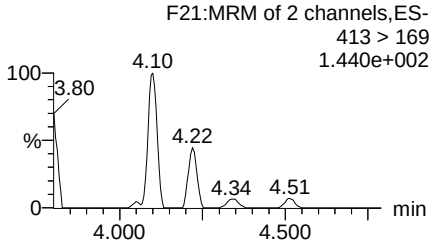
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

Total PFOA





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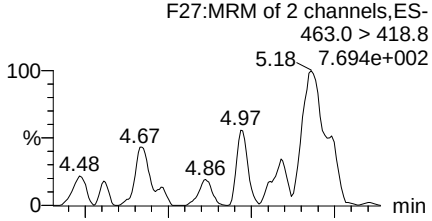
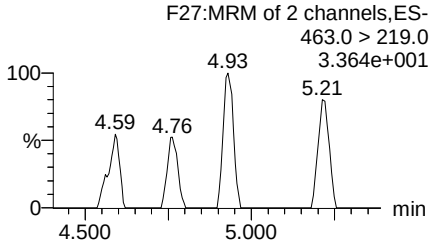
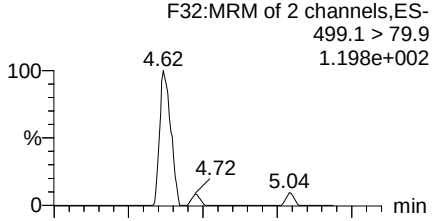
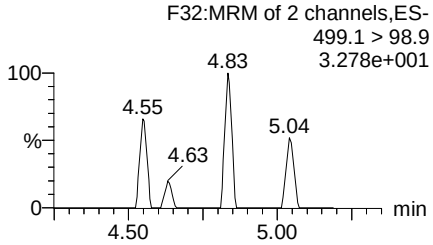




Total PFOS





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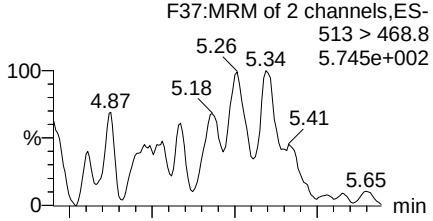
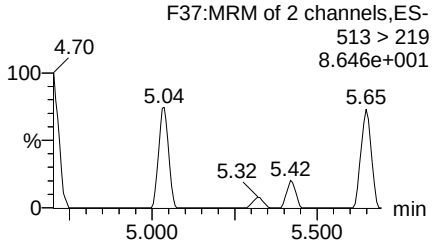
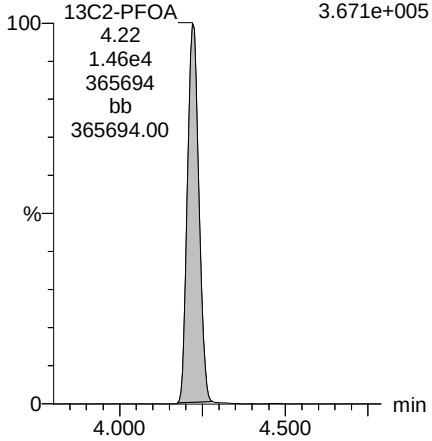
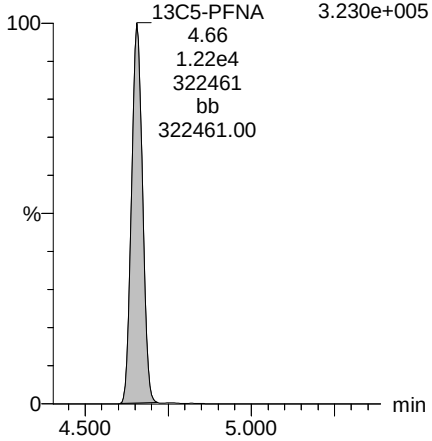




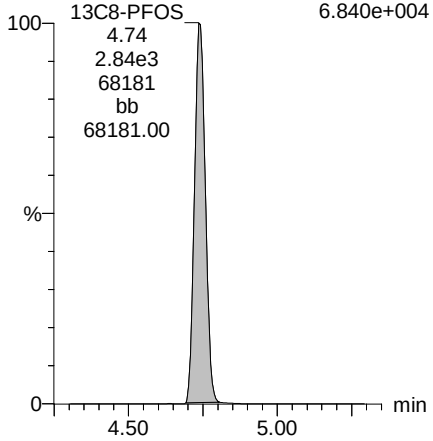
13C2-PFOA



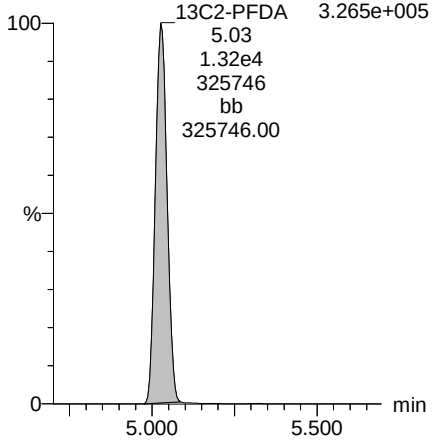
13C5-PFNA



13C8-PFOS



13C2-PFDA



AR 6/6/2018

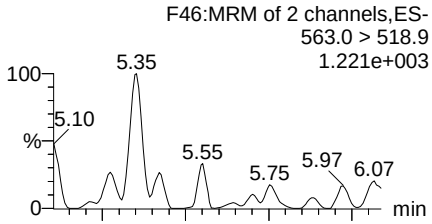
MM 6/6/2018

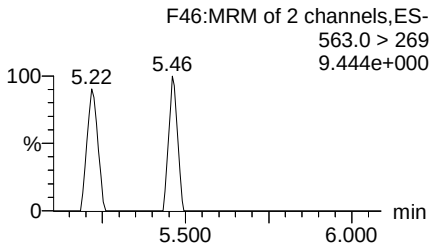
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

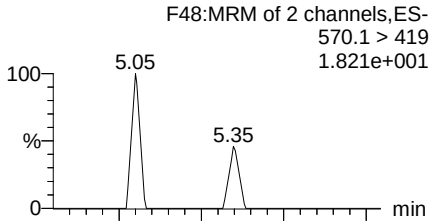
Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

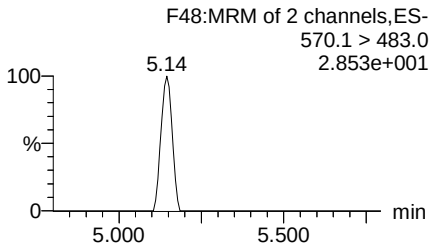
PFUdA





Total N-MeFOSAA





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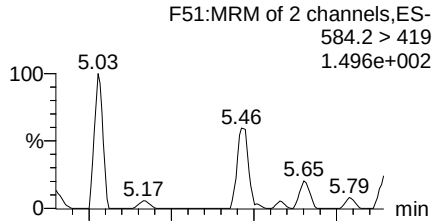
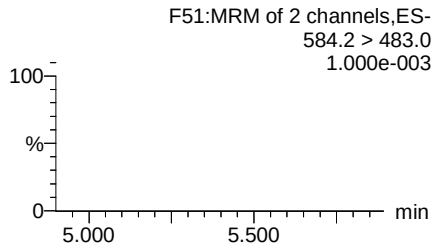
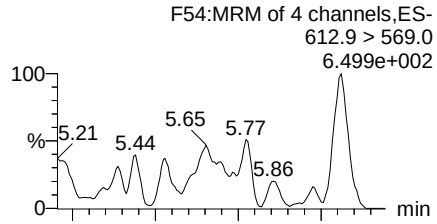
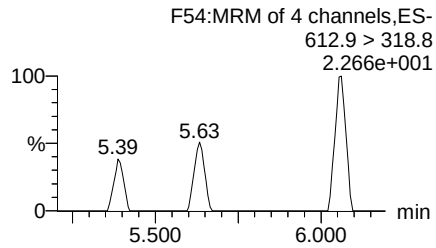


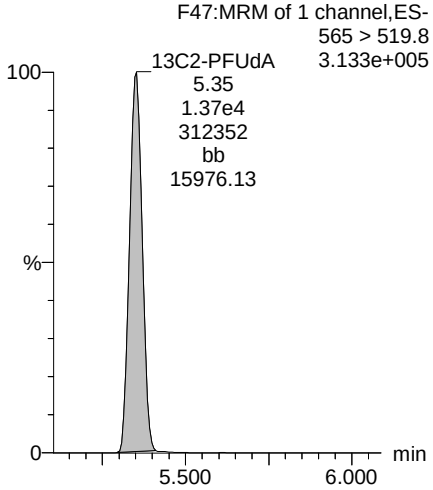


PFDoA

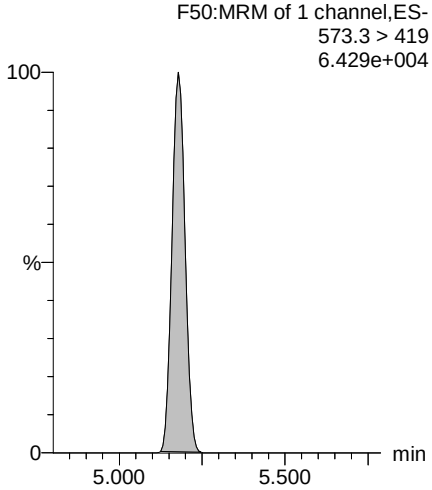




13C2-PFUdA



d3-N-MeFOSAA



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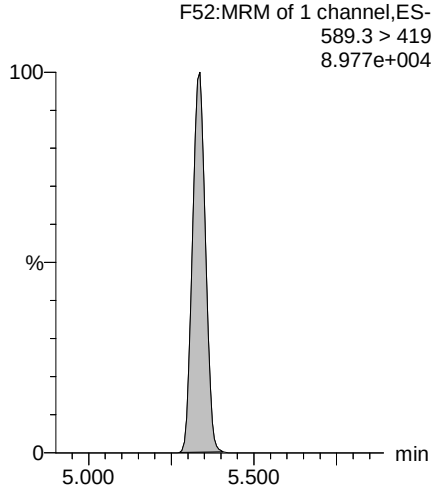
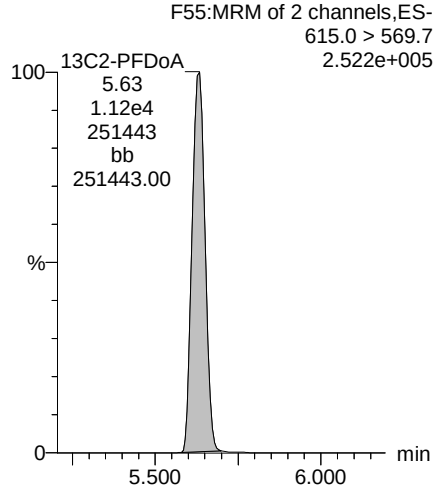


13C2-PFDoA



AR 6/6/2018

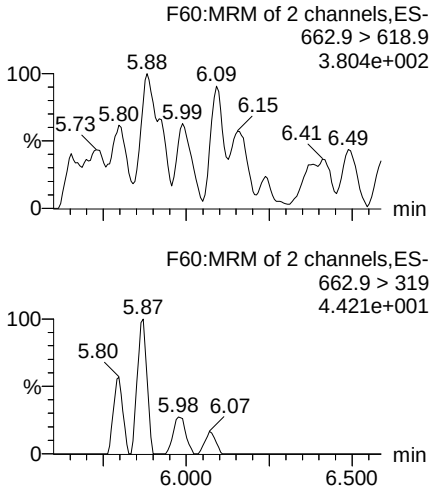
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

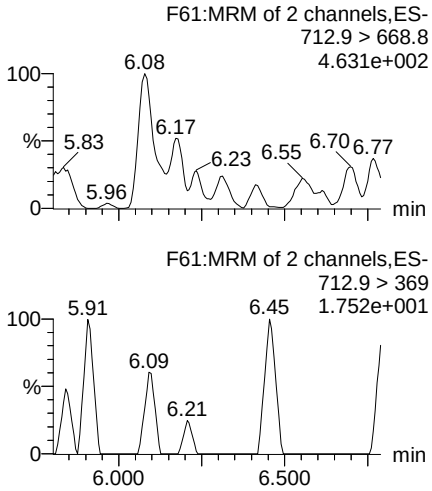
Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

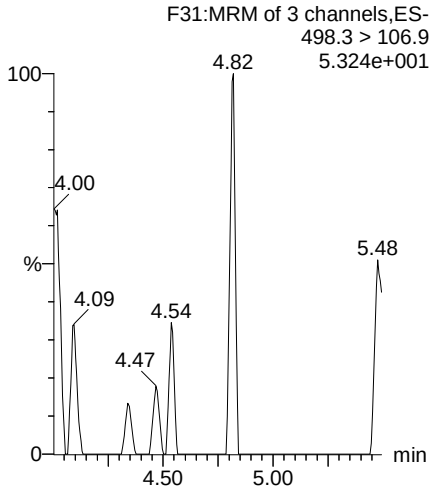
PFTrDA



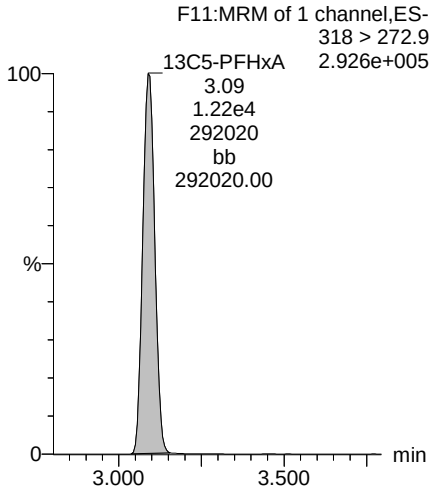
PFTeDA



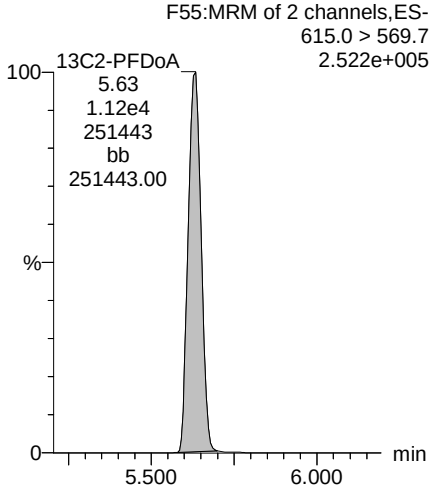
TCDA



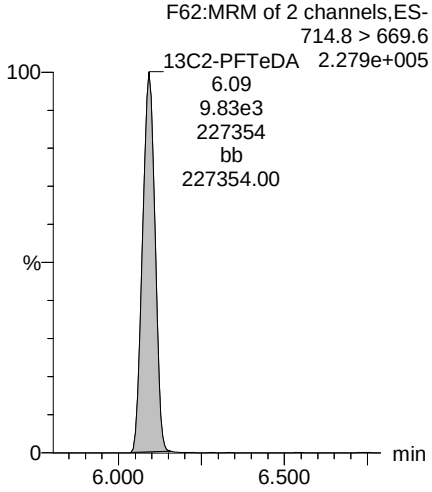
13C5-PFHxA



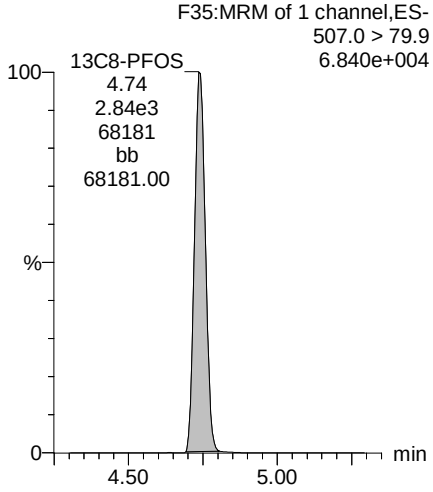
13C2-PFDoA



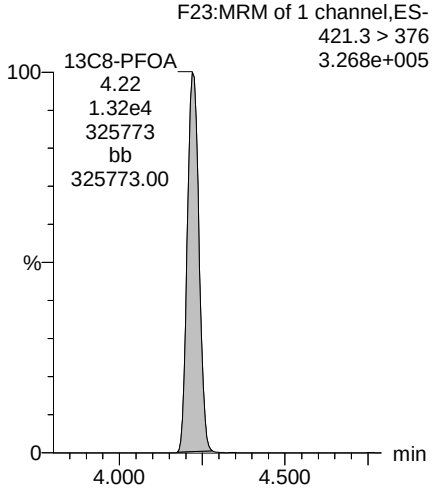
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



AR 6/6/2018

Vista Analytical Laboratory

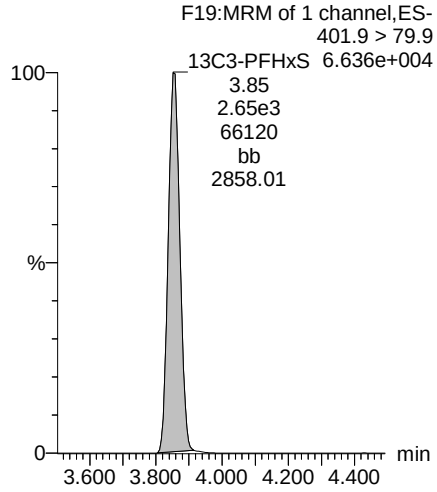
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-30.qld

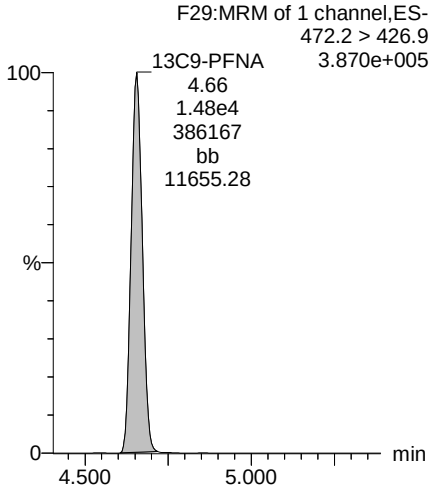
Last Altered: Wednesday, June 06, 2018 15:22:16 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:23:12 Pacific Daylight Time

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

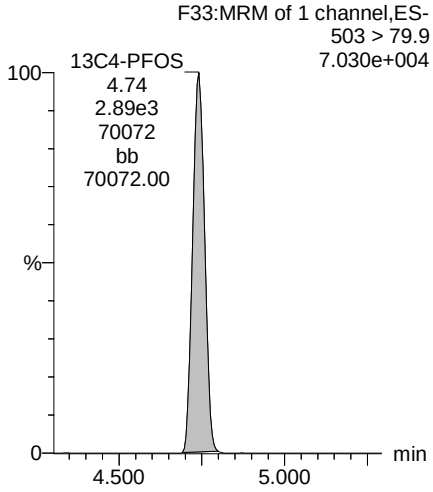
13C3-PFHxS



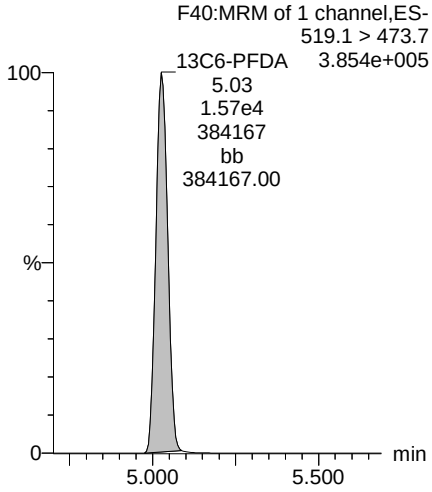
13C9-PFNA



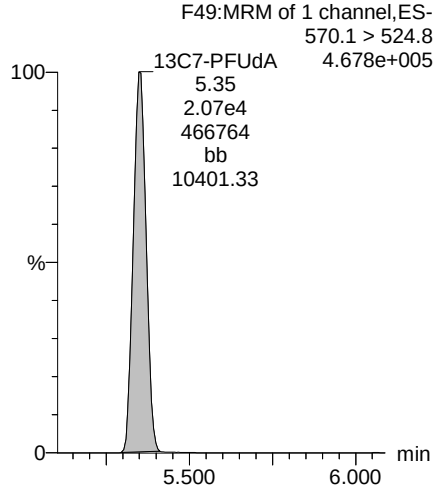
13C4-PFOS



13C6-PFDA



13C7-PFUdA



AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:40:13 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7	5.72e2	1.28e3	0.123		2.57	2.57	5.60	22.8610		2.672	NO
2	5	PFHxA	313.2 > 268.9	7.47e3	2.30e3	0.123		3.07	3.07	16.2	82.4634		349.076	YES
3	7	PFHpA	363.0 > 318.9		5.96e3	0.123		3.67						
4	8	L-PFHxS	398.9 > 79.6	1.81e2	1.07e3	0.123		3.83	3.83	2.11	8.9752		2.261	YES
5	11	L-PFOA	413 > 368.7	3.51e2	9.69e3	0.123		4.25	4.20	0.453	3.3312		4.557	NO
6	14	PFNA	463.0 > 418.8		7.87e3	0.123		4.66						
7	16	L-PFOS	499.1 > 79.9	2.39e1	2.42e3	0.123		4.74	4.73	0.123	1.6051		4.969	YES
8	18	PFDA	513 > 468.8		8.14e3	0.123		5.03						
9	21	L-MeFOSAA	570.1 > 419		2.59e3	0.123		5.18						
10	23	L-EtFOSAA	584.2 > 419		3.43e3	0.123		5.37						

AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:40:39 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		8.75e3	0.123		5.35						
2	27	PFDoA	612.9 > 569.0		8.80e3	0.123		5.63						
3	29	PFTrDA	662.9 > 618.9		8.80e3	0.123		5.88						
4	30	PFTeDA	712.9 > 668.8		7.92e3	0.123		6.10						
5	38	13C3-PFBS	302. > 98.8	1.28e3	8.42e3	0.123	0.104	2.60	2.57	1.90	148.3846	146.2		
6	40	13C2-PFHxA	315 > 269.8	2.30e3	8.42e3	0.123	0.729	3.09	3.07	3.42	38.1134	93.9		
7	41	13C4-PFHpA	367.2 > 321.8	5.96e3	8.42e3	0.123	0.836	3.71	3.67	8.86	85.9984	84.7		
8	42	18O2-PFHxS	403.0 > 102.6	1.07e3	2.52e3	0.123	0.443	3.86	3.83	5.32	97.6031	96.2		
9	44	13C2-PFOA	414.9 > 369.7	9.69e3	9.62e3	0.123	1.332	4.23	4.20	12.6	76.8001	75.7		

AR 6/6/2018

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Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	7.87e3	1.06e4	0.123	0.951	4.66	4.64	9.28	79.2314	78.1		
2	46	13C8-PFOSA	506.1 > 77.7	1.37e3	1.53e4	0.123	0.140	4.73	4.70	1.12	65.0442	64.1		
3	47	13C8-PFOS	507.0 > 79.9	2.42e3	2.79e3	0.123	1.060	4.74	4.72	10.8	83.0675	81.8		
4	48	13C2-PFDA	515.1 > 469.9	8.14e3	1.20e4	0.123	1.130	5.03	5.01	8.45	60.7030	59.8		
5	50	d3-N-MeFOSAA	573.3 > 419	2.59e3	1.53e4	0.123	0.184	5.18	5.17	2.12	93.7114	92.3		
6	51	d5-N-EtFOSAA	589.3 > 419	3.43e3	1.53e4	0.123	0.223	5.34	5.32	2.80	101.9643	100.5		
7	52	13C2-PFUdA	565 > 519.8	8.75e3	1.53e4	0.123	0.936	5.35	5.34	7.16	62.0745	61.2		
8	53	13C2-PFDoA	615.0 > 569.7	8.80e3	1.20e4	0.123	1.168	5.63	5.62	9.13	63.4648	62.5		
9	55	13C2-PFTeDA	714.8 > 669.6	7.92e3	1.53e4	0.123	0.706	6.09	6.08	6.48	74.4768	73.4		
10	57	13C2-PFHxDA	815 > 769.7	5.93e3	1.53e4	0.123	1.079	6.43	6.43	4.85	36.5309	90.0		
11	60	13C4-PFBA	217. > 171.8	6.30e3	6.30e3	0.123	1.000	1.35	1.30	12.5	101.5022	100.0		
12	61	13C5-PFHxA	318 > 272.9	8.42e3	8.42e3	0.123	1.000	3.09	3.06	12.5	101.5022	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	2.52e3	2.52e3	0.123	1.000	3.86	3.83	12.5	101.5022	100.0		
14	63	13C8-PFOA	421.3 > 376	9.62e3	9.62e3	0.123	1.000	4.23	4.20	12.5	101.5022	100.0		
15	64	13C9-PFNA	472.2 > 426.9	1.06e4	1.06e4	0.123	1.000	4.66	4.64	12.5	101.5022	100.0		
16	65	13C4-PFOS	503 > 79.9	2.79e3	2.79e3	0.123	1.000	4.74	4.72	12.5	101.5022	100.0		
17	66	13C6-PFDA	519.1 > 473.7	1.20e4	1.20e4	0.123	1.000	5.03	5.01	12.5	101.5022	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	1.53e4	1.53e4	0.123	1.000	5.35	5.33	12.5	101.5022	100.0		
19	68	Total PFHxS	398.9 > 79.6	1.81e2	1.07e3	0.123		4.05		2.11	8.9752			
20	69	Total PFOA	413 > 368.7	3.51e2	9.69e3	0.123		4.30		0.453	3.3312			
21	70	Total PFOS	499.1 > 79.9	2.39e1	2.42e3	0.123		4.90		0.123	1.6051			
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	2.59e3	0.123		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	3.43e3	0.123		5.70		0.000				

AR 6/6/2018

Vista Analytical Laboratory

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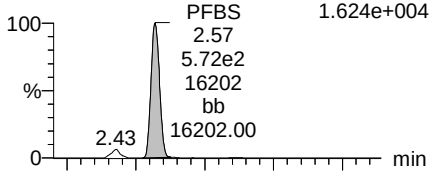
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

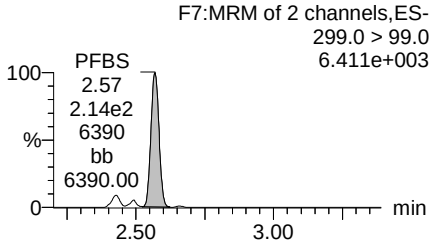
Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

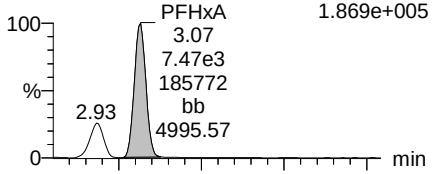
Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

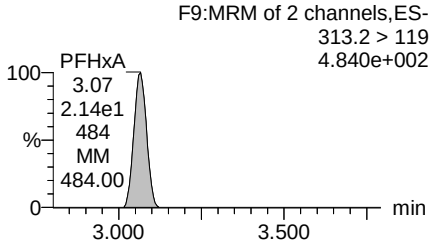
PFBS



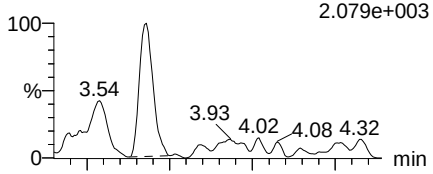


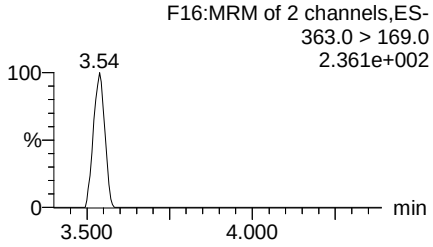
PFHxA



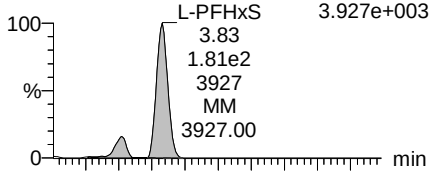


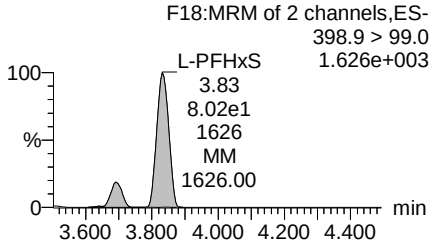
PFHpA



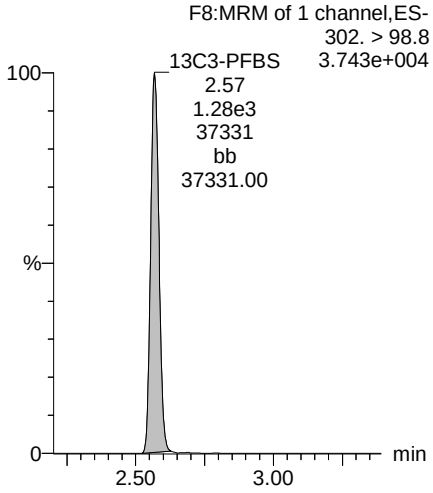


Total PFHxS

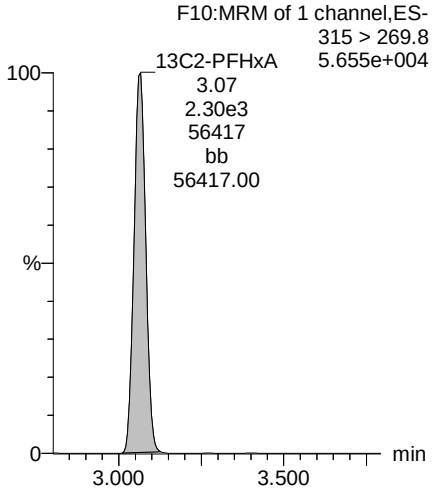




13C3-PFBS



13C2-PFHxA



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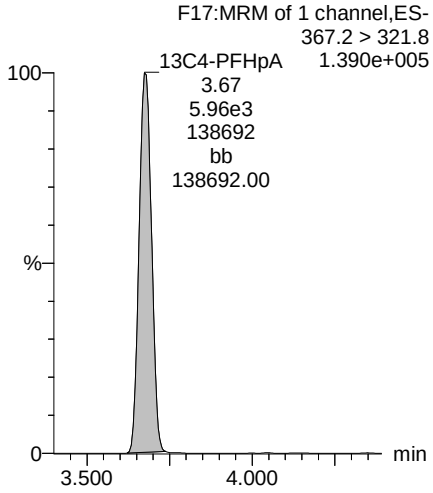
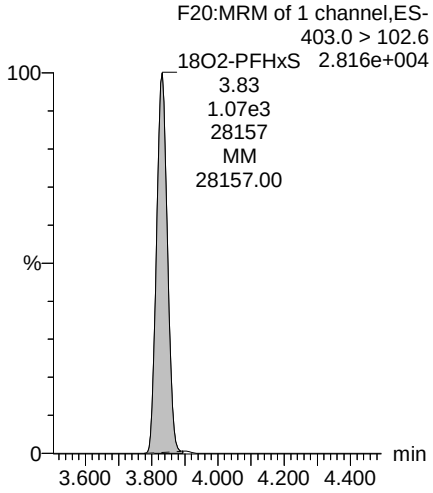


18O2-PFHxS



AR 6/6/2018

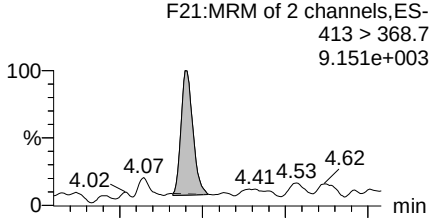
MM 6/6/2018

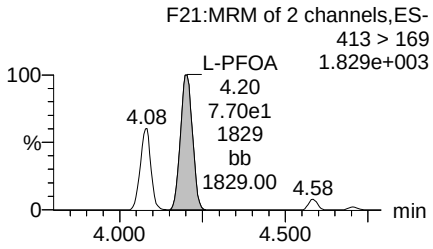
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

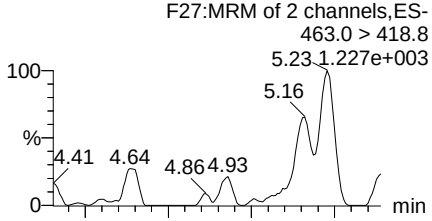
Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

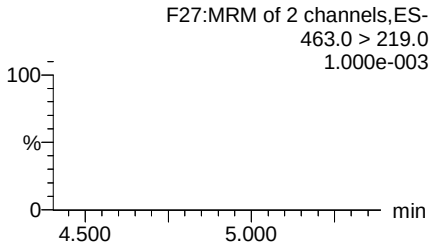
Total PFOA



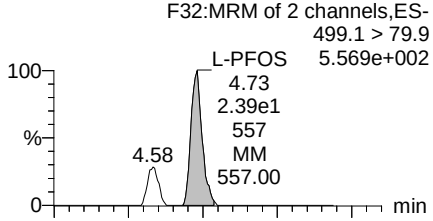


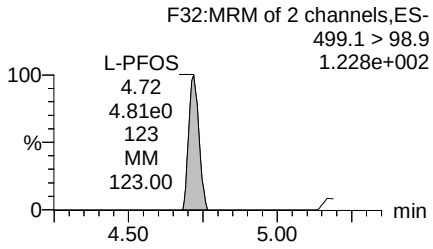
PFNA



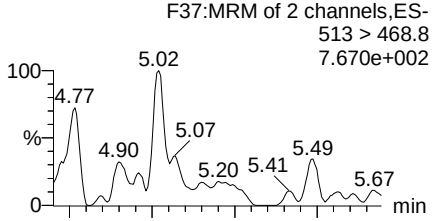


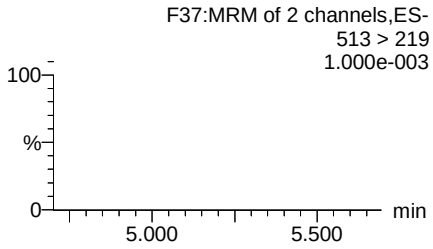
Total PFOS



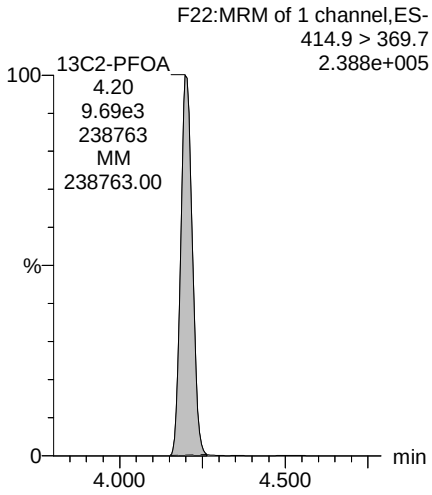


PFDA

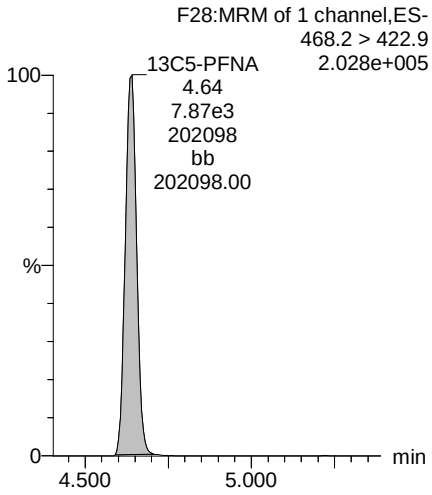




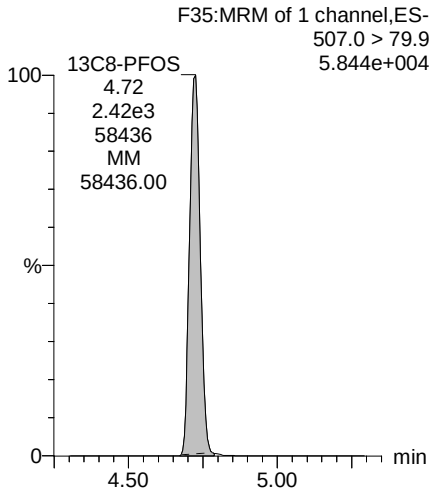
13C2-PFOA



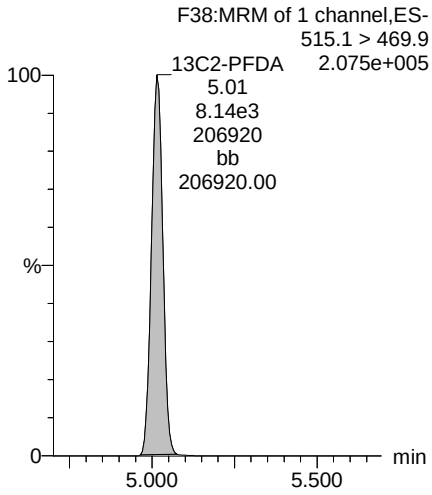
13C5-PFNA



13C8-PFOS



13C2-PFDA



AR 6/6/2018

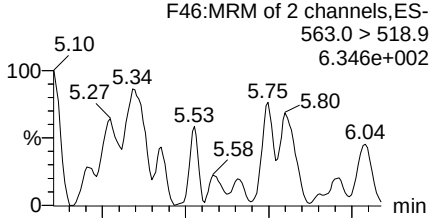
MM 6/6/2018

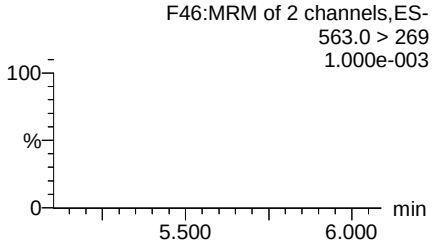
Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

PFUdA





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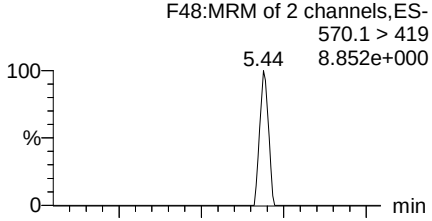

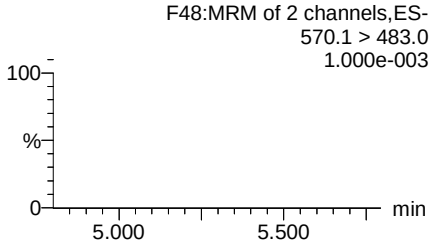

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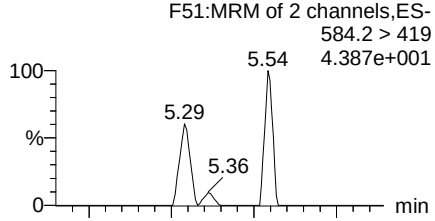
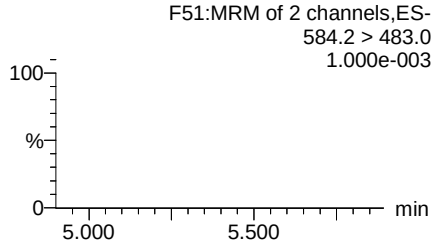
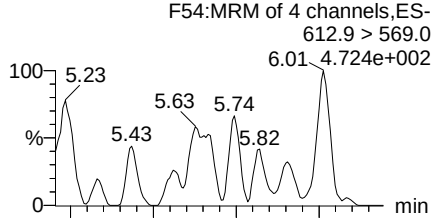
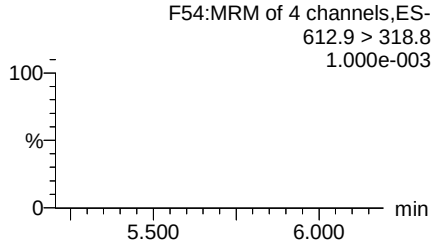


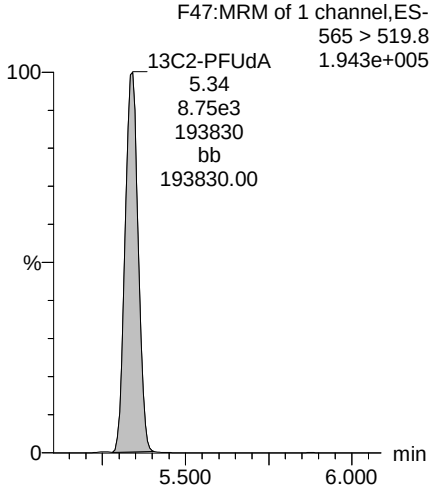


PFDoA

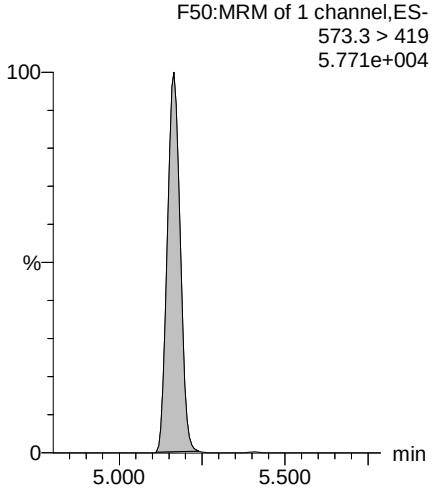




13C2-PFUdA



d3-N-MeFOSAA



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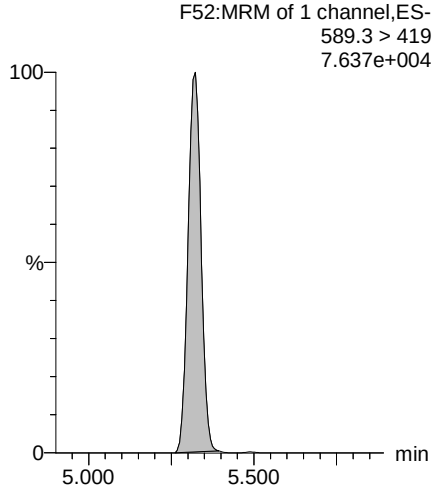
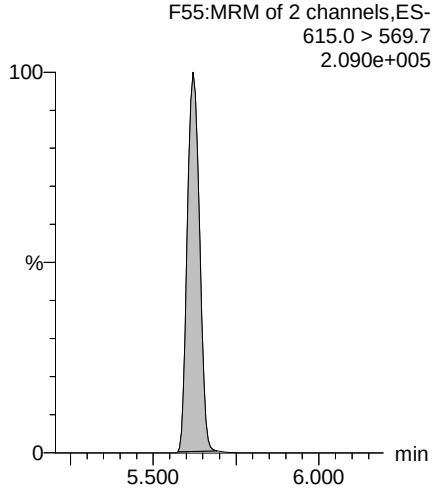


13C2-PFDoA



AR 6/6/2018

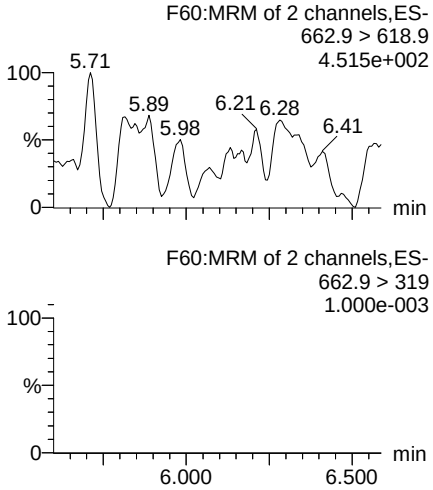
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

PFTrDA



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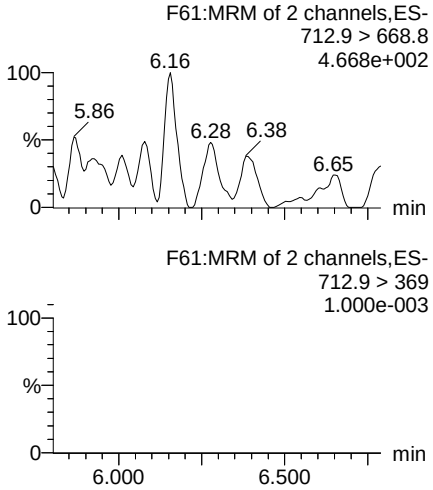
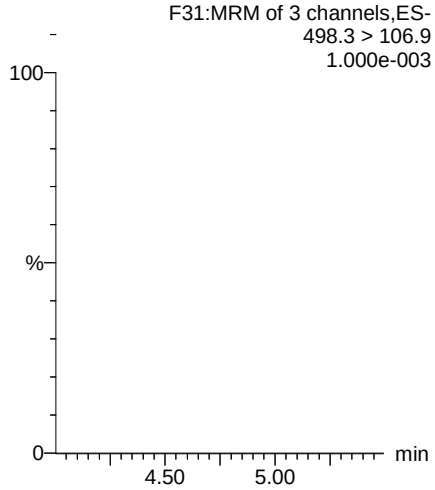
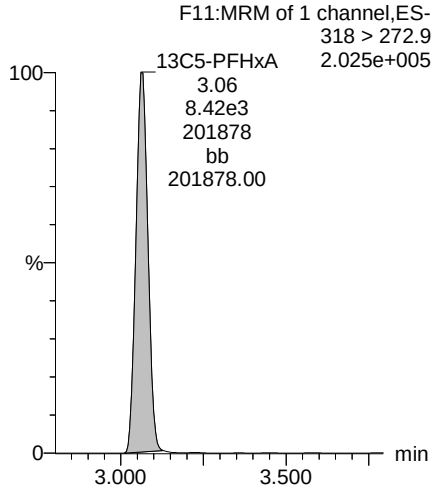


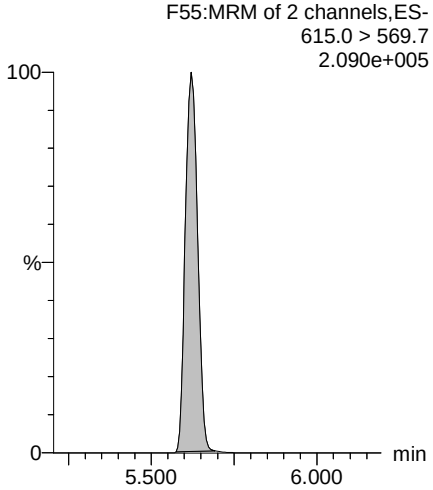
TCDA



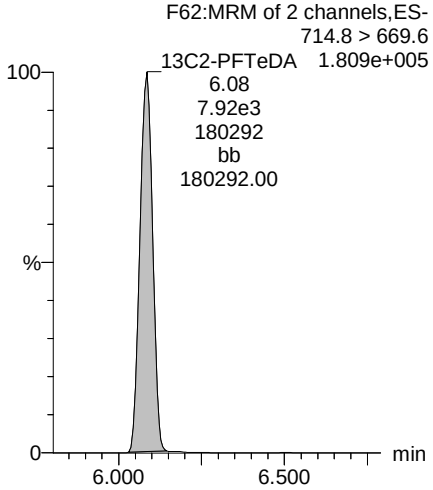
13C5-PFHxA



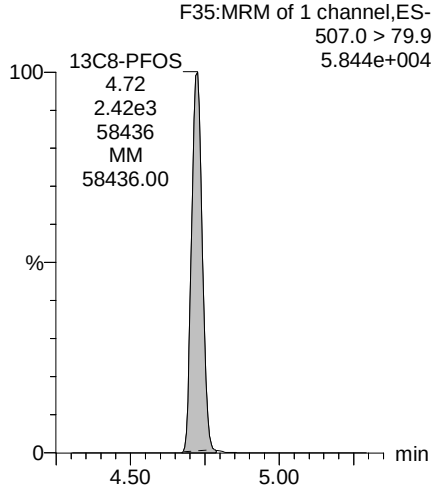
13C2-PFDoA



13C2-PFTeDA



13C8-PFOS



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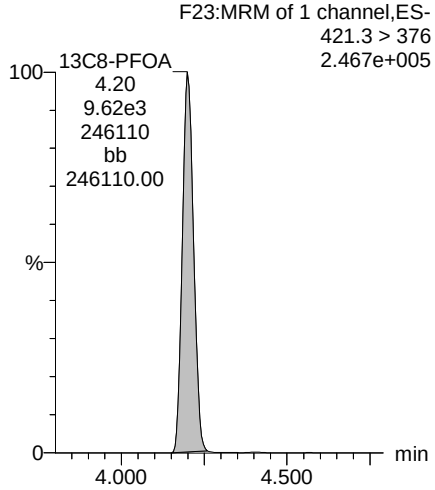


AR 6/6/2018

Vista Analytical Laboratory

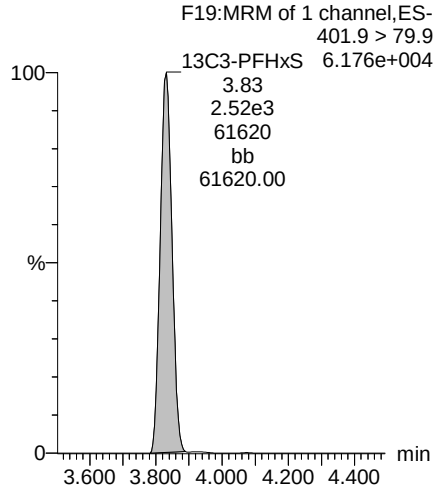
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180605M2\180605M2-36.qld

Last Altered: Wednesday, June 06, 2018 15:39:41 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:41:08 Pacific Daylight Time

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

13C3-PFHxS



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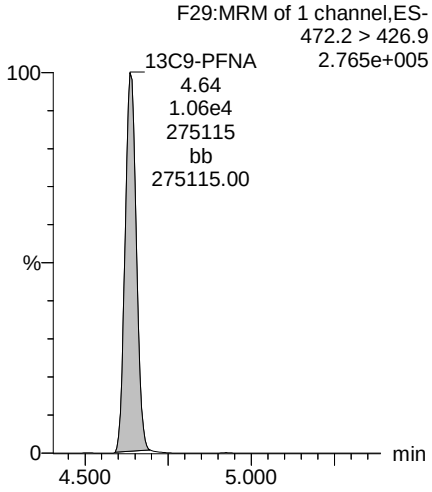
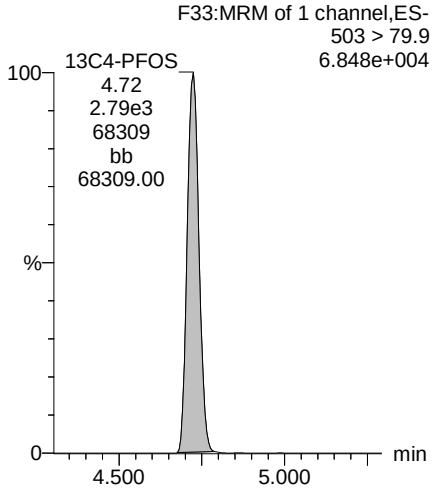
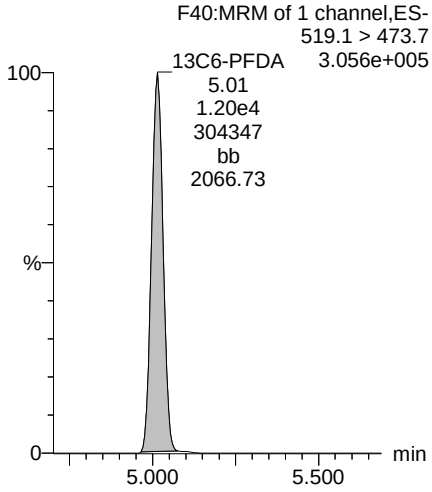


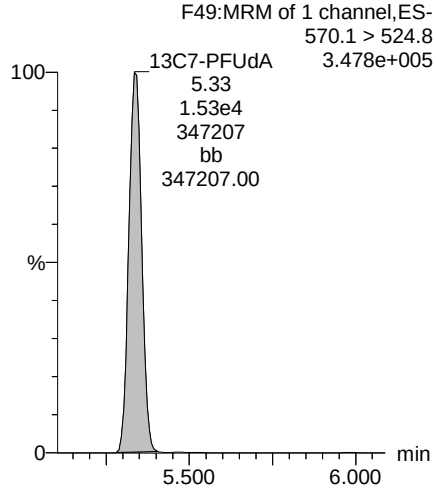
13C4-PFOS



13C6-PFDA



13C7-PFUdA



AR 6/6/2018

Vista Analytical Laboratory

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:27:45 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	3	PFBS	299.0 > 79.7		1.80e3	0.121		2.60						
2	5	PFHxA	313.2 > 268.9		4.16e3	0.121		3.09						
3	7	PFHpA	363.0 > 318.9		1.11e4	0.121		3.70						
4	8	L-PFHxS	398.9 > 79.6	1.06e1	1.47e3	0.121		3.85	3.86	0.0905	0.4288		2.068	NO
5	11	L-PFOA	413 > 368.7		1.88e4	0.121		4.25						
6	14	PFNA	463.0 > 418.8		1.36e4	0.121		4.66						
7	16	L-PFOS	499.1 > 79.9		3.56e3	0.121		4.74						
8	18	PFDA	513 > 468.8		1.66e4	0.121		5.03						
9	21	L-MeFOSAA	570.1 > 419		3.49e3	0.121		5.18						
10	23	L-EtFOSAA	584.2 > 419		4.23e3	0.121		5.37						

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:27:59 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	25	PFUdA	563.0 > 518.9		1.61e4	0.121		5.35						
2	27	PFDoA	612.9 > 569.0		1.65e4	0.121		5.63						
3	29	PFTrDA	662.9 > 618.9		1.65e4	0.121		5.88						
4	30	PFTeDA	712.9 > 668.8		1.19e4	0.121		6.10						
5	38	13C3-PFBS	302. > 98.8	1.80e3	1.48e4	0.121	0.104	2.60	2.60	1.52	121.1613	117.0		
6	40	13C2-PFHxA	315 > 269.8	4.16e3	1.48e4	0.121	0.729	3.09	3.09	3.52	39.9604	96.4		
7	41	13C4-PFHpA	367.2 > 321.8	1.11e4	1.48e4	0.121	0.836	3.71	3.70	9.37	92.8941	89.7		
8	42	18O2-PFHxS	403.0 > 102.6	1.47e3	3.71e3	0.121	0.443	3.86	3.85	4.95	92.6806	89.5		
9	44	13C2-PFOA	414.9 > 369.7	1.88e4	1.66e4	0.121	1.332	4.23	4.23	14.1	87.8029	84.8		

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Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:28:14 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

	#	Name	Trace	Area	IS Area	Wt./Vol.	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Ion Ratio	Ratio Out?
1	45	13C5-PFNA	468.2 > 422.9	1.36e4	1.56e4	0.121	0.951	4.66	4.66	10.9	95.0025	91.7		
2	46	13C8-PFOSA	506.1 > 77.7	1.33e3	2.48e4	0.121	0.140	4.73	4.72	0.671	39.8643	38.5		
3	47	13C8-PFOS	507.0 > 79.9	3.56e3	3.96e3	0.121	1.060	4.74	4.74	11.3	87.9506	84.9		
4	48	13C2-PFDA	515.1 > 469.9	1.66e4	2.24e4	0.121	1.130	5.03	5.03	9.24	67.7864	65.4		
5	50	d3-N-MeFOSAA	573.3 > 419	3.49e3	2.48e4	0.121	0.184	5.18	5.18	1.76	79.3984	76.7		
6	51	d5-N-EtFOSAA	589.3 > 419	4.23e3	2.48e4	0.121	0.223	5.34	5.34	2.13	79.0268	76.3		
7	52	13C2-PFUdA	565 > 519.8	1.61e4	2.48e4	0.121	0.936	5.35	5.35	8.10	71.7019	69.2		
8	53	13C2-PFDoA	615.0 > 569.7	1.65e4	2.24e4	0.121	1.168	5.63	5.63	9.19	65.2021	62.9		
9	55	13C2-PFTeDA	714.8 > 669.6	1.19e4	2.48e4	0.121	0.706	6.09	6.09	6.00	70.3691	67.9		
10	57	13C2-PFHxDA	815 > 769.7	9.44e3	2.48e4	0.121	1.079	6.43	6.43	4.75	36.5136	88.1		
11	60	13C4-PFBA	217. > 171.8	1.06e4	1.06e4	0.121	1.000	1.35	1.34	12.5	103.5797	100.0		
12	61	13C5-PFHxA	318 > 272.9	1.48e4	1.48e4	0.121	1.000	3.09	3.09	12.5	103.5797	100.0		
13	62	13C3-PFHxS	401.9 > 79.9	3.71e3	3.71e3	0.121	1.000	3.86	3.86	12.5	103.5797	100.0		
14	63	13C8-PFOA	421.3 > 376	1.66e4	1.66e4	0.121	1.000	4.23	4.22	12.5	103.5797	100.0		
15	64	13C9-PFNA	472.2 > 426.9	1.56e4	1.56e4	0.121	1.000	4.66	4.66	12.5	103.5797	100.0		
16	65	13C4-PFOS	503 > 79.9	3.96e3	3.96e3	0.121	1.000	4.74	4.74	12.5	103.5797	100.0		
17	66	13C6-PFDA	519.1 > 473.7	2.24e4	2.24e4	0.121	1.000	5.03	5.03	12.5	103.5797	100.0		
18	67	13C7-PFUdA	570.1 > 524.8	2.48e4	2.48e4	0.121	1.000	5.35	5.35	12.5	103.5797	100.0		
19	68	Total PFHxS	398.9 > 79.6	1.06e1	1.47e3	0.121		4.05		0.0905	0.4288			
20	69	Total PFOA	413 > 368.7	0.00e0	1.88e4	0.121		4.30		0.000				
21	70	Total PFOS	499.1 > 79.9	0.00e0	3.56e3	0.121		4.90		0.000				
22	71	Total N-MeFOSAA	570.1 > 419	0.00e0	3.49e3	0.121		5.55		0.000				
23	72	Total N-EtFOSAA	584.2 > 419	0.00e0	4.23e3	0.121		5.70		0.000				

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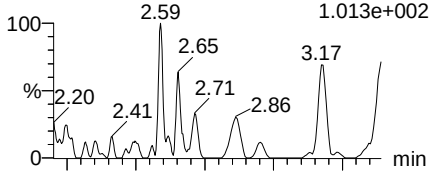
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

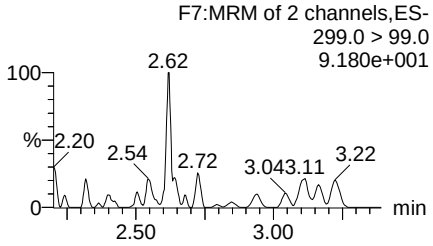
Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:28:14 Pacific Daylight Time

Method: Z:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

PFBS





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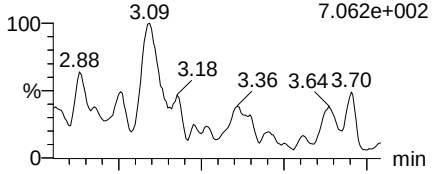

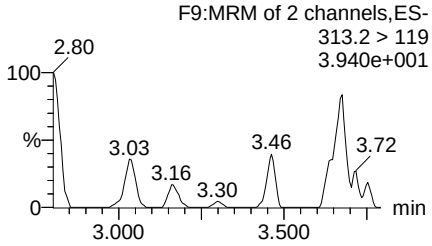

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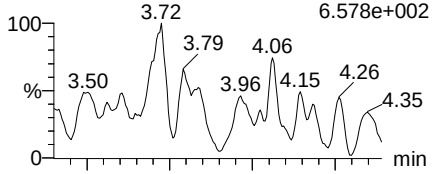

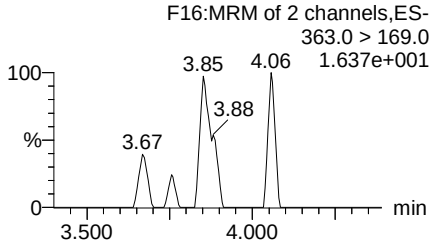

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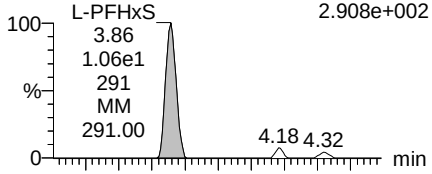

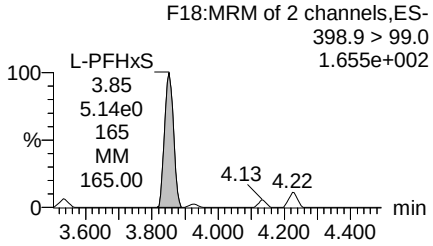

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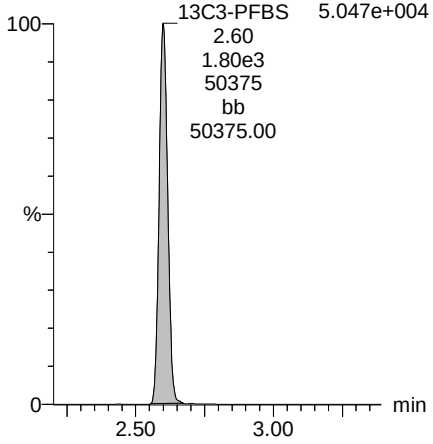

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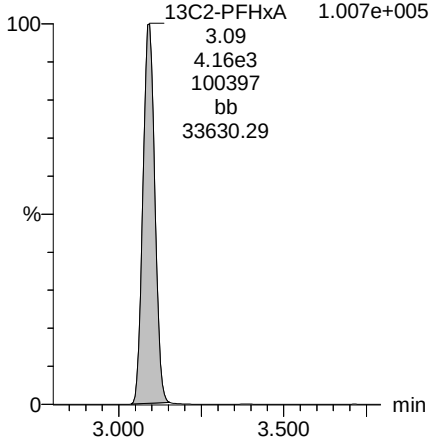

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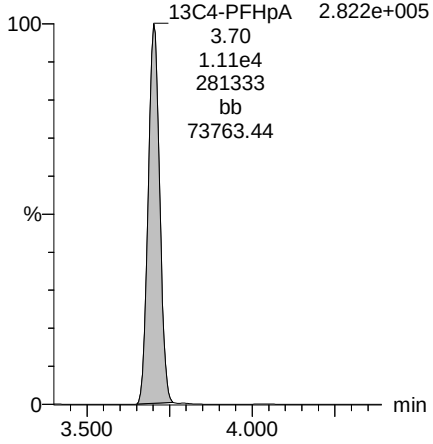

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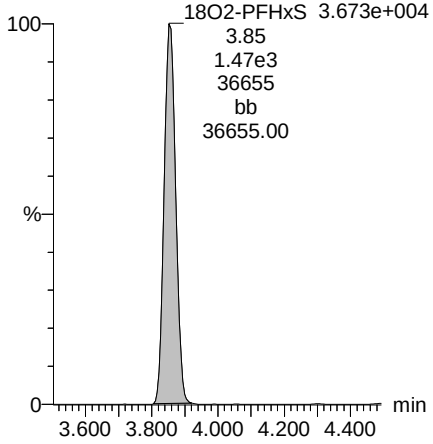

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MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:28:14 Pacific Daylight Time

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

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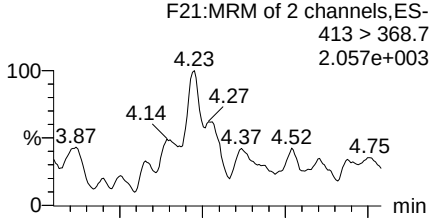

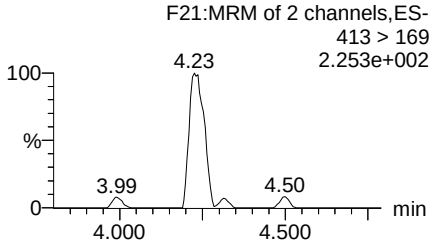

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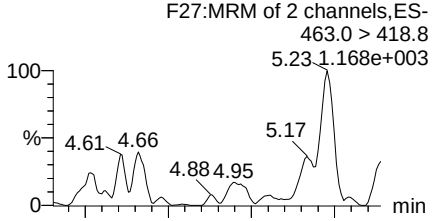

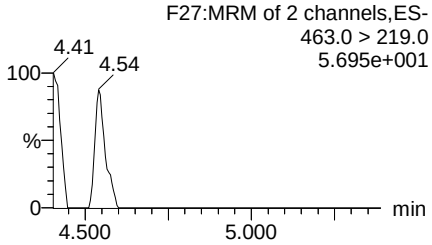

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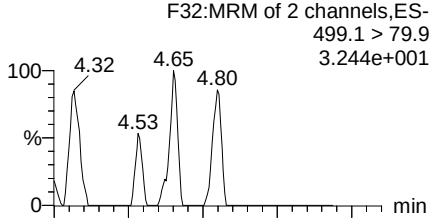

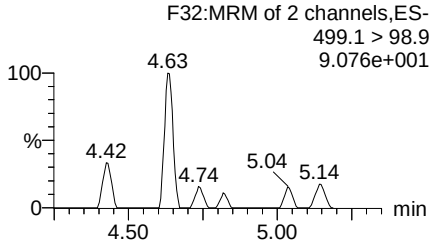

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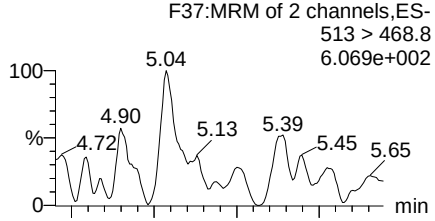

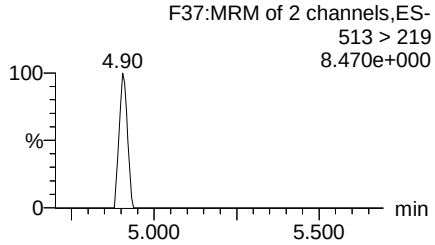

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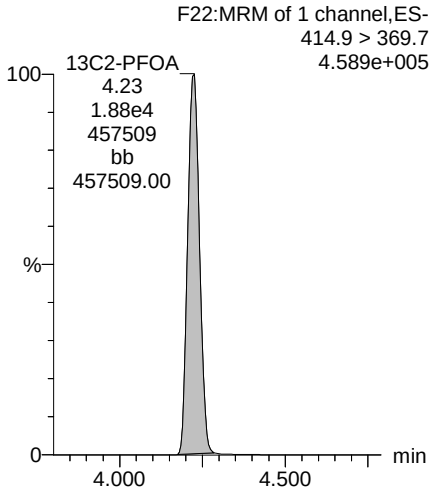

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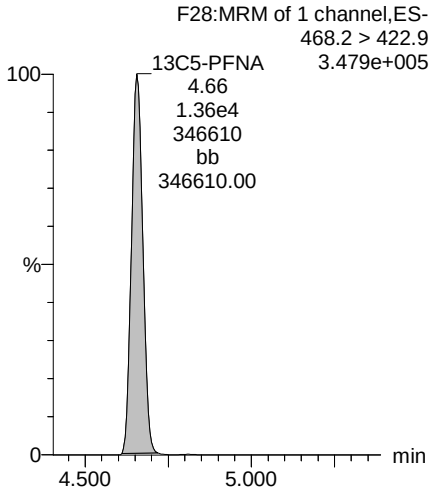

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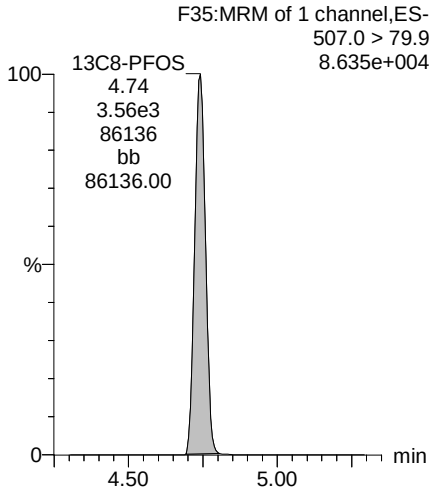

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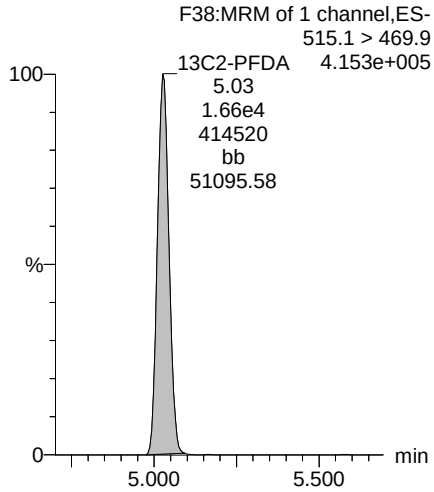


AR 6/6/2018

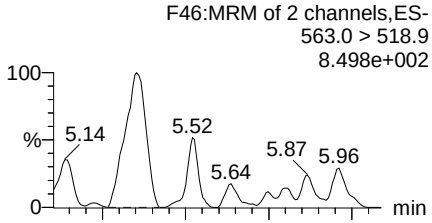
MM 6/6/2018

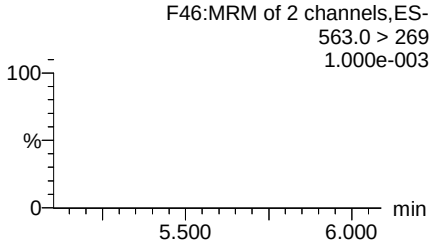
Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:28:14 Pacific Daylight Time

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

PFUdA





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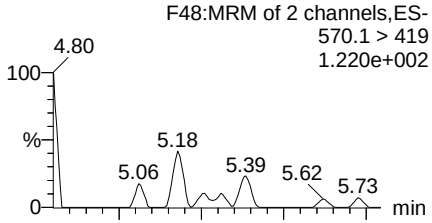

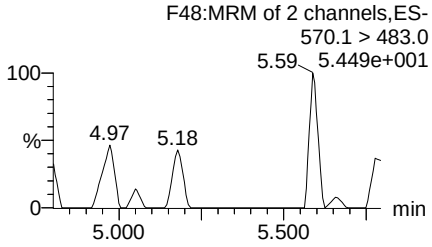

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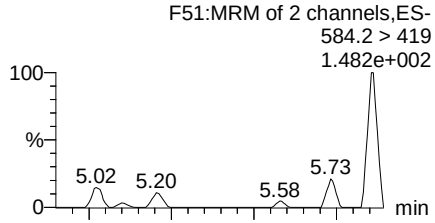

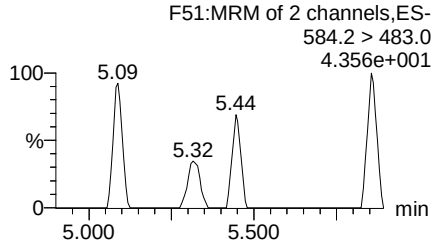

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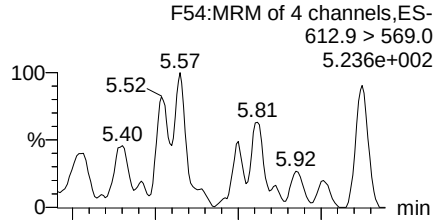

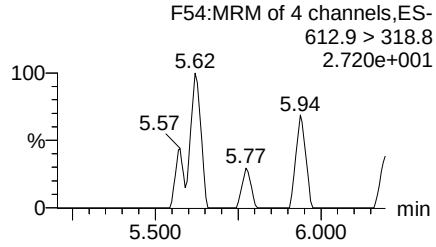

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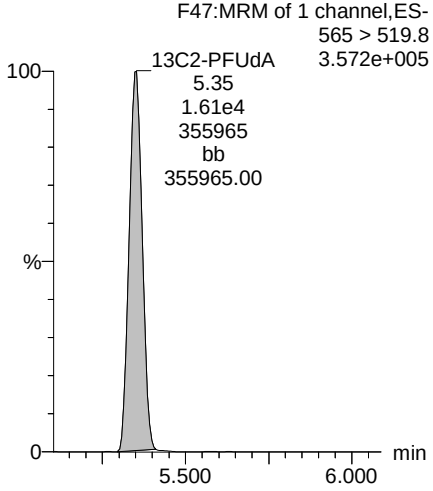
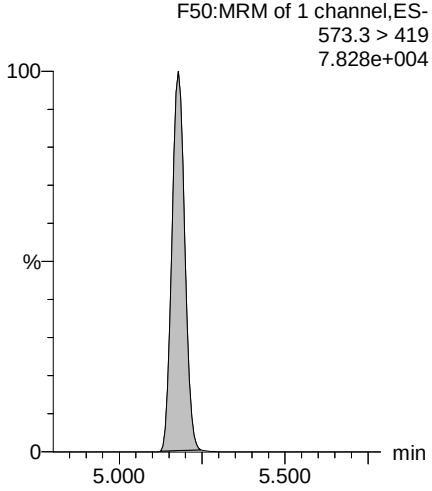


d3-N-MeFOSAA



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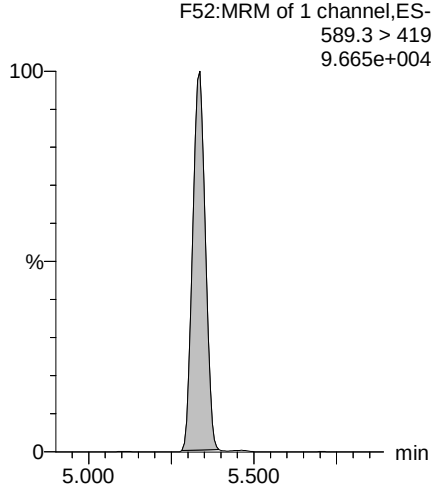

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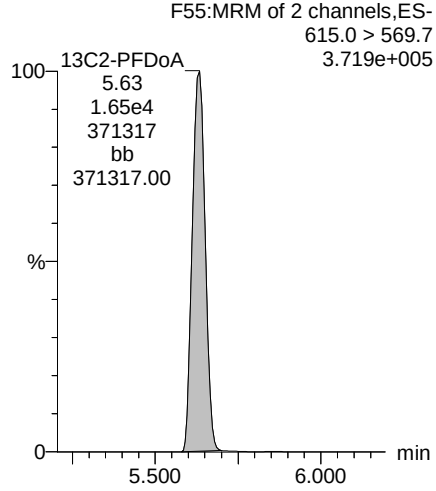


AR 6/6/2018

Vista Analytical Laboratory

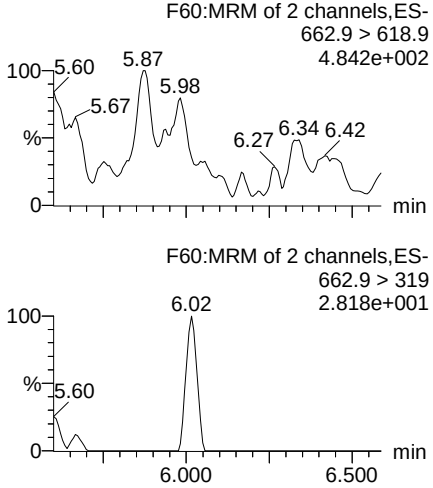
MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

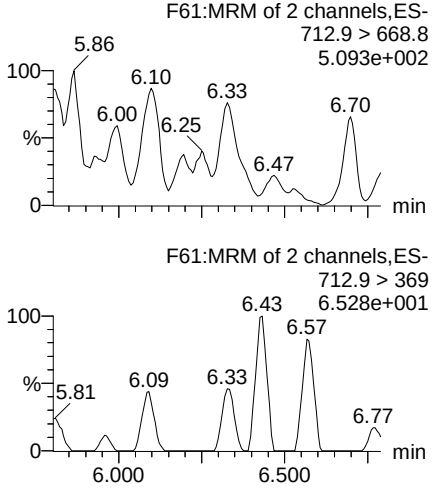
Last Altered: Wednesday, June 06, 2018 15:27:15 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 15:28:14 Pacific Daylight Time

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

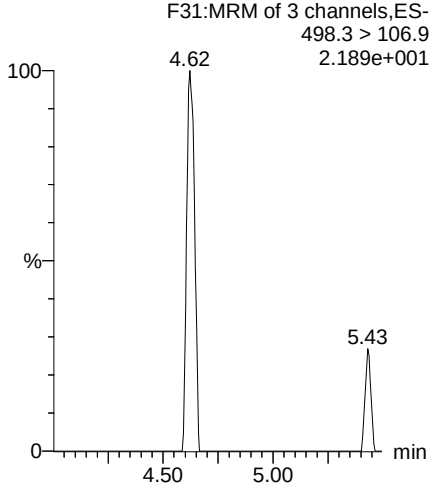
PFTrDA



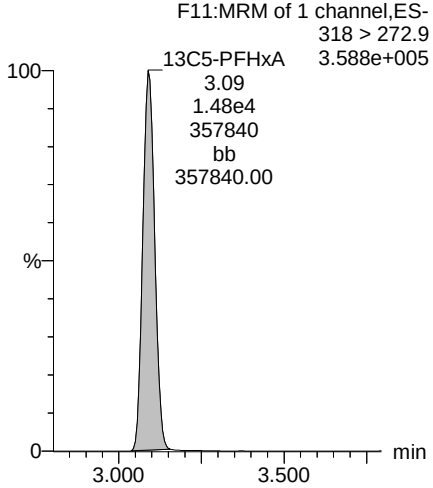
PFTeDA



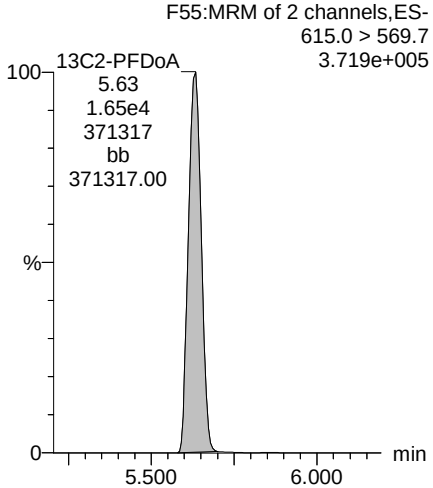
TCDA



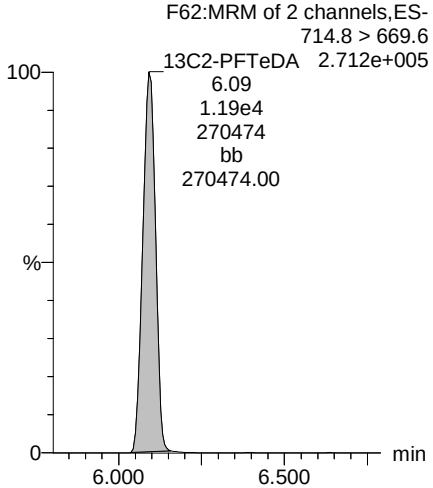
13C5-PFHxA



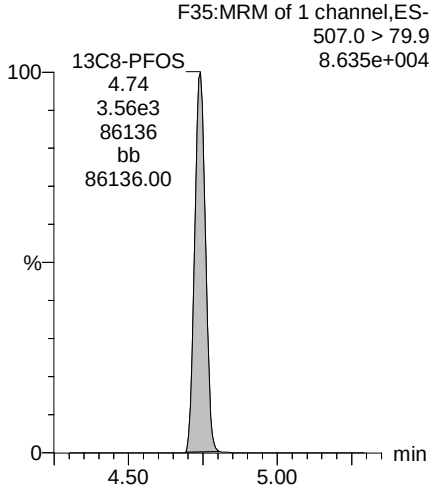
13C2-PFDoA



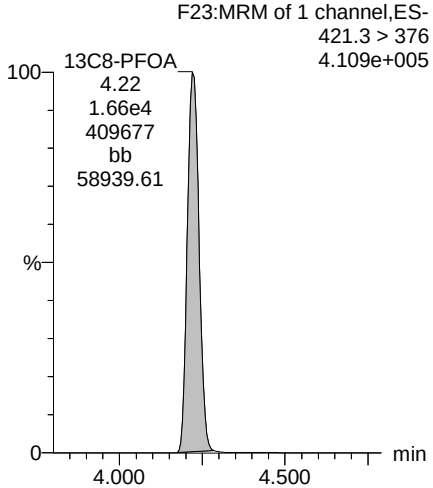
13C2-PFTeDA



13C8-PFOS



13C8-PFOA



AR 6/6/2018

MM 6/6/2018

Dataset: Z:\Projects\PFAS.PRO\Results\180604M2\180604M2-32.qld

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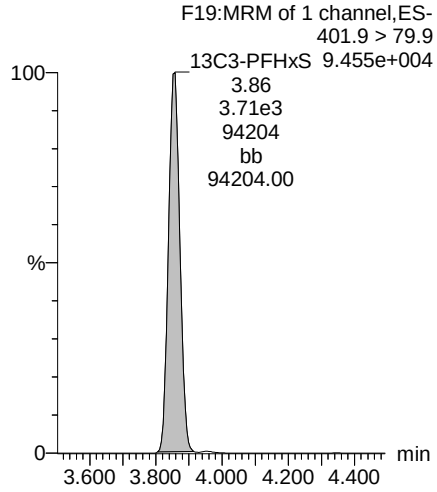
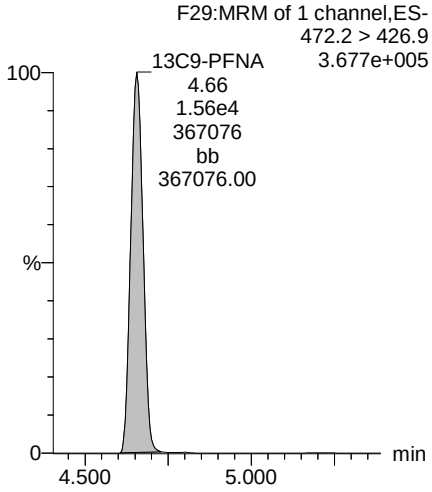
Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

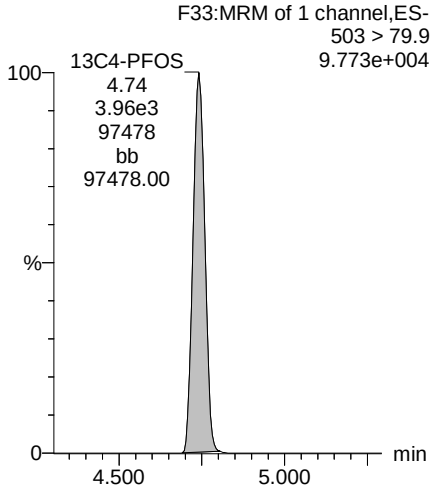
13C3-PFHxS



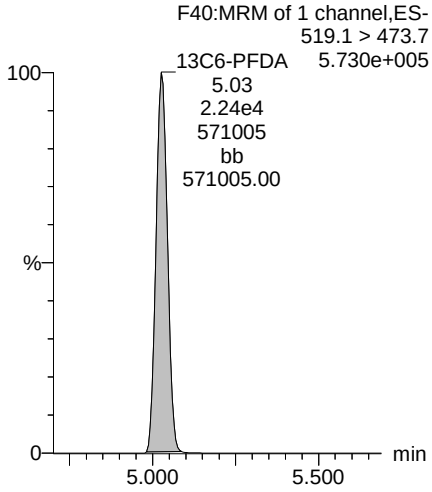
13C9-PFNA



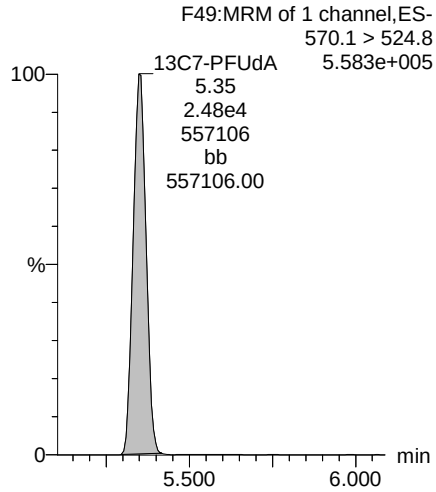
13C4-PFOS



13C6-PFDA



13C7-PFUdA



AR 6/6/2018

INJECTION INTERNAL STANDARD (IIS) AREAS,

INSTRUMENT BLANKS (IB)

AND

CONTINUTING CALIBRATION VERIFICATIONS CCV)

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 15:20:11 Pacific Daylight Time
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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_RS-5-19-18.mdb 20 May 2018 12:59:37
Calibration: 05 Jun 2018 15:20:11

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-6 PFC CS3 18E2907	1.24e4	100.0	NO
2	2	13C5-PFHxA	ST180604M2-6 PFC CS3 18E2907	1.77e4	100.0	NO
3	3	13C3-PFHxS	ST180604M2-6 PFC CS3 18E2907	3.62e3	100.0	NO
4	4	13C8-PFOA	ST180604M2-6 PFC CS3 18E2907	1.60e4	100.0	NO
5	5	13C9-PFNA	ST180604M2-6 PFC CS3 18E2907	1.80e4	100.0	NO
6	6	13C4-PFOS	ST180604M2-6 PFC CS3 18E2907	3.73e3	100.0	NO
7	7	13C6-PFDA	ST180604M2-6 PFC CS3 18E2907	2.37e4	100.0	NO
8	8	13C7-PFUdA	ST180604M2-6 PFC CS3 18E2907	2.92e4	100.0	NO

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-7 PFC CS4 18E2908	1.08e4	86.9	NO
2	2	13C5-PFHxA	ST180604M2-7 PFC CS4 18E2908	1.58e4	89.2	NO
3	3	13C3-PFHxS	ST180604M2-7 PFC CS4 18E2908	3.01e3	83.1	NO
4	4	13C8-PFOA	ST180604M2-7 PFC CS4 18E2908	1.45e4	90.6	NO
5	5	13C9-PFNA	ST180604M2-7 PFC CS4 18E2908	1.87e4	103.5	NO
6	6	13C4-PFOS	ST180604M2-7 PFC CS4 18E2908	3.32e3	89.1	NO
7	7	13C6-PFDA	ST180604M2-7 PFC CS4 18E2908	1.88e4	79.3	NO
8	8	13C7-PFUdA	ST180604M2-7 PFC CS4 18E2908	2.64e4	90.2	NO

Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-8 PFC CS5 18E2909	1.06e4	85.4	NO
2	2	13C5-PFHxA	ST180604M2-8 PFC CS5 18E2909	1.47e4	83.5	NO
3	3	13C3-PFHxS	ST180604M2-8 PFC CS5 18E2909	3.12e3	86.3	NO
4	4	13C8-PFOA	ST180604M2-8 PFC CS5 18E2909	1.53e4	95.7	NO
5	5	13C9-PFNA	ST180604M2-8 PFC CS5 18E2909	1.75e4	97.2	NO
6	6	13C4-PFOS	ST180604M2-8 PFC CS5 18E2909	3.20e3	85.7	NO
7	7	13C6-PFDA	ST180604M2-8 PFC CS5 18E2909	1.54e4	65.0	NO
8	8	13C7-PFUdA	ST180604M2-8 PFC CS5 18E2909	2.30e4	78.6	NO

Name: 180604M2_10, Date: 04-Jun-2018, Time: 20:35:29, ID: ST180604M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-9 PFC CS6 18E2910	1.04e4	83.9	NO
2	2	13C5-PFHxA	ST180604M2-9 PFC CS6 18E2910	1.41e4	80.1	NO
3	3	13C3-PFHxS	ST180604M2-9 PFC CS6 18E2910	2.85e3	78.8	NO
4	4	13C8-PFOA	ST180604M2-9 PFC CS6 18E2910	1.28e4	80.2	NO
5	5	13C9-PFNA	ST180604M2-9 PFC CS6 18E2910	1.58e4	87.5	NO
6	6	13C4-PFOS	ST180604M2-9 PFC CS6 18E2910	2.83e3	76.0	NO
7	7	13C6-PFDA	ST180604M2-9 PFC CS6 18E2910	1.75e4	73.8	NO
8	8	13C7-PFUdA	ST180604M2-9 PFC CS6 18E2910	1.95e4	66.9	NO

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Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-10 PFC CS7 18E2911	9.78e3	78.7	NO
2	2	13C5-PFHxA	ST180604M2-10 PFC CS7 18E2911	1.27e4	71.8	NO
3	3	13C3-PFHxS	ST180604M2-10 PFC CS7 18E2911	2.52e3	69.6	NO
4	4	13C8-PFOA	ST180604M2-10 PFC CS7 18E2911	1.29e4	81.0	NO
5	5	13C9-PFNA	ST180604M2-10 PFC CS7 18E2911	1.41e4	78.5	NO
6	6	13C4-PFOS	ST180604M2-10 PFC CS7 18E2911	2.55e3	68.2	NO
7	7	13C6-PFDA	ST180604M2-10 PFC CS7 18E2911	1.59e4	66.9	NO
8	8	13C7-PFUdA	ST180604M2-10 PFC CS7 18E2911	1.64e4	56.1	NO

Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ICV180604M2-1 PFC 537 ICV 18E2901	1.04e4	83.6	NO
2	2	13C5-PFHxA	ICV180604M2-1 PFC 537 ICV 18E2901	1.50e4	85.2	NO
3	3	13C3-PFHxS	ICV180604M2-1 PFC 537 ICV 18E2901	3.08e3	85.2	NO
4	4	13C8-PFOA	ICV180604M2-1 PFC 537 ICV 18E2901	1.53e4	95.6	NO
5	5	13C9-PFNA	ICV180604M2-1 PFC 537 ICV 18E2901	1.66e4	92.4	NO
6	6	13C4-PFOS	ICV180604M2-1 PFC 537 ICV 18E2901	3.23e3	86.6	NO
7	7	13C6-PFDA	ICV180604M2-1 PFC 537 ICV 18E2901	1.90e4	80.1	NO
8	8	13C7-PFUdA	ICV180604M2-1 PFC 537 ICV 18E2901	2.36e4	80.9	NO

Name: 180604M2_14, Date: 04-Jun-2018, Time: 21:17:19, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Dataset: Untitled

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Name: 180604M2_15, Date: 04-Jun-2018, Time: 21:27:44, ID: 1800982-05 REEPDW554 0.11977, Description: REEPDW554

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-05 REEPDW554 0.11977	1.07e4	86.0	NO
2	2	13C5-PFHxA	1800982-05 REEPDW554 0.11977	1.54e4	87.3	NO
3	3	13C3-PFHxS	1800982-05 REEPDW554 0.11977	3.70e3	102.4	NO
4	4	13C8-PFOA	1800982-05 REEPDW554 0.11977	1.70e4	106.7	NO
5	5	13C9-PFNA	1800982-05 REEPDW554 0.11977	2.00e4	110.8	NO
6	6	13C4-PFOS	1800982-05 REEPDW554 0.11977	4.18e3	112.0	NO
7	7	13C6-PFDA	1800982-05 REEPDW554 0.11977	2.08e4	87.8	NO
8	8	13C7-PFUdA	1800982-05 REEPDW554 0.11977	2.84e4	97.3	NO

Name: 180604M2_16, Date: 04-Jun-2018, Time: 21:38:15, ID: 1800982-06 REEPDW1043 0.12141, Description: REEPDW1043

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800982-06 REEPDW1043 0.12141	9.01e3	72.6	NO
2	2	13C5-PFHxA	1800982-06 REEPDW1043 0.12141	1.36e4	77.2	NO
3	3	13C3-PFHxS	1800982-06 REEPDW1043 0.12141	3.74e3	103.4	NO
4	4	13C8-PFOA	1800982-06 REEPDW1043 0.12141	1.49e4	93.5	NO
5	5	13C9-PFNA	1800982-06 REEPDW1043 0.12141	1.44e4	79.8	NO
6	6	13C4-PFOS	1800982-06 REEPDW1043 0.12141	3.80e3	101.8	NO
7	7	13C6-PFDA	1800982-06 REEPDW1043 0.12141	1.83e4	77.2	NO
8	8	13C7-PFUdA	1800982-06 REEPDW1043 0.12141	2.16e4	73.8	NO

Name: 180604M2_17, Date: 04-Jun-2018, Time: 21:48:40, ID: B8E0141-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0141-BS1 OPR 0.125	1.50e4	121.2	NO
2	2	13C5-PFHxA	B8E0141-BS1 OPR 0.125	2.16e4	122.5	NO
3	3	13C3-PFHxS	B8E0141-BS1 OPR 0.125	4.55e3	125.9	NO
4	4	13C8-PFOA	B8E0141-BS1 OPR 0.125	2.14e4	134.0	NO
5	5	13C9-PFNA	B8E0141-BS1 OPR 0.125	2.58e4	143.1	NO
6	6	13C4-PFOS	B8E0141-BS1 OPR 0.125	4.36e3	116.9	NO
7	7	13C6-PFDA	B8E0141-BS1 OPR 0.125	2.60e4	109.9	NO
8	8	13C7-PFUdA	B8E0141-BS1 OPR 0.125	3.21e4	109.7	NO

Name: 180604M2_18, Date: 04-Jun-2018, Time: 21:59:10, ID: B8E0224-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0224-BSD1 LCSD 0.125	9.02e3	72.6	NO
2	2	13C5-PFHxA	B8E0224-BSD1 LCSD 0.125	1.38e4	78.3	NO
3	3	13C3-PFHxS	B8E0224-BSD1 LCSD 0.125	3.03e3	83.7	NO
4	4	13C8-PFOA	B8E0224-BSD1 LCSD 0.125	1.44e4	89.9	NO
5	5	13C9-PFNA	B8E0224-BSD1 LCSD 0.125	1.62e4	89.8	NO
6	6	13C4-PFOS	B8E0224-BSD1 LCSD 0.125	3.07e3	82.2	NO
7	7	13C6-PFDA	B8E0224-BSD1 LCSD 0.125	1.75e4	73.7	NO
8	8	13C7-PFUdA	B8E0224-BSD1 LCSD 0.125	2.58e4	88.2	NO

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Name: 180604M2_19, Date: 04-Jun-2018, Time: 22:09:36, ID: B8E0224-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0224-BS1 OPR 0.125	9.26e3	74.6	NO
2	2	13C5-PFHxA	B8E0224-BS1 OPR 0.125	1.29e4	73.1	NO
3	3	13C3-PFHxS	B8E0224-BS1 OPR 0.125	2.82e3	77.9	NO
4	4	13C8-PFOA	B8E0224-BS1 OPR 0.125	1.44e4	90.1	NO
5	5	13C9-PFNA	B8E0224-BS1 OPR 0.125	1.72e4	95.2	NO
6	6	13C4-PFOS	B8E0224-BS1 OPR 0.125	2.98e3	79.9	NO
7	7	13C6-PFDA	B8E0224-BS1 OPR 0.125	1.74e4	73.6	NO
8	8	13C7-PFUdA	B8E0224-BS1 OPR 0.125	2.05e4	70.0	NO

Name: 180604M2_20, Date: 04-Jun-2018, Time: 22:20:06, ID: B8E0224-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0224-BLK1 Method Blank 0.125	8.93e3	72.0	NO
2	2	13C5-PFHxA	B8E0224-BLK1 Method Blank 0.125	1.41e4	79.8	NO
3	3	13C3-PFHxS	B8E0224-BLK1 Method Blank 0.125	3.12e3	86.3	NO
4	4	13C8-PFOA	B8E0224-BLK1 Method Blank 0.125	1.41e4	88.0	NO
5	5	13C9-PFNA	B8E0224-BLK1 Method Blank 0.125	1.82e4	101.2	NO
6	6	13C4-PFOS	B8E0224-BLK1 Method Blank 0.125	3.31e3	88.6	NO
7	7	13C6-PFDA	B8E0224-BLK1 Method Blank 0.125	1.83e4	77.4	NO
8	8	13C7-PFUdA	B8E0224-BLK1 Method Blank 0.125	1.99e4	68.1	NO

Name: 180604M2_21, Date: 04-Jun-2018, Time: 22:30:30, ID: 1800952-13RE1 REEPDW488 0.11053, Description: REEPDW488

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800952-13RE1 REEPDW488 0.11053	6.63e3	53.4	NO
2	2	13C5-PFHxA	1800952-13RE1 REEPDW488 0.11053	1.07e4	60.5	NO
3	3	13C3-PFHxS	1800952-13RE1 REEPDW488 0.11053	3.63e3	100.4	NO
4	4	13C8-PFOA	1800952-13RE1 REEPDW488 0.11053	1.33e4	83.3	NO
5	5	13C9-PFNA	1800952-13RE1 REEPDW488 0.11053	1.66e4	92.3	NO
6	6	13C4-PFOS	1800952-13RE1 REEPDW488 0.11053	3.70e3	99.2	NO
7	7	13C6-PFDA	1800952-13RE1 REEPDW488 0.11053	1.70e4	71.9	NO
8	8	13C7-PFUdA	1800952-13RE1 REEPDW488 0.11053	2.01e4	68.7	NO

Name: 180604M2_22, Date: 04-Jun-2018, Time: 22:41:01, ID: B8E0250-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0250-BS1 OPR 0.125	8.47e3	68.2	NO
2	2	13C5-PFHxA	B8E0250-BS1 OPR 0.125	1.21e4	68.4	NO
3	3	13C3-PFHxS	B8E0250-BS1 OPR 0.125	2.93e3	80.9	NO
4	4	13C8-PFOA	B8E0250-BS1 OPR 0.125	1.20e4	75.4	NO
5	5	13C9-PFNA	B8E0250-BS1 OPR 0.125	1.54e4	85.3	NO
6	6	13C4-PFOS	B8E0250-BS1 OPR 0.125	2.85e3	76.4	NO
7	7	13C6-PFDA	B8E0250-BS1 OPR 0.125	1.52e4	64.2	NO
8	8	13C7-PFUdA	B8E0250-BS1 OPR 0.125	2.03e4	69.6	NO

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Name: 180604M2_23, Date: 04-Jun-2018, Time: 22:51:31, ID: B8E0250-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0250-BSD1 LCSD 0.125	8.05e3	64.8	NO
2	2	13C5-PFHxA	B8E0250-BSD1 LCSD 0.125	1.17e4	66.1	NO
3	3	13C3-PFHxS	B8E0250-BSD1 LCSD 0.125	2.64e3	73.0	NO
4	4	13C8-PFOA	B8E0250-BSD1 LCSD 0.125	1.19e4	74.3	NO
5	5	13C9-PFNA	B8E0250-BSD1 LCSD 0.125	1.38e4	76.4	NO
6	6	13C4-PFOS	B8E0250-BSD1 LCSD 0.125	2.76e3	73.8	NO
7	7	13C6-PFDA	B8E0250-BSD1 LCSD 0.125	1.40e4	59.0	NO
8	8	13C7-PFUdA	B8E0250-BSD1 LCSD 0.125	1.62e4	55.5	NO

Name: 180604M2_24, Date: 04-Jun-2018, Time: 23:01:55, ID: B8E0250-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0250-BLK1 Method Blank 0.125	7.28e3	58.7	NO
2	2	13C5-PFHxA	B8E0250-BLK1 Method Blank 0.125	1.10e4	62.3	NO
3	3	13C3-PFHxS	B8E0250-BLK1 Method Blank 0.125	2.39e3	66.2	NO
4	4	13C8-PFOA	B8E0250-BLK1 Method Blank 0.125	1.07e4	66.7	NO
5	5	13C9-PFNA	B8E0250-BLK1 Method Blank 0.125	1.31e4	72.7	NO
6	6	13C4-PFOS	B8E0250-BLK1 Method Blank 0.125	2.60e3	69.6	NO
7	7	13C6-PFDA	B8E0250-BLK1 Method Blank 0.125	1.42e4	59.9	NO
8	8	13C7-PFUdA	B8E0250-BLK1 Method Blank 0.125	2.00e4	68.3	NO

Name: 180604M2_25, Date: 04-Jun-2018, Time: 23:12:26, ID: 1801003-01 GN18057PA 0.11594, Description: GN18057PA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801003-01 GN18057PA 0.11594	9.73e3	78.3	NO
2	2	13C5-PFHxA	1801003-01 GN18057PA 0.11594	1.34e4	76.1	NO
3	3	13C3-PFHxS	1801003-01 GN18057PA 0.11594	3.05e3	84.2	NO
4	4	13C8-PFOA	1801003-01 GN18057PA 0.11594	1.39e4	86.8	NO
5	5	13C9-PFNA	1801003-01 GN18057PA 0.11594	1.74e4	96.5	NO
6	6	13C4-PFOS	1801003-01 GN18057PA 0.11594	3.18e3	85.2	NO
7	7	13C6-PFDA	1801003-01 GN18057PA 0.11594	1.81e4	76.5	NO
8	8	13C7-PFUdA	1801003-01 GN18057PA 0.11594	2.42e4	82.7	NO

Name: 180604M2_26, Date: 04-Jun-2018, Time: 23:22:51, ID: 1801003-02 GN18058PA 0.11833, Description: GN18058PA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801003-02 GN18058PA 0.11833	8.34e3	67.1	NO
2	2	13C5-PFHxA	1801003-02 GN18058PA 0.11833	1.20e4	68.0	NO
3	3	13C3-PFHxS	1801003-02 GN18058PA 0.11833	2.44e3	67.4	NO
4	4	13C8-PFOA	1801003-02 GN18058PA 0.11833	1.12e4	70.0	NO
5	5	13C9-PFNA	1801003-02 GN18058PA 0.11833	1.61e4	89.3	NO
6	6	13C4-PFOS	1801003-02 GN18058PA 0.11833	2.82e3	75.5	NO
7	7	13C6-PFDA	1801003-02 GN18058PA 0.11833	1.37e4	58.0	NO
8	8	13C7-PFUdA	1801003-02 GN18058PA 0.11833	1.94e4	66.4	NO

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Name: 180604M2_27, Date: 04-Jun-2018, Time: 23:33:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-01 A1-MW-51-SA1 0.11961	3.32e3	26.8	YES
2	2	13C5-PFHxA	1801024-01 A1-MW-51-SA1 0.11961	4.40e3	24.9	YES
3	3	13C3-PFHxS	1801024-01 A1-MW-51-SA1 0.11961	2.26e3	62.6	NO
4	4	13C8-PFOA	1801024-01 A1-MW-51-SA1 0.11961	4.58e3	28.7	YES
5	5	13C9-PFNA	1801024-01 A1-MW-51-SA1 0.11961	5.86e3	32.5	YES
6	6	13C4-PFOS	1801024-01 A1-MW-51-SA1 0.11961	2.45e3	65.6	NO
7	7	13C6-PFDA	1801024-01 A1-MW-51-SA1 0.11961	6.05e3	25.5	YES
8	8	13C7-PFUdA	1801024-01 A1-MW-51-SA1 0.11961	8.35e3	28.6	YES

Name: 180604M2_28, Date: 04-Jun-2018, Time: 23:43:47, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-02 A1-MW-50-SA1 0.12082	5.21e3	42.0	YES
2	2	13C5-PFHxA	1801024-02 A1-MW-50-SA1 0.12082	6.80e3	38.5	YES
3	3	13C3-PFHxS	1801024-02 A1-MW-50-SA1 0.12082	2.48e3	68.4	NO
4	4	13C8-PFOA	1801024-02 A1-MW-50-SA1 0.12082	5.83e3	36.5	YES
5	5	13C9-PFNA	1801024-02 A1-MW-50-SA1 0.12082	6.26e3	34.7	YES
6	6	13C4-PFOS	1801024-02 A1-MW-50-SA1 0.12082	2.63e3	70.5	NO
7	7	13C6-PFDA	1801024-02 A1-MW-50-SA1 0.12082	6.10e3	25.7	YES
8	8	13C7-PFUdA	1801024-02 A1-MW-50-SA1 0.12082	6.35e3	21.7	YES

Name: 180604M2_29, Date: 04-Jun-2018, Time: 23:54:17, ID: 1801024-03 A1-MW-49-SA1 0.12317, Description: A1-MW-49-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-03 A1-MW-49-SA1 0.12317	7.80e3	62.9	NO
2	2	13C5-PFHxA	1801024-03 A1-MW-49-SA1 0.12317	1.11e4	63.0	NO
3	3	13C3-PFHxS	1801024-03 A1-MW-49-SA1 0.12317	2.75e3	76.0	NO
4	4	13C8-PFOA	1801024-03 A1-MW-49-SA1 0.12317	1.05e4	65.9	NO
5	5	13C9-PFNA	1801024-03 A1-MW-49-SA1 0.12317	1.35e4	74.6	NO
6	6	13C4-PFOS	1801024-03 A1-MW-49-SA1 0.12317	2.76e3	74.0	NO
7	7	13C6-PFDA	1801024-03 A1-MW-49-SA1 0.12317	1.30e4	54.7	NO
8	8	13C7-PFUdA	1801024-03 A1-MW-49-SA1 0.12317	1.79e4	61.2	NO

Name: 180604M2_30, Date: 05-Jun-2018, Time: 00:04:41, ID: 1801024-04 A1-MW-05-SA1 0.11875, Description: A1-MW-05-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-04 A1-MW-05-SA1 0.11875	8.23e3	66.3	NO
2	2	13C5-PFHxA	1801024-04 A1-MW-05-SA1 0.11875	1.22e4	69.1	NO
3	3	13C3-PFHxS	1801024-04 A1-MW-05-SA1 0.11875	2.65e3	73.3	NO
4	4	13C8-PFOA	1801024-04 A1-MW-05-SA1 0.11875	1.32e4	82.3	NO
5	5	13C9-PFNA	1801024-04 A1-MW-05-SA1 0.11875	1.48e4	82.3	NO
6	6	13C4-PFOS	1801024-04 A1-MW-05-SA1 0.11875	2.89e3	77.4	NO
7	7	13C6-PFDA	1801024-04 A1-MW-05-SA1 0.11875	1.57e4	66.3	NO
8	8	13C7-PFUdA	1801024-04 A1-MW-05-SA1 0.11875	2.07e4	70.8	NO

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Name: 180604M2_31, Date: 05-Jun-2018, Time: 00:15:11, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-05 A1-MW-04-SA1 0.12315	6.51e3	52.4	NO
2	2	13C5-PFHxA	1801024-05 A1-MW-04-SA1 0.12315	9.83e3	55.7	NO
3	3	13C3-PFHxS	1801024-05 A1-MW-04-SA1 0.12315	2.97e3	82.0	NO
4	4	13C8-PFOA	1801024-05 A1-MW-04-SA1 0.12315	9.28e3	58.1	NO
5	5	13C9-PFNA	1801024-05 A1-MW-04-SA1 0.12315	1.08e4	59.9	NO
6	6	13C4-PFOS	1801024-05 A1-MW-04-SA1 0.12315	2.92e3	78.1	NO
7	7	13C6-PFDA	1801024-05 A1-MW-04-SA1 0.12315	1.13e4	47.8	YES
8	8	13C7-PFUdA	1801024-05 A1-MW-04-SA1 0.12315	1.54e4	52.6	NO

Name: 180604M2_32, Date: 05-Jun-2018, Time: 00:25:41, ID: 1801024-06 FRB-20180522 0.12068, Description: FRB-20180522

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-06 FRB-20180522 0.12068	1.06e4	85.5	NO
2	2	13C5-PFHxA	1801024-06 FRB-20180522 0.12068	1.48e4	83.7	NO
3	3	13C3-PFHxS	1801024-06 FRB-20180522 0.12068	3.71e3	102.5	NO
4	4	13C8-PFOA	1801024-06 FRB-20180522 0.12068	1.66e4	104.0	NO
5	5	13C9-PFNA	1801024-06 FRB-20180522 0.12068	1.56e4	86.3	NO
6	6	13C4-PFOS	1801024-06 FRB-20180522 0.12068	3.96e3	106.0	NO
7	7	13C6-PFDA	1801024-06 FRB-20180522 0.12068	2.24e4	94.7	NO
8	8	13C7-PFUdA	1801024-06 FRB-20180522 0.12068	2.48e4	85.0	NO

Name: 180604M2_33, Date: 05-Jun-2018, Time: 00:36:06, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA	1.03e1	0.1	YES
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-11 PFC CS3 18E2907	1.32e4	106.6	NO
2	2	13C5-PFHxA	ST180604M2-11 PFC CS3 18E2907	2.01e4	113.5	NO
3	3	13C3-PFHxS	ST180604M2-11 PFC CS3 18E2907	4.07e3	112.6	NO
4	4	13C8-PFOA	ST180604M2-11 PFC CS3 18E2907	1.97e4	123.5	NO
5	5	13C9-PFNA	ST180604M2-11 PFC CS3 18E2907	2.37e4	131.6	NO
6	6	13C4-PFOS	ST180604M2-11 PFC CS3 18E2907	4.43e3	118.8	NO
7	7	13C6-PFDA	ST180604M2-11 PFC CS3 18E2907	2.47e4	104.2	NO
8	8	13C7-PFUdA	ST180604M2-11 PFC CS3 18E2907	2.82e4	96.5	NO

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Name: 180604M2_35, Date: 05-Jun-2018, Time: 00:57:02, ID: 1801071-01 A1-MW-27-SA1 0.11705, Description: A1-MW-27-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-01 A1-MW-27-SA1 0.11705	6.41e3	51.7	NO
2	2	13C5-PFHxA	1801071-01 A1-MW-27-SA1 0.11705	9.37e3	53.1	NO
3	3	13C3-PFHxS	1801071-01 A1-MW-27-SA1 0.11705	3.54e3	97.8	NO
4	4	13C8-PFOA	1801071-01 A1-MW-27-SA1 0.11705	1.12e4	70.3	NO
5	5	13C9-PFNA	1801071-01 A1-MW-27-SA1 0.11705	1.40e4	77.4	NO
6	6	13C4-PFOS	1801071-01 A1-MW-27-SA1 0.11705	3.54e3	94.9	NO
7	7	13C6-PFDA	1801071-01 A1-MW-27-SA1 0.11705	1.46e4	61.4	NO
8	8	13C7-PFUdA	1801071-01 A1-MW-27-SA1 0.11705	2.23e4	76.1	NO

Name: 180604M2_36, Date: 05-Jun-2018, Time: 01:07:32, ID: 1801071-02 A1-MW-55-SA1 0.11428, Description: A1-MW-55-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-02 A1-MW-55-SA1 0.11428	5.65e3	45.5	YES
2	2	13C5-PFHxA	1801071-02 A1-MW-55-SA1 0.11428	8.29e3	46.9	YES
3	3	13C3-PFHxS	1801071-02 A1-MW-55-SA1 0.11428	2.91e3	80.5	NO
4	4	13C8-PFOA	1801071-02 A1-MW-55-SA1 0.11428	9.14e3	57.2	NO
5	5	13C9-PFNA	1801071-02 A1-MW-55-SA1 0.11428	1.23e4	68.4	NO
6	6	13C4-PFOS	1801071-02 A1-MW-55-SA1 0.11428	2.95e3	79.1	NO
7	7	13C6-PFDA	1801071-02 A1-MW-55-SA1 0.11428	1.36e4	57.6	NO
8	8	13C7-PFUdA	1801071-02 A1-MW-55-SA1 0.11428	1.84e4	62.9	NO

Name: 180604M2_37, Date: 05-Jun-2018, Time: 01:17:57, ID: 1801071-03 A1-MW-23-SA1 0.11436, Description: A1-MW-23-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-03 A1-MW-23-SA1 0.11436	6.16e3	49.6	YES
2	2	13C5-PFHxA	1801071-03 A1-MW-23-SA1 0.11436	1.03e4	58.1	NO
3	3	13C3-PFHxS	1801071-03 A1-MW-23-SA1 0.11436	3.15e3	87.0	NO
4	4	13C8-PFOA	1801071-03 A1-MW-23-SA1 0.11436	1.15e4	71.9	NO
5	5	13C9-PFNA	1801071-03 A1-MW-23-SA1 0.11436	1.56e4	86.5	NO
6	6	13C4-PFOS	1801071-03 A1-MW-23-SA1 0.11436	3.29e3	88.3	NO
7	7	13C6-PFDA	1801071-03 A1-MW-23-SA1 0.11436	1.63e4	68.6	NO
8	8	13C7-PFUdA	1801071-03 A1-MW-23-SA1 0.11436	1.96e4	66.9	NO

Name: 180604M2_38, Date: 05-Jun-2018, Time: 01:28:28, ID: 1801071-04 A1-MW-07-SA1 0.11908, Description: A1-MW-07-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-04 A1-MW-07-SA1 0.11908	5.51e3	44.4	YES
2	2	13C5-PFHxA	1801071-04 A1-MW-07-SA1 0.11908	7.72e3	43.7	YES
3	3	13C3-PFHxS	1801071-04 A1-MW-07-SA1 0.11908	3.30e3	91.1	NO
4	4	13C8-PFOA	1801071-04 A1-MW-07-SA1 0.11908	7.49e3	46.9	YES
5	5	13C9-PFNA	1801071-04 A1-MW-07-SA1 0.11908	1.11e4	61.7	NO
6	6	13C4-PFOS	1801071-04 A1-MW-07-SA1 0.11908	3.44e3	92.3	NO
7	7	13C6-PFDA	1801071-04 A1-MW-07-SA1 0.11908	1.29e4	54.5	NO
8	8	13C7-PFUdA	1801071-04 A1-MW-07-SA1 0.11908	1.90e4	65.0	NO

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Name: 180604M2_39, Date: 05-Jun-2018, Time: 01:38:53, ID: 1801071-05 FRB-20180530 0.49878, Description: FRB-20180530

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-05 FRB-20180530 0.49878	9.36e3	75.4	NO
2	2	13C5-PFHxA	1801071-05 FRB-20180530 0.49878	1.59e4	90.1	NO
3	3	13C3-PFHxS	1801071-05 FRB-20180530 0.49878	3.67e3	101.6	NO
4	4	13C8-PFOA	1801071-05 FRB-20180530 0.49878	1.68e4	105.2	NO
5	5	13C9-PFNA	1801071-05 FRB-20180530 0.49878	1.96e4	108.9	NO
6	6	13C4-PFOS	1801071-05 FRB-20180530 0.49878	3.77e3	101.1	NO
7	7	13C6-PFDA	1801071-05 FRB-20180530 0.49878	2.11e4	89.0	NO
8	8	13C7-PFUdA	1801071-05 FRB-20180530 0.49878	2.66e4	90.9	NO

Name: 180604M2_40, Date: 05-Jun-2018, Time: 01:49:23, ID: 1800930-03RE1 WT1805091300GSC 0.25438, Description: WT1805091300GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800930-03RE1 WT1805091300GSC 0...	1.18e4	95.0	NO
2	2	13C5-PFHxA	1800930-03RE1 WT1805091300GSC 0...	1.76e4	99.8	NO
3	3	13C3-PFHxS	1800930-03RE1 WT1805091300GSC 0...	4.07e3	112.4	NO
4	4	13C8-PFOA	1800930-03RE1 WT1805091300GSC 0...	1.65e4	103.3	NO
5	5	13C9-PFNA	1800930-03RE1 WT1805091300GSC 0...	1.98e4	109.6	NO
6	6	13C4-PFOS	1800930-03RE1 WT1805091300GSC 0...	4.00e3	107.3	NO
7	7	13C6-PFDA	1800930-03RE1 WT1805091300GSC 0...	1.95e4	82.2	NO
8	8	13C7-PFUdA	1800930-03RE1 WT1805091300GSC 0...	2.53e4	86.4	NO

Name: 180604M2_41, Date: 05-Jun-2018, Time: 01:59:48, ID: 1800930-12RE1 WT1805100850GSC 0.25112, Description: WT1805100850GSC

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800930-12RE1 WT1805100850GSC 0...	9.85e3	79.3	NO
2	2	13C5-PFHxA	1800930-12RE1 WT1805100850GSC 0...	1.50e4	84.8	NO
3	3	13C3-PFHxS	1800930-12RE1 WT1805100850GSC 0...	3.32e3	91.9	NO
4	4	13C8-PFOA	1800930-12RE1 WT1805100850GSC 0...	1.47e4	91.9	NO
5	5	13C9-PFNA	1800930-12RE1 WT1805100850GSC 0...	1.83e4	101.8	NO
6	6	13C4-PFOS	1800930-12RE1 WT1805100850GSC 0...	3.42e3	91.8	NO
7	7	13C6-PFDA	1800930-12RE1 WT1805100850GSC 0...	1.68e4	71.1	NO
8	8	13C7-PFUdA	1800930-12RE1 WT1805100850GSC 0...	2.29e4	78.5	NO

Name: 180604M2_42, Date: 05-Jun-2018, Time: 02:10:18, ID: 1801021-01 Milk 5, Description: Milk

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801021-01 Milk 5	1.03e4	83.2	NO
2	2	13C5-PFHxA	1801021-01 Milk 5	1.52e4	85.9	NO
3	3	13C3-PFHxS	1801021-01 Milk 5	3.37e3	93.3	NO
4	4	13C8-PFOA	1801021-01 Milk 5	1.48e4	92.9	NO
5	5	13C9-PFNA	1801021-01 Milk 5	1.74e4	96.5	NO
6	6	13C4-PFOS	1801021-01 Milk 5	3.39e3	90.8	NO
7	7	13C6-PFDA	1801021-01 Milk 5	1.95e4	82.4	NO
8	8	13C7-PFUdA	1801021-01 Milk 5	2.59e4	88.7	NO

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 15:20:11 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 15:21:52 Pacific Daylight Time

Name: 180604M2_43, Date: 05-Jun-2018, Time: 02:20:43, ID: 1801000-01 DPH-MW6 0.10261, Description: DPH-MW6

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801000-01 DPH-MW6 0.10261	8.33e3	67.1	NO
2	2	13C5-PFHxA	1801000-01 DPH-MW6 0.10261	1.19e4	67.4	NO
3	3	13C3-PFHxS	1801000-01 DPH-MW6 0.10261	3.20e3	88.4	NO
4	4	13C8-PFOA	1801000-01 DPH-MW6 0.10261	1.30e4	81.1	NO
5	5	13C9-PFNA	1801000-01 DPH-MW6 0.10261	1.47e4	81.4	NO
6	6	13C4-PFOS	1801000-01 DPH-MW6 0.10261	3.23e3	86.5	NO
7	7	13C6-PFDA	1801000-01 DPH-MW6 0.10261	1.46e4	61.4	NO
8	8	13C7-PFUdA	1801000-01 DPH-MW6 0.10261	2.11e4	72.2	NO

Name: 180604M2_44, Date: 05-Jun-2018, Time: 02:31:14, ID: 1801002-01 Trip Blank 0.25726, Description: Trip Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801002-01 Trip Blank 0.25726	8.87e3	71.4	NO
2	2	13C5-PFHxA	1801002-01 Trip Blank 0.25726	1.32e4	74.6	NO
3	3	13C3-PFHxS	1801002-01 Trip Blank 0.25726	3.03e3	83.6	NO
4	4	13C8-PFOA	1801002-01 Trip Blank 0.25726	1.36e4	85.4	NO
5	5	13C9-PFNA	1801002-01 Trip Blank 0.25726	1.52e4	84.5	NO
6	6	13C4-PFOS	1801002-01 Trip Blank 0.25726	3.14e3	84.0	NO
7	7	13C6-PFDA	1801002-01 Trip Blank 0.25726	1.45e4	61.2	NO
8	8	13C7-PFUdA	1801002-01 Trip Blank 0.25726	2.37e4	81.1	NO

Name: 180604M2_45, Date: 05-Jun-2018, Time: 02:41:38, ID: 1801002-02 P2-3 0.26152, Description: P2-3

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801002-02 P2-3 0.26152	1.01e4	81.7	NO
2	2	13C5-PFHxA	1801002-02 P2-3 0.26152	1.45e4	82.3	NO
3	3	13C3-PFHxS	1801002-02 P2-3 0.26152	3.57e3	98.7	NO
4	4	13C8-PFOA	1801002-02 P2-3 0.26152	1.58e4	98.8	NO
5	5	13C9-PFNA	1801002-02 P2-3 0.26152	1.81e4	100.7	NO
6	6	13C4-PFOS	1801002-02 P2-3 0.26152	3.31e3	88.8	NO
7	7	13C6-PFDA	1801002-02 P2-3 0.26152	2.09e4	88.3	NO
8	8	13C7-PFUdA	1801002-02 P2-3 0.26152	2.56e4	87.5	NO

Name: 180604M2_46, Date: 05-Jun-2018, Time: 02:52:09, ID: 1801002-03 Ditch-1 0.2637, Description: Ditch-1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801002-03 Ditch-1 0.2637	9.53e3	76.8	NO
2	2	13C5-PFHxA	1801002-03 Ditch-1 0.2637	1.37e4	77.6	NO
3	3	13C3-PFHxS	1801002-03 Ditch-1 0.2637	3.05e3	84.3	NO
4	4	13C8-PFOA	1801002-03 Ditch-1 0.2637	1.37e4	85.7	NO
5	5	13C9-PFNA	1801002-03 Ditch-1 0.2637	1.66e4	92.3	NO
6	6	13C4-PFOS	1801002-03 Ditch-1 0.2637	3.06e3	82.0	NO
7	7	13C6-PFDA	1801002-03 Ditch-1 0.2637	1.89e4	79.8	NO
8	8	13C7-PFUdA	1801002-03 Ditch-1 0.2637	2.33e4	79.6	NO

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Last Altered: Tuesday, June 05, 2018 15:20:11 Pacific Daylight Time
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Name: 180604M2_47, Date: 05-Jun-2018, Time: 03:02:38, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180604M2_48, Date: 05-Jun-2018, Time: 03:13:03, ID: ST180604M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180604M2-12 PFC CS3 18E2907	1.40e4	112.5	NO
2	2	13C5-PFHxA	ST180604M2-12 PFC CS3 18E2907	2.03e4	114.9	NO
3	3	13C3-PFHxS	ST180604M2-12 PFC CS3 18E2907	4.31e3	119.2	NO
4	4	13C8-PFOA	ST180604M2-12 PFC CS3 18E2907	2.06e4	129.0	NO
5	5	13C9-PFNA	ST180604M2-12 PFC CS3 18E2907	2.31e4	128.4	NO
6	6	13C4-PFOS	ST180604M2-12 PFC CS3 18E2907	4.37e3	117.1	NO
7	7	13C6-PFDA	ST180604M2-12 PFC CS3 18E2907	2.48e4	104.5	NO
8	8	13C7-PFUdA	ST180604M2-12 PFC CS3 18E2907	3.18e4	108.8	NO

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Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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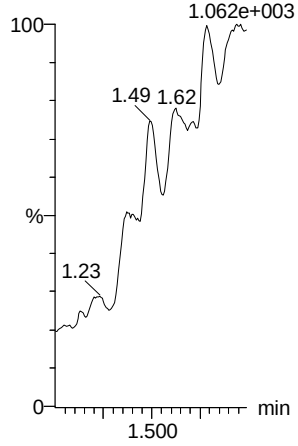

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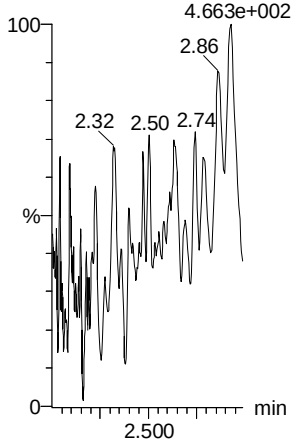

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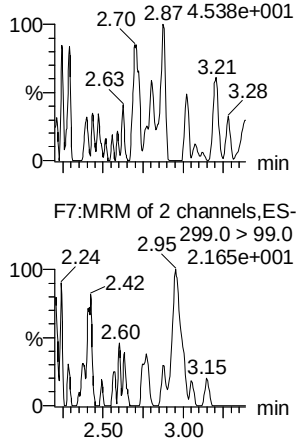

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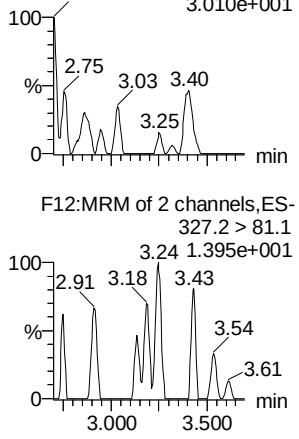

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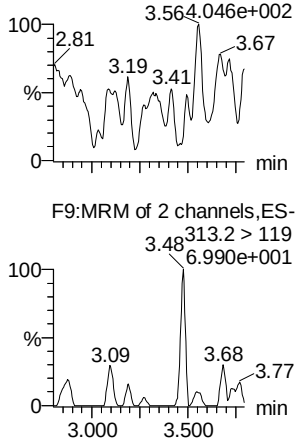

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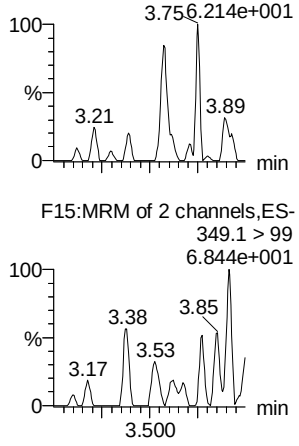

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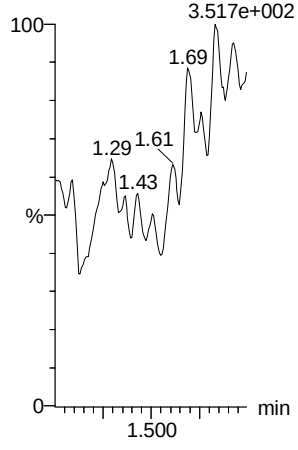

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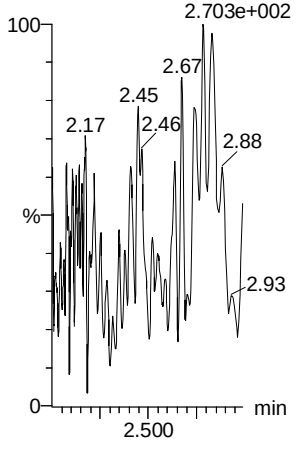

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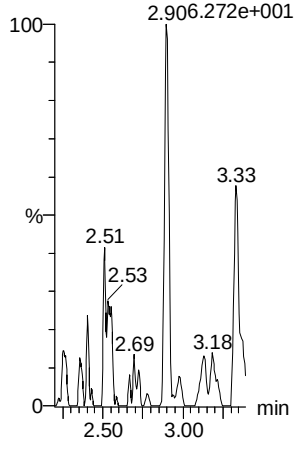

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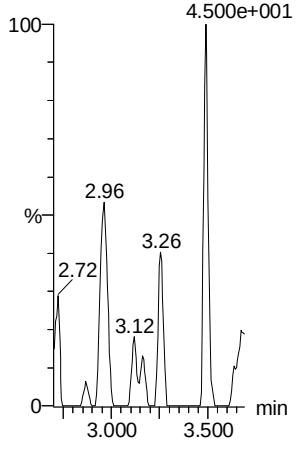

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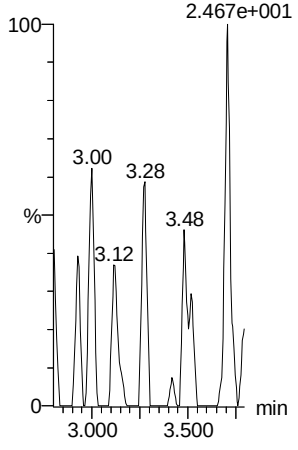

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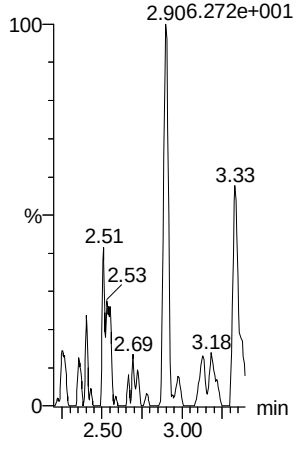

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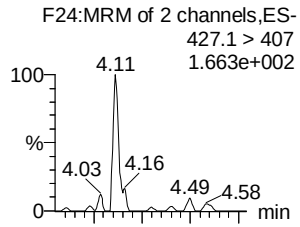
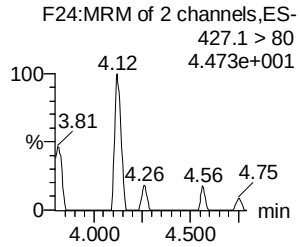
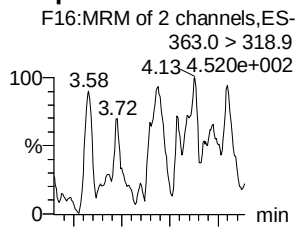
Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

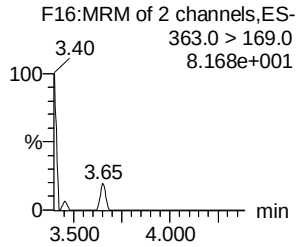
6:2 FTS



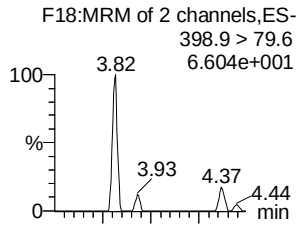


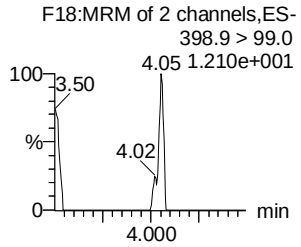
PFHpA





L-PFHxS





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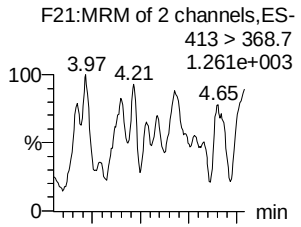

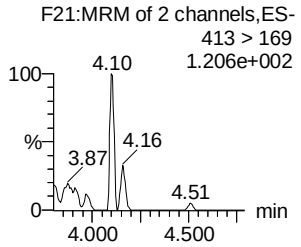

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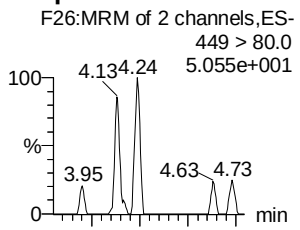

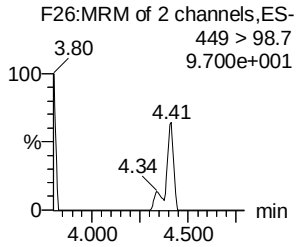

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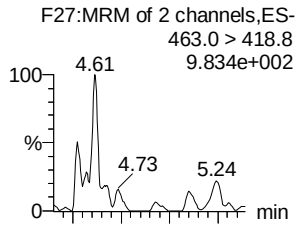

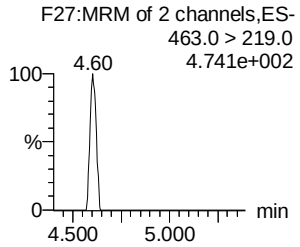

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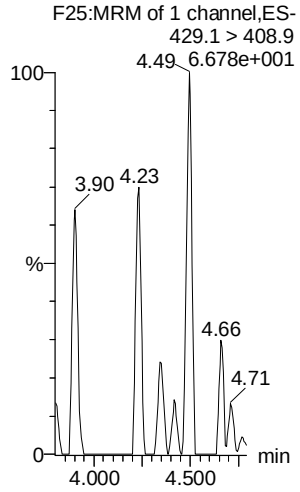

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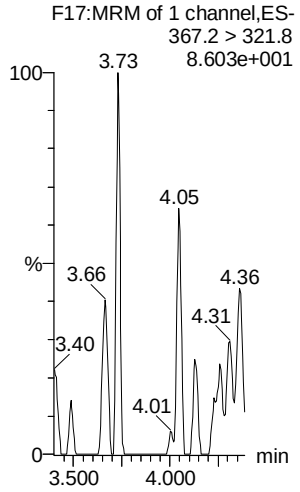
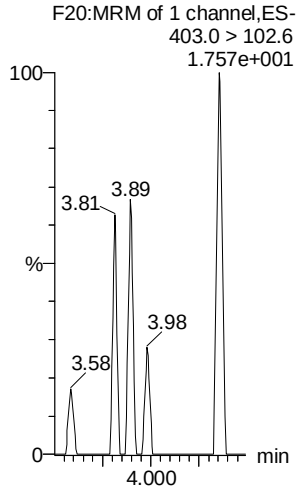


18O2-PFHxS



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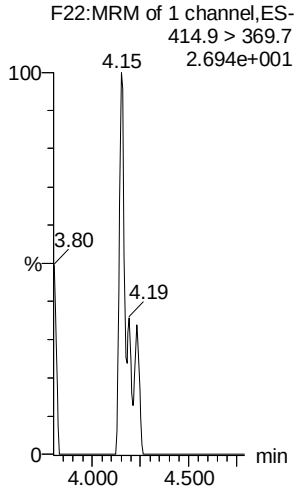

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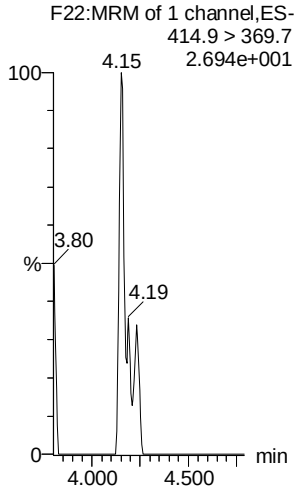

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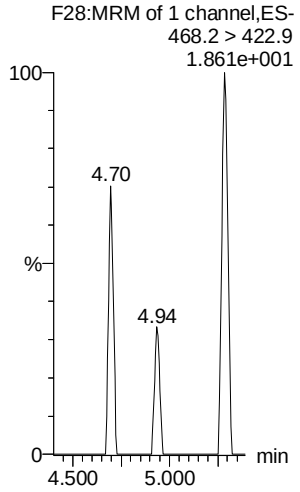

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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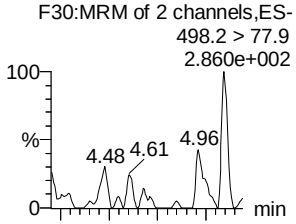
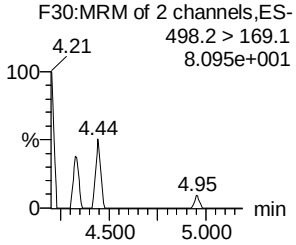
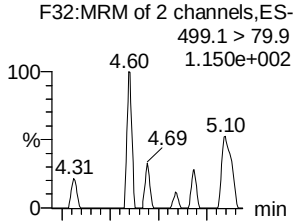
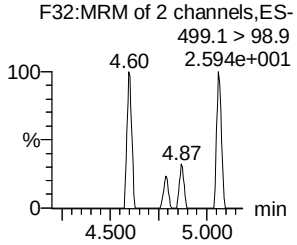




L-PFOS





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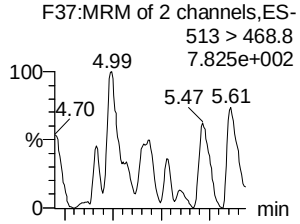

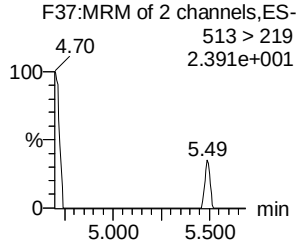

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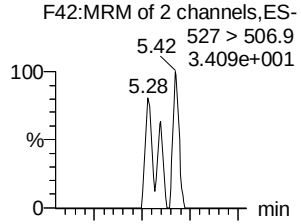
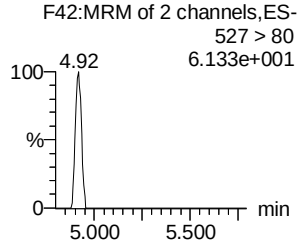
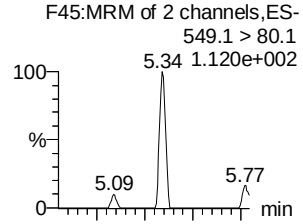
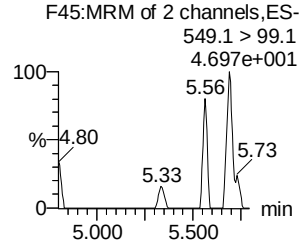




PFNS





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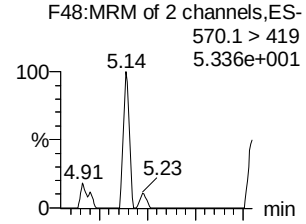

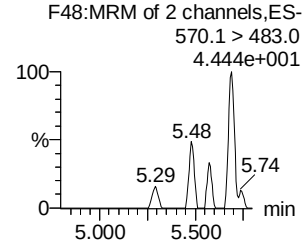

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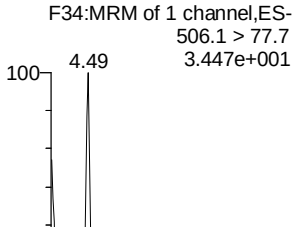

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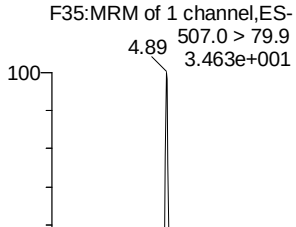

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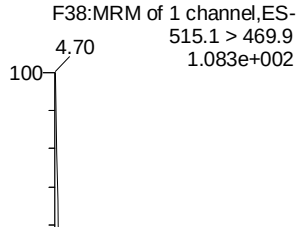

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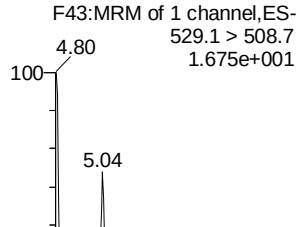

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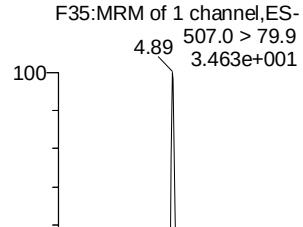

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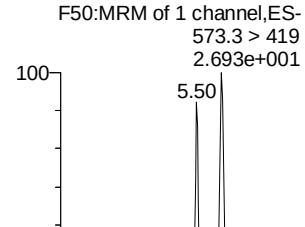

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Printed: Tuesday, June 05, 2018 11:17:53 Pacific Daylight Time

Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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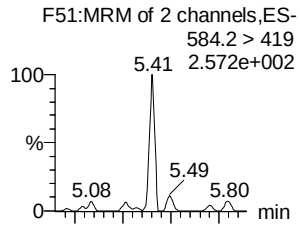

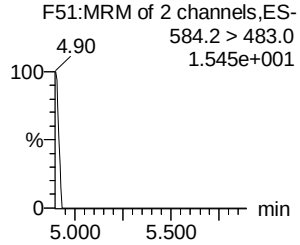

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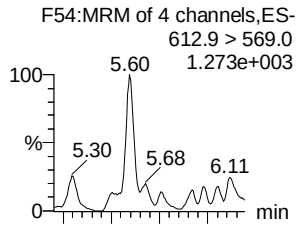

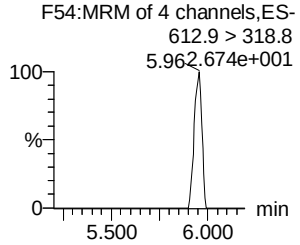

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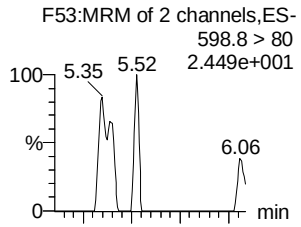

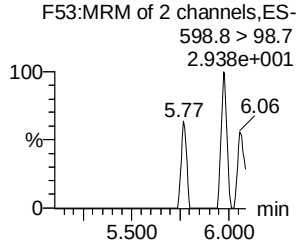

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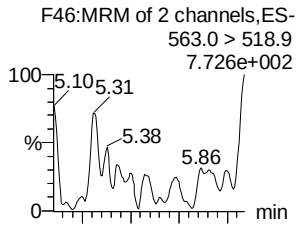

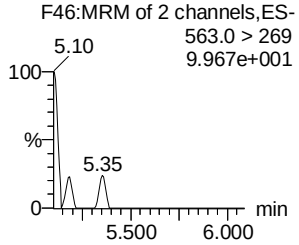

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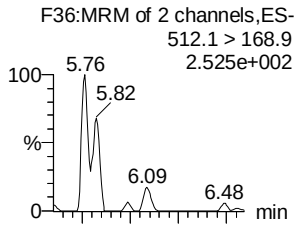

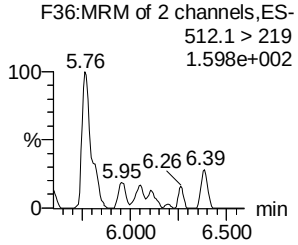

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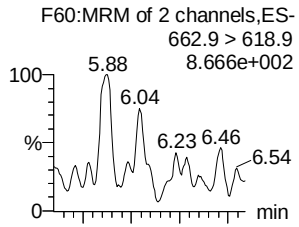

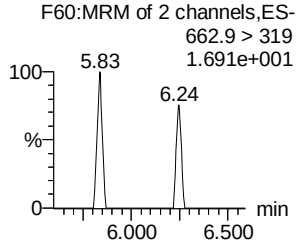

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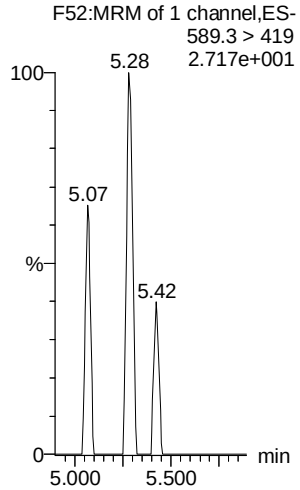

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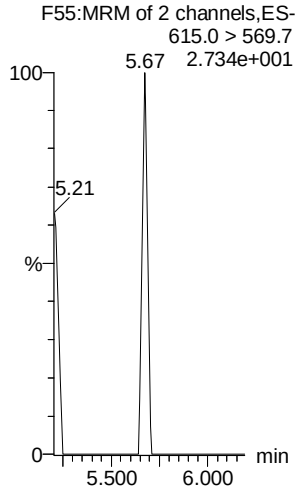

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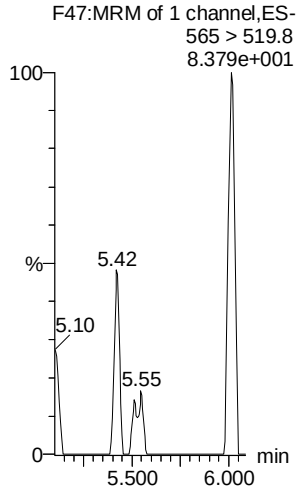

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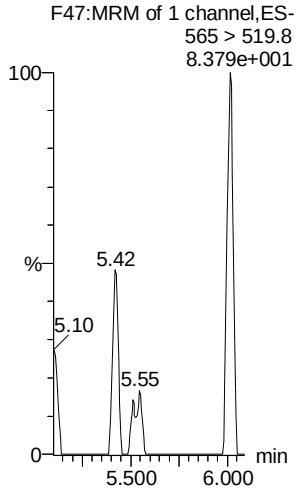

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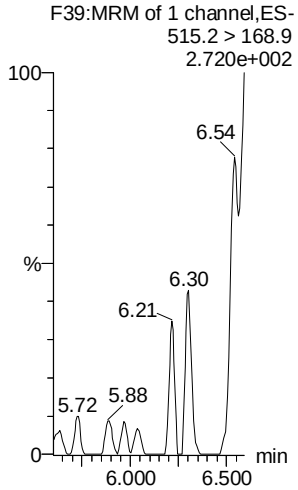

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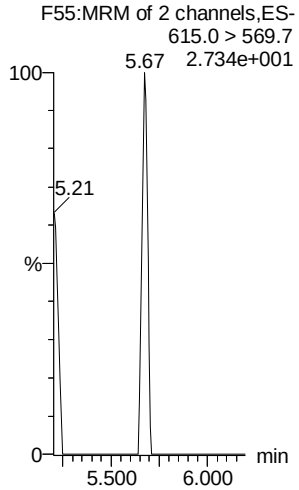

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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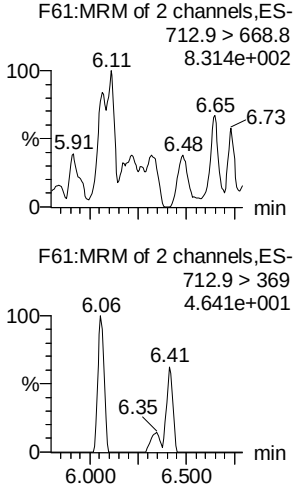

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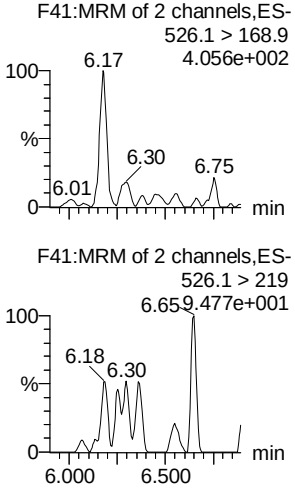

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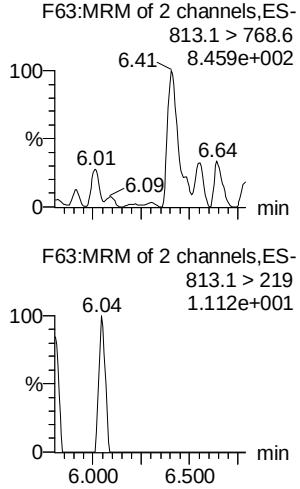

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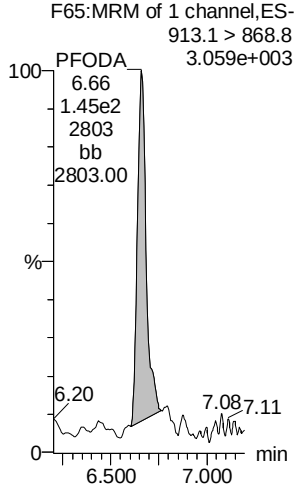

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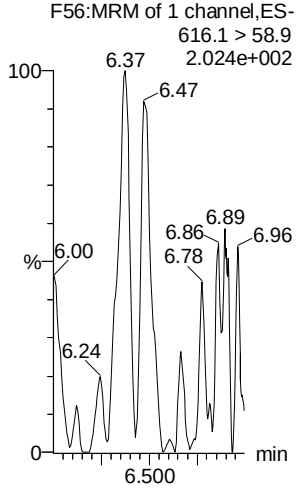

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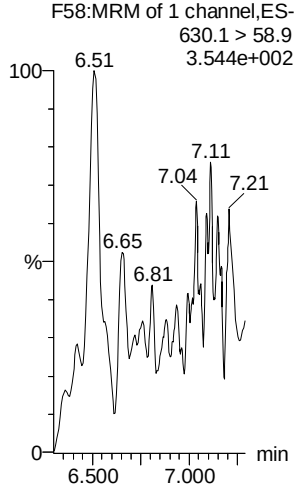

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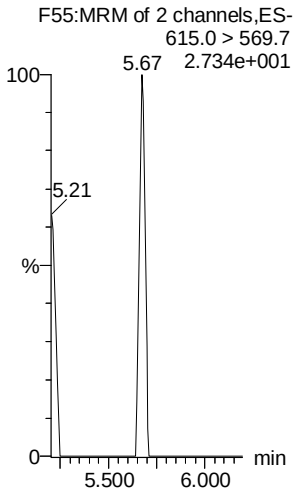

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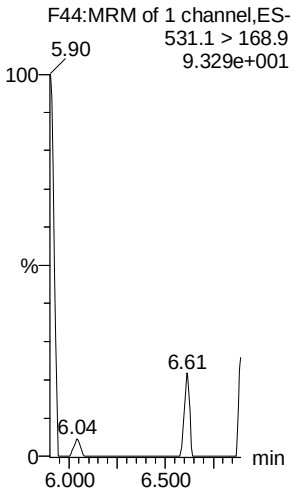

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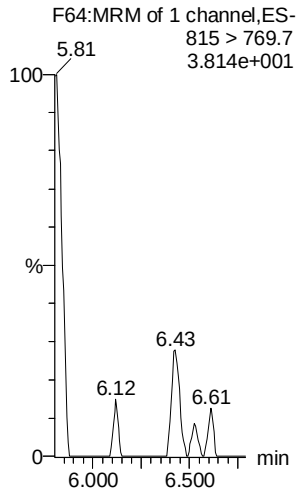

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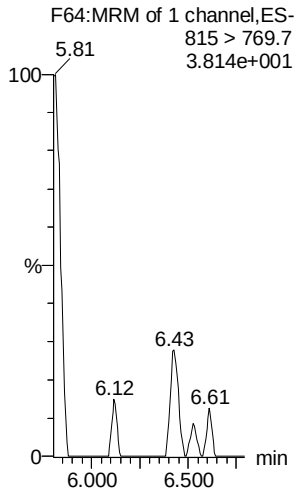

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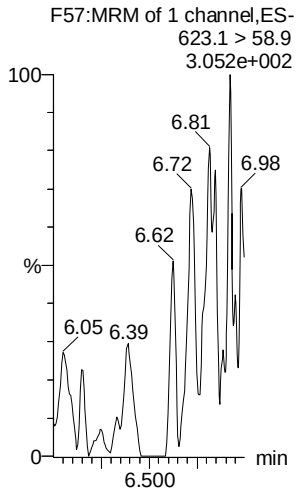

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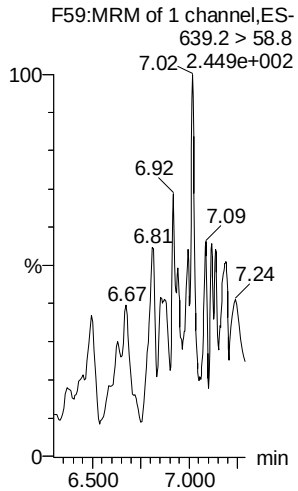

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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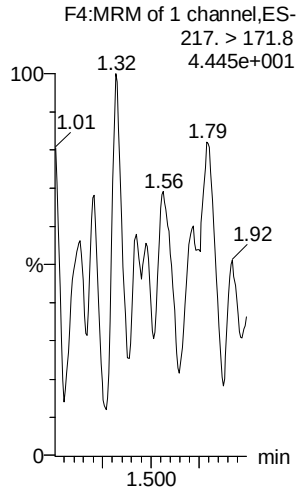

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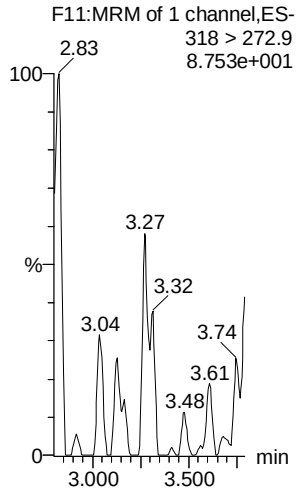

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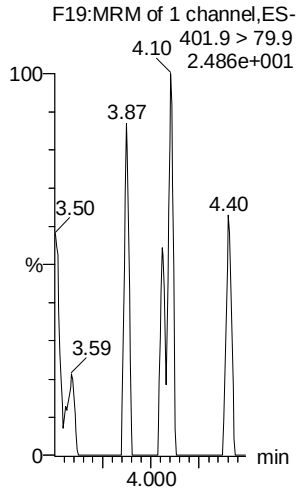

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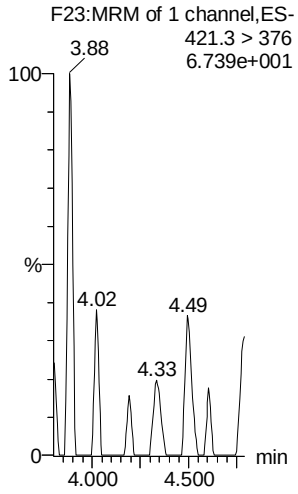

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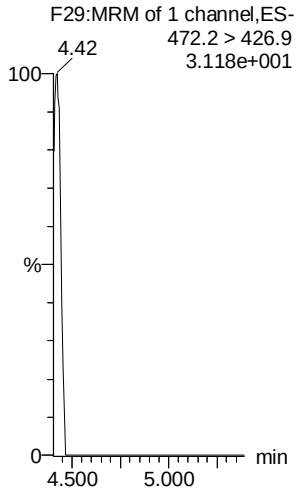

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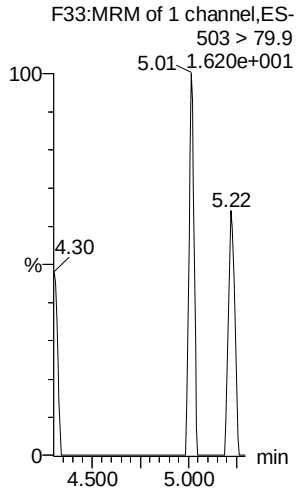

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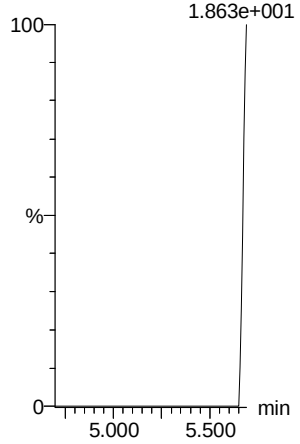

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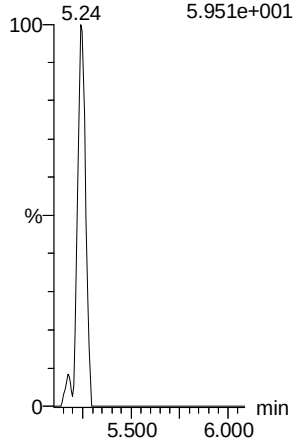

LC Calibration Standards Review Checklist Q4

			ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manual Integrations	other
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Calibration ID: -12	L (M) H		☑	☑	☑	☑	☑	☑	☐
Calibration ID: -13	L (M) H		☑	☑	☑	☑	☑	☑	☐
Calibration ID: -14	L (M) H		☑	☑	☑	☑	☑	☑	☐
Calibration ID: -15	L (M) H		☑	☑	☑	☑	☐	☑	☐
Calibration ID: -16	L (M) H		☑	☑	☑	☑	☑	☑	☐
Calibration ID:	L M H		☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H		☐	N/A ☐ AR 6/5/18	☐	☐	☐	☐	☐
Calibration ID:	L M H		☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H		☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 5/20/18

Run Log Present: ☑

# of Samples per Sequence Checked: ☑

Instrument Blank Saved ☑

IIS Area Saved ☑

Reviewed By: QM 6/5/18
Initials/Date

Comments:

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:33 Pacific Daylight Time

JAM 6/5/18

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Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	1	PFBA	213.0 > 16...	1.08e4	1.18e4		1.35	1.35	11.4	10.3	102.9	NO		
2	2	PFPeA	263.1 > 21...	1.40e4	1.73e4		2.31	2.31	10.2	9.90	99.0	NO		
3	3	PFBS	299.0 > 79.7	3.46e3	2.08e3		2.60	2.60	20.7	10.4	104.1	NO	2.610	NO
4	4	4:2 FTS	327.2>307.2	3.75e3	4.80e3		3.00	3.01	9.76	9.03	90.3	NO	1.709	NO
5	5	PFHxA	313.2 > 26...	1.86e4	5.99e3		3.09	3.09	15.6	9.74	97.4	NO	344.757	NO
6	6	PFPeS	349.1>80.1	3.06e3	2.08e3		3.29	3.29	18.4	10.2	101.7	NO	1.686	NO
7	7	PFHpA	363.0 > 31...	1.61e4	1.63e4		3.71	3.71	12.3	10.6	105.6	NO	19.745	NO
8	8	L-PFHxS	398.9 > 79.6	2.82e3	1.87e3		3.86	3.86	18.8	9.81	98.1	NO	1.980	NO
9	10	6:2 FTS	427.1 > 407	4.66e3	4.84e3		4.17	4.17	12.0	9.73	97.3	NO	3.328	NO
10	11	L-PFOA	413 > 368.7	2.02e4	2.48e4		4.25	4.23	10.2	11.3	112.7	NO	4.110	NO
11	13	PFHpS	449 > 80.0	3.31e3	2.48e4		4.33	4.34	1.67	10.6	105.7	NO	1.884	NO
12	14	PFNA	463.0 > 41...	2.41e4	2.32e4		4.66	4.66	13.0	10.1	101.4	NO	5.023	NO
13	15	PFOSA	498.2 > 77.9	3.31e3	4.56e3		4.73	4.73	9.08	9.56	95.6	NO	32.134	YES
14	16	L-PFOS	499.1 > 79.9	3.49e3	4.18e3		4.74	4.74	10.4	11.2	112.2	NO	1.903	NO
15	18	PFDA	513 > 468.8	2.23e4	2.90e4		5.03	5.03	9.61	9.32	93.2	NO	5.719	NO
16	19	8:2 FTS	527 > 506.9	4.48e3	3.98e3		5.00	5.00	14.0	9.78	97.8	NO	2.422	NO
17	20	PFNS	549.1>80.1	2.84e3	4.18e3		5.09	5.09	8.48	10.1	101.4	NO	1.770	NO
18	21	L-MeFOSAA	570.1 > 419	8.50e3	5.89e3		5.18	5.18	18.0	9.52	95.2	NO	12.674	NO

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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	23	L-EtFOSAA	584.2 > 419	6.66e3	7.49e3		5.37	5.34	11.1	9.74	97.4	NO	13.790	NO
2	25	PFUdA	563.0 > 51...	2.13e4	2.70e4		5.35	5.35	9.87	10.2	101.7	NO	9.720	NO
3	26	PFDS	598.8 > 80	3.53e3	2.70e4		5.40	5.40	1.63	11.3	113.1	NO	1.973	NO
4	27	PFDoA	612.9 > 56...	2.61e4	2.73e4		5.63	5.63	12.0	10.7	107.1	NO	8.613	NO
5	28	N-MeFOSA	512.1 > 16...	6.67e3	1.90e4		5.82	5.82	52.6	50.1	100.2	NO	1.357	NO
6	29	PFTrDA	662.9 > 61...	2.77e4	2.73e4		5.88	5.88	12.7	11.7	116.8	NO	25.690	NO
7	30	PFTeDA	712.9 > 66...	2.25e4	1.96e4		6.10	6.09	14.4	11.1	110.8	NO	11.047	NO
8	31	N-EtFOSA	526.1 > 16...	8.45e3	2.72e4		6.23	6.23	46.6	50.3	100.6	NO	1.430	NO
9	32	PFHxDA	813.1 > 76...	1.36e4	1.29e4		6.43	6.43	5.29	8.71	87.1	NO	26.320	NO
10	33	PFODA	913.1 > 86...	2.28e4	1.29e4		6.67	6.67	8.83	9.95	99.5	NO		
11	34	N-MeFOSE	616.1 > 58.9	4.69e3	1.47e4		6.37	6.37	47.8	48.0	96.0	NO		
12	35	N-EtFOSE	630.1 > 58.9	6.05e3	1.38e4		6.52	6.52	65.7	55.0	110.1	NO		
13	36	13C3-PFBA	216.1 > 17...	1.18e4	1.32e4	0.885	1.34	1.35	11.1	12.6	100.6	NO		
14	37	13C3-PFPeA	266. > 221.8	1.73e4	2.01e4	0.849	2.31	2.31	10.8	12.7	101.4	NO		
15	38	13C3-PFBS	302. > 98.8	2.08e3	2.01e4	0.104	2.60	2.60	1.30	12.5	100.1	NO		
16	39	13C2-4:2 FTS	329.2>308.9	4.80e3	2.01e4	0.248	3.01	3.00	2.99	12.1	96.6	NO		
17	40	13C2-PFHxA	315 > 269.8	5.99e3	2.01e4	0.729	3.09	3.09	3.73	5.12	102.4	NO		
18	41	13C4-PFHpA	367.2 > 32...	1.63e4	2.01e4	0.836	3.71	3.71	10.2	12.1	97.2	NO		
19	42	18O2-PFHxS	403.0 > 10...	1.87e3	4.07e3	0.443	3.86	3.86	5.75	13.0	103.9	NO		
20	43	13C2-6:2 FTS	429.1 > 40...	4.84e3	1.97e4	0.249	4.17	4.17	3.07	12.3	98.6	NO		
21	44	13C2-PFOA	414.9 > 36...	2.48e4	1.97e4	1.332	4.23	4.23	15.7	11.8	94.4	NO		
22	45	13C5-PFNA	468.2 > 42...	2.32e4	2.37e4	0.951	4.66	4.66	12.2	12.8	102.7	NO		
23	46	13C8-PFOSA	506.1 > 77.7	4.56e3	2.82e4	0.140	4.73	4.73	2.02	14.5	116.0	NO		
24	47	13C8-PFOS	507.0 > 79.9	4.18e3	4.43e3	1.060	4.74	4.74	11.8	11.1	89.0	NO		
25	48	13C2-PFDA	515.1 > 46...	2.90e4	2.47e4	1.130	5.03	5.03	14.7	13.0	103.8	NO		
26	49	13C2-8:2 FTS	529.1 > 50...	3.98e3	2.01e4	0.217	5.00	5.00	2.48	11.4	91.4	NO		
27	50	d3-N-MeFOSAA	573.3 > 419	5.89e3	2.82e4	0.184	5.18	5.18	2.61	14.2	113.9	NO		
28	51	d5-N-EtFOSAA	589.3 > 419	7.49e3	2.82e4	0.223	5.34	5.34	3.32	14.9	119.1	NO		
29	52	13C2-PFUdA	565 > 519.8	2.70e4	2.82e4	0.936	5.35	5.35	12.0	12.8	102.4	NO		
30	53	13C2-PFDoA	615.0 > 56...	2.73e4	2.47e4	1.168	5.63	5.63	13.8	11.8	94.5	NO		
31	54	d3-N-MeFOSA	515.2 > 16...	1.90e4	2.82e4	0.051	5.85	5.85	8.43	165	109.8	NO		
32	55	13C2-PFTeDA	714.8 > 66...	1.96e4	2.82e4	0.706	6.09	6.09	8.67	12.3	98.3	NO		

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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
33	56	d5-N-ETFOSA	531.1 > 16...	2.72e4	2.82e4	0.071	6.24	6.24	12.1	169	112.8	NO		
34	57	13C2-PFHxDA	815 > 769.7	1.29e4	2.82e4	1.079	6.43	6.43	5.72	5.30	106.0	NO		
35	58	d7-N-MeFOSE	623.1 > 58.9	1.47e4	2.82e4	0.041	6.37	6.36	6.53	158	105.5	NO		
36	59	d9-N-EtFOSE	639.2 > 58.8	1.38e4	2.82e4	0.038	6.51	6.51	6.12	160	106.5	NO		
37	60	13C4-PFBA	217. > 171.8	1.32e4	1.32e4	1.000	1.35	1.35	12.5	12.5	100.0	NO		
38	61	13C5-PFHxA	318 > 272.9	2.01e4	2.01e4	1.000	3.09	3.09	12.5	12.5	100.0	NO		
39	62	13C3-PFHxS	401.9 > 79.9	4.07e3	4.07e3	1.000	3.86	3.86	12.5	12.5	100.0	NO		
40	63	13C8-PFOA	421.3 > 376	1.97e4	1.97e4	1.000	4.23	4.23	12.5	12.5	100.0	NO		
41	64	13C9-PFNA	472.2 > 42...	2.37e4	2.37e4	1.000	4.66	4.66	12.5	12.5	100.0	NO		
42	65	13C4-PFOS	503 > 79.9	4.43e3	4.43e3	1.000	4.74	4.74	12.5	12.5	100.0	NO		
43	66	13C6-PFDA	519.1 > 47...	2.47e4	2.47e4	1.000	5.03	5.03	12.5	12.5	100.0	NO		
44	67	13C7-PFUdA	570.1 > 52...	2.82e4	2.82e4	1.000	5.35	5.35	12.5	12.5	100.0	NO		

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 13:44:58 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 13:45:07 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180604M2_13	ICV180604M2-1 PFC 537 ICV 18E2901	04-Jun-18	21:06:49
2	2	180604M2_14	IPA	04-Jun-18	21:17:19
3	3	180604M2_15	1800982-05 REEPDW554 0.11977	04-Jun-18	21:27:44
4	4	180604M2_16	1800982-06 REEPDW1043 0.12141	04-Jun-18	21:38:15
5	5	180604M2_17	B8E0141-BS1 OPR 0.125	04-Jun-18	21:48:40
6	6	180604M2_18	B8E0224-BSD1 LCSD 0.125	04-Jun-18	21:59:10
7	7	180604M2_19	B8E0224-BS1 OPR 0.125	04-Jun-18	22:09:36
8	8	180604M2_20	B8E0224-BLK1 Method Blank 0.125	04-Jun-18	22:20:06
9	9	180604M2_21	1800952-13RE1 REEPDW488 0.11053	04-Jun-18	22:30:30
10	10	180604M2_22	B8E0250-BS1 OPR 0.125	04-Jun-18	22:41:01
11	11	180604M2_23	B8E0250-BSD1 LCSD 0.125	04-Jun-18	22:51:31
12	12	180604M2_24	B8E0250-BLK1 Method Blank 0.125	04-Jun-18	23:01:55
13	13	180604M2_25	1801003-01 GN18057PA 0.11594	04-Jun-18	23:12:26
14	14	180604M2_26	1801003-02 GN18058PA 0.11833	04-Jun-18	23:22:51
15	15	180604M2_27	1801024-01 A1-MW-51-SA1 0.11961	04-Jun-18	23:33:21
16	16	180604M2_28	1801024-02 A1-MW-50-SA1 0.12082	04-Jun-18	23:43:47
17	17	180604M2_29	1801024-03 A1-MW-49-SA1 0.12317	04-Jun-18	23:54:17
18	18	180604M2_30	1801024-04 A1-MW-05-SA1 0.11875	05-Jun-18	00:04:41
19	19	180604M2_31	1801024-05 A1-MW-04-SA1 0.12315	05-Jun-18	00:15:11
20	20	180604M2_32	1801024-06 FRB-20180522 0.12068	05-Jun-18	00:25:41
21	21	180604M2_33	IPA	05-Jun-18	00:36:06
22	22	180604M2_34	ST180604M2-11 PFC CS3 18E2907	05-Jun-18	00:46:37
23	23	180604M2_35	1801071-01 A1-MW-27-SA1 0.11705	05-Jun-18	00:57:02
24	24	180604M2_36	1801071-02 A1-MW-55-SA1 0.11428	05-Jun-18	01:07:32
25	25	180604M2_37	1801071-03 A1-MW-23-SA1 0.11436	05-Jun-18	01:17:57
26	26	180604M2_38	1801071-04 A1-MW-07-SA1 0.11908	05-Jun-18	01:28:28
27	27	180604M2_39	1801071-05 FRB-20180530 0.49878	05-Jun-18	01:38:53
28	28	180604M2_40	1800930-03RE1 WT1805091300GSC 0...	05-Jun-18	01:49:23
29	29	180604M2_41	1800930-12RE1 WT1805100850GSC 0...	05-Jun-18	01:59:48
30	30	180604M2_42	1801021-01 Milk 5	05-Jun-18	02:10:18
31	31	180604M2_43	1801000-01 DPH-MW6 0.10261	05-Jun-18	02:20:43

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 13:44:58 Pacific Daylight Time
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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
32	32	180604M2_44	1801002-01 Trip Blank 0.25726	05-Jun-18	02:31:14
33	33	180604M2_45	1801002-02 P2-3 0.26152	05-Jun-18	02:41:38
34	34	180604M2_46	1801002-03 Ditch-1 0.2637	05-Jun-18	02:52:09
35	35	180604M2_47	IPA	05-Jun-18	03:02:38
36	36	180604M2_48	ST180604M2-12 PFC CS3 18E2907	05-Jun-18	03:13:03
37	37	180604M2_49	B8E0226-BS1 OPR 1	05-Jun-18	03:23:33
38	38	180604M2_50	B8E0226-BLK1 Method Blank 1	05-Jun-18	03:33:58
39	39	180604M2_51	1800821-02RE1 S-SED-BB2 1.6	05-Jun-18	03:44:28
40	40	180604M2_52	1800821-03RE1 S-SED-5 2.76	05-Jun-18	03:54:53
41	41	180604M2_53	1800821-04RE1 S-SED-5-DUP 2.91	05-Jun-18	04:05:24
42	42	180604M2_54	1800821-05RE1 S-SED-110 1.51	05-Jun-18	04:15:48
43	43	180604M2_55	1800821-06RE1 S-SED-111 2.01	05-Jun-18	04:26:18
44	44	180604M2_56	1800821-07RE1 S-SED-LR 1.44	05-Jun-18	04:36:43
45	45	180604M2_57	1800821-08RE1 S-SED-BB1 1.19	05-Jun-18	04:47:14
46	46	180604M2_58	1800821-09RE1 S-SED-4 2.68	05-Jun-18	04:57:38
47	47	180604M2_59	B8E0104-BS1 OPR 0.125	05-Jun-18	05:08:09
48	48	180604M2_60	B8E0104-BLK1 Method Blank 0.125	05-Jun-18	05:18:34
49	49	180604M2_61	1800917-01 NB-3 0.12018	05-Jun-18	05:29:04
50	50	180604M2_62	1800917-02 NB-2 0.11907	05-Jun-18	05:39:29
51	51	180604M2_63	IPA	05-Jun-18	05:49:51
52	52	180604M2_64	ST180604M2-13 PFC CS3 18E2907	05-Jun-18	06:00:21
53	53	180604M2_65	1800917-03 NB-4 0.11583	05-Jun-18	06:10:52
54	54	180604M2_66	1800917-04 NB-5 0.11709	05-Jun-18	06:21:16
55	55	180604M2_67	1800917-05 FIELD DUP 0.11588	05-Jun-18	06:31:47
56	56	180604M2_68	1800917-06 NB-1 0.11536	05-Jun-18	06:42:17
57	57	180604M2_69	1800920-01 MW-DEP-1 0.11504	05-Jun-18	06:52:41
58	58	180604M2_70	1800920-02 MW-DEP-2 0.11632	05-Jun-18	07:03:11
59	59	180604M2_71	1800920-03 Field Reagent blank 0.11615	05-Jun-18	07:13:36
60	60	180604M2_72	B8E0129-BS1 OPR 0.125	05-Jun-18	07:24:06
61	61	180604M2_73	B8E0129-BLK1 Method Blank 0.125	05-Jun-18	07:34:36
62	62	180604M2_74	1800919-01 MW-1A 0.02004	05-Jun-18	07:45:01
63	63	180604M2_75	1800919-02 MW-1B 0.01985	05-Jun-18	07:55:32
64	64	180604M2_76	1800919-03 MW-8A 0.01961	05-Jun-18	08:05:56
65	65	180604M2_77	1800919-04 MW-8B 0.01952	05-Jun-18	08:16:27

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Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 13:44:58 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 13:45:07 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
66	66	180604M2_78	IPA	05-Jun-18	08:26:52
67	67	180604M2_79	ST180604M2-14 PFC CS3 18E2907	05-Jun-18	08:37:22
68	68	180604M2_80	1800919-05 MW-8C 0.01981	05-Jun-18	08:47:47
69	69	180604M2_81	1800919-06 Field Reagent Blank 0.12527	05-Jun-18	08:58:18
70	70	180604M2_82	B8E0135-BS1 OPR 1	05-Jun-18	09:08:41
71	71	180604M2_83	B8E0135-BLK1 Method Blank 1	05-Jun-18	09:19:12
72	72	180604M2_84	1800945-01 SS-1 1.25	05-Jun-18	09:29:36
73	73	180604M2_85	1800945-02 SS-2 1.16	05-Jun-18	09:40:07
74	74	180604M2_86	1800945-03 SS-3 1.46	05-Jun-18	09:50:32
75	75	180604M2_87	1800945-04 SS-4 1.24	05-Jun-18	10:01:03
76	76	180604M2_88	1800945-05 SS-5 1.6	05-Jun-18	10:11:28
77	77	180604M2_89	1800945-06 SS-6 1.25	05-Jun-18	10:21:58
78	78	180604M2_90	1800945-07 SS-7 1.32	05-Jun-18	10:32:23
79	79	180604M2_91	IPA	05-Jun-18	10:42:53
80	80	180604M2_92	ST180604M2-15 PFC CS3 18E2907	05-Jun-18	10:53:18
81	81	180604M2_93	1800945-08 SS-8 1.15	05-Jun-18	11:03:48
82	82	180604M2_94	1800945-09 SS-9 1.37	05-Jun-18	11:14:14
83	83	180604M2_95	1800945-10 SS-10 1.91	05-Jun-18	11:24:44
84	84	180604M2_96	1800945-11 SS-11 1.55	05-Jun-18	11:35:09
85	85	180604M2_97	1800945-12 SS-12 1.18	05-Jun-18	11:45:39
86	86	180604M2_98	1800945-13 SS-20 1.48	05-Jun-18	11:56:04
87	87	180604M2_99	IPA	05-Jun-18	12:06:34
88	88	180604M2_100	ST180604M2-16 PFC CS3 18E2907	05-Jun-18	12:16:59

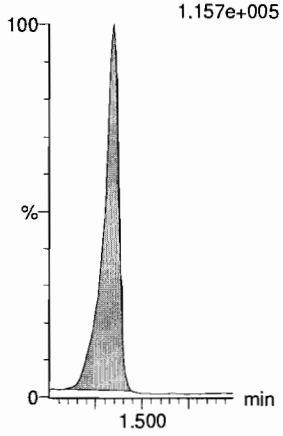
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

PFBA



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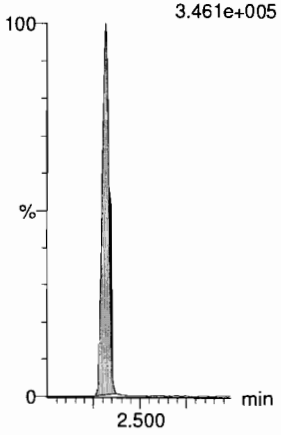

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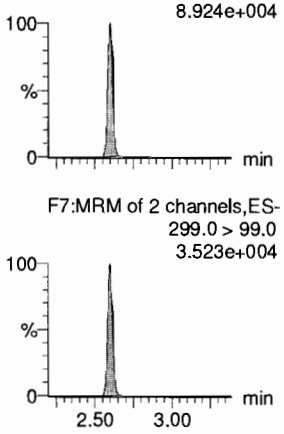
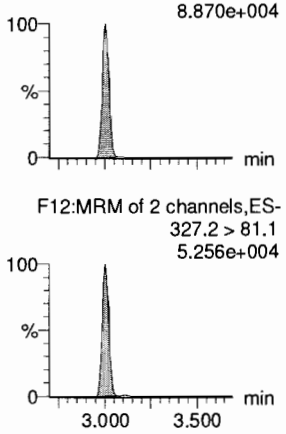


4:2 FTS



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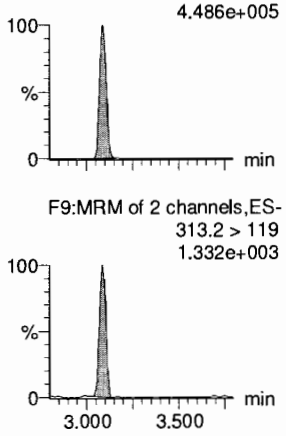

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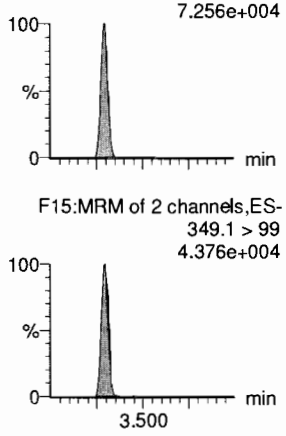

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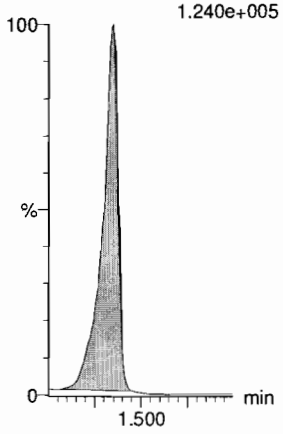

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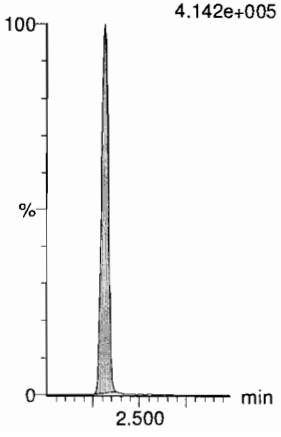

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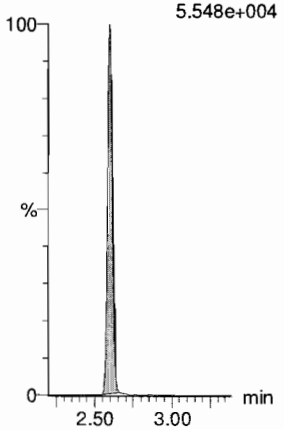

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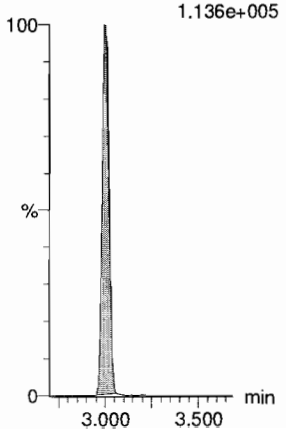

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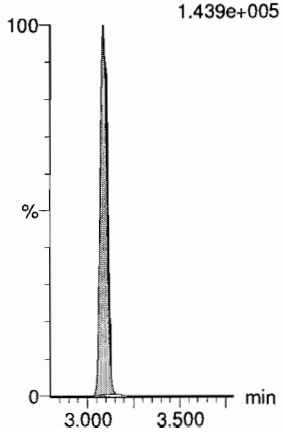

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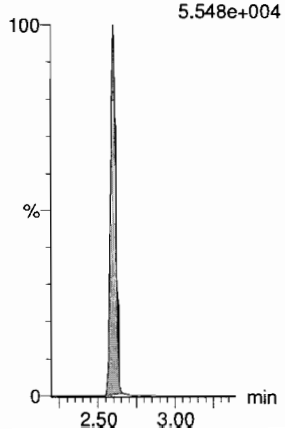

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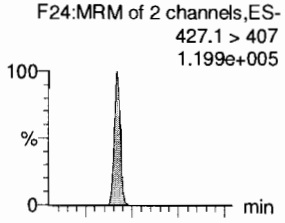
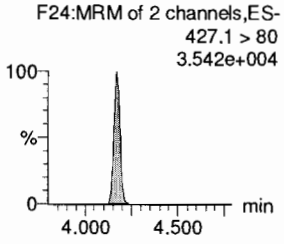
Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

6:2 FTS





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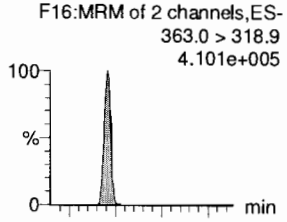

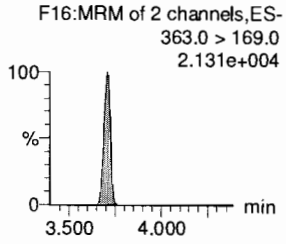

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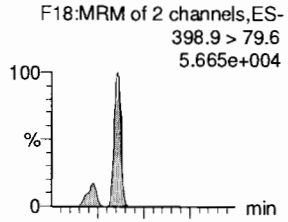

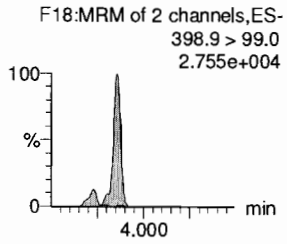

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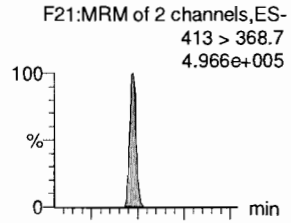

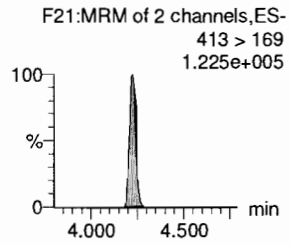

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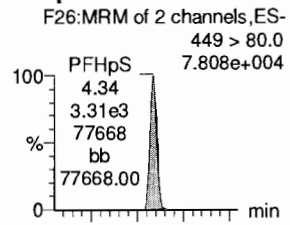

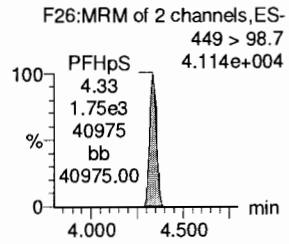

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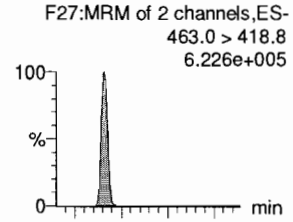

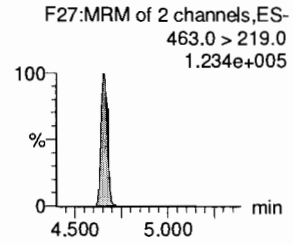

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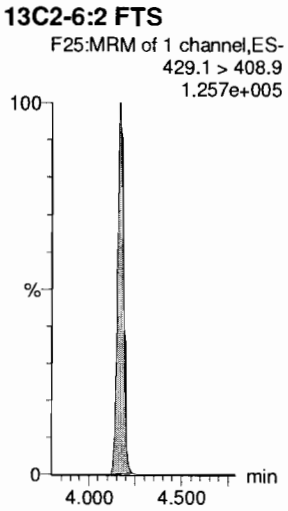

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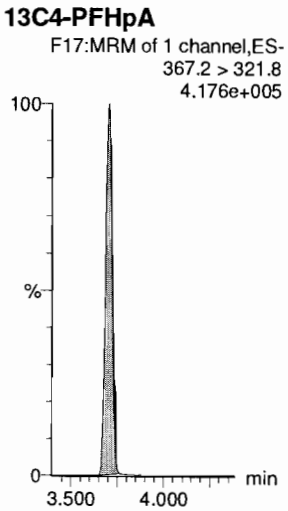
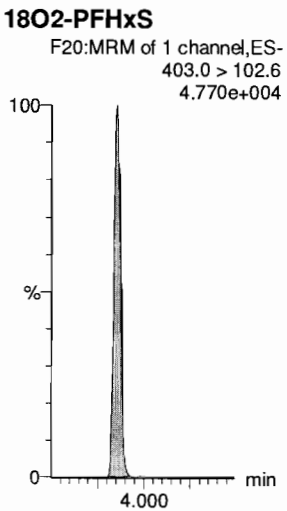


18O2-PFHxS



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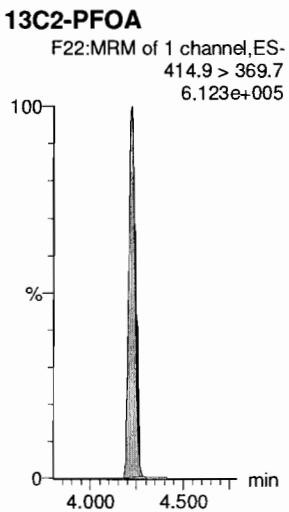

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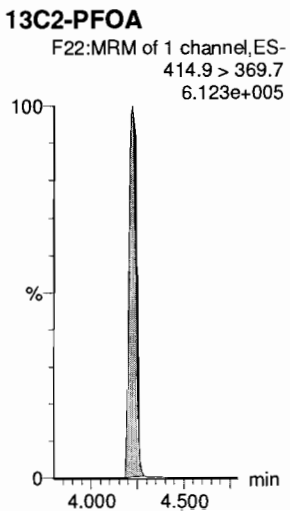

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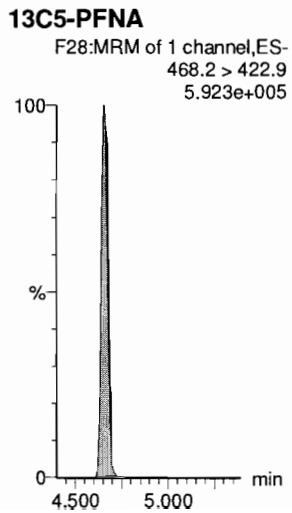

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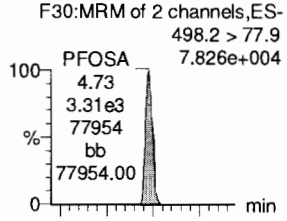
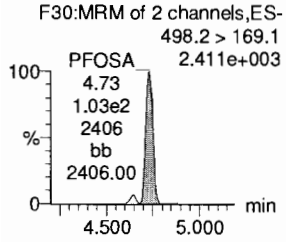
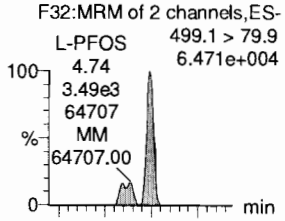
Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

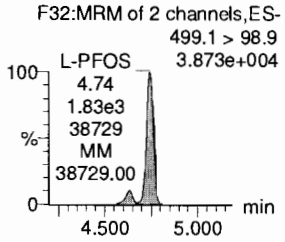
PFOSA





L-PFOS





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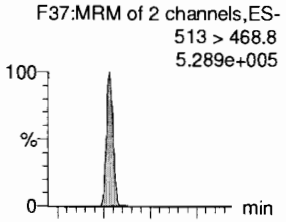
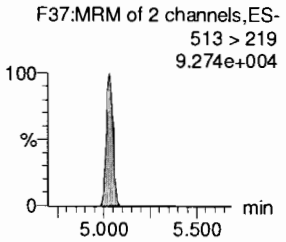
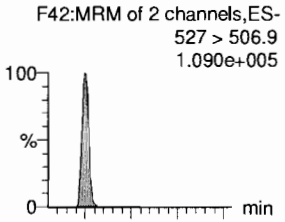
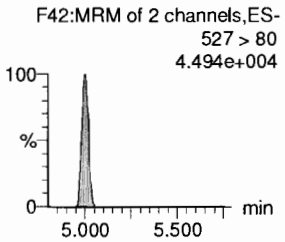




8:2 FTS





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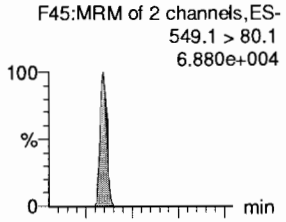

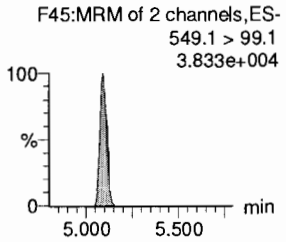

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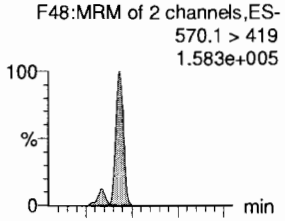

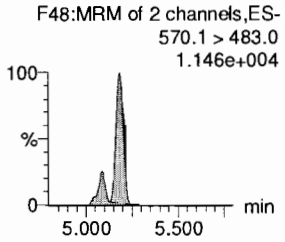

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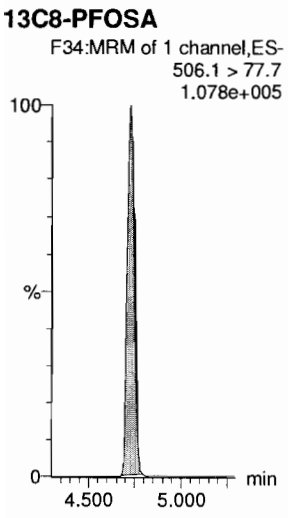

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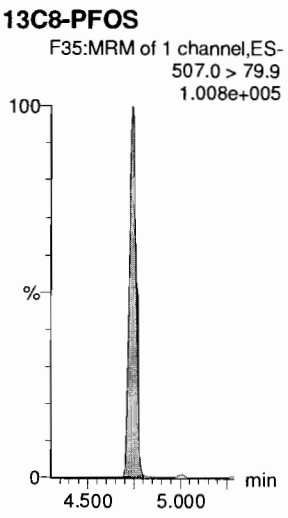

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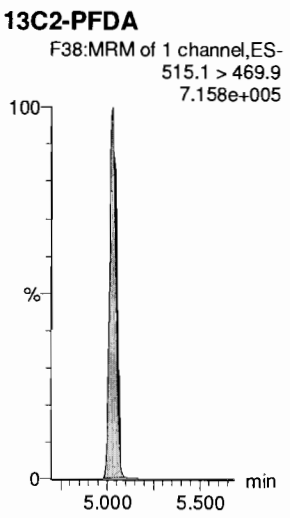
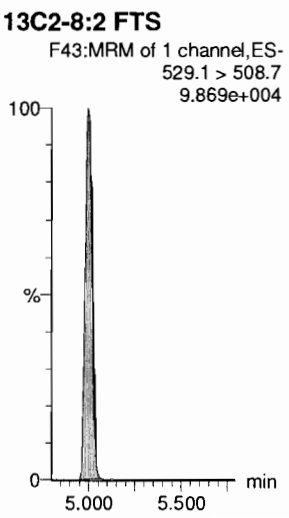


13C2-8:2 FTS



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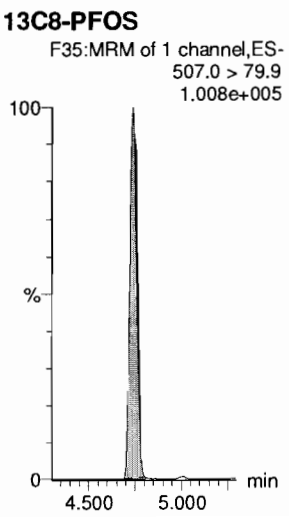

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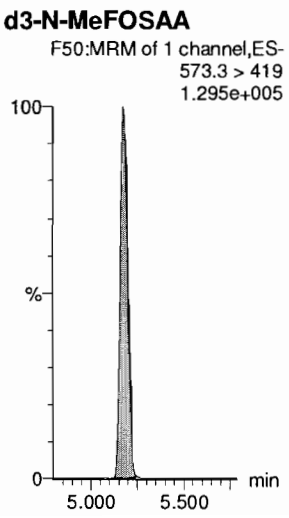

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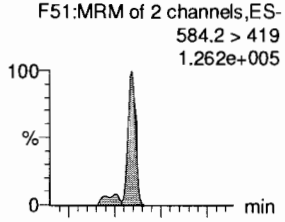
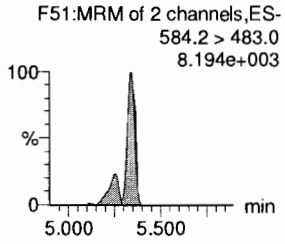
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

L-EtFOSAA





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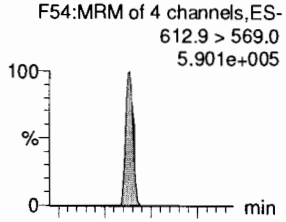

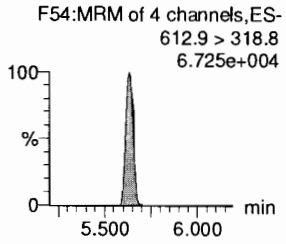

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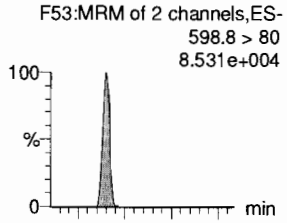
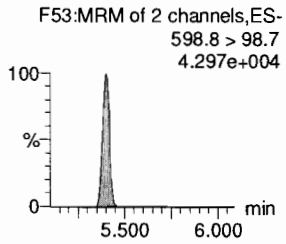
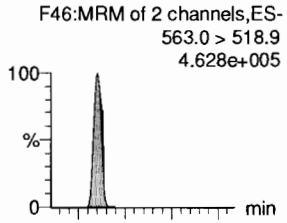
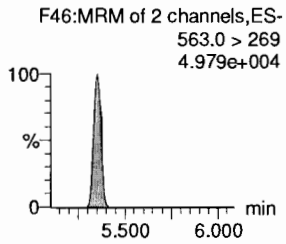


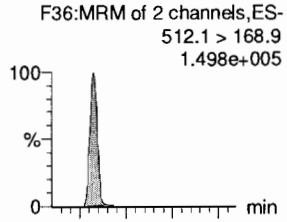


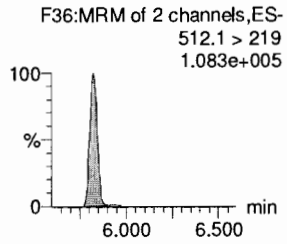
PFUdA



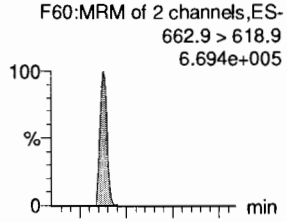


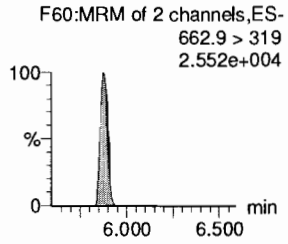
N-MeFOSA



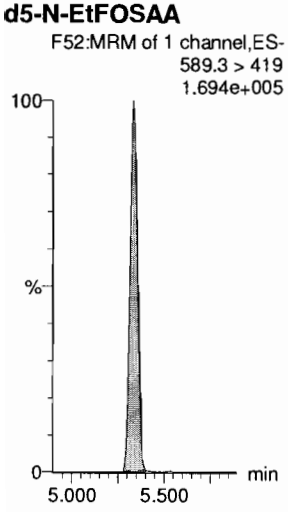


PFTrDA

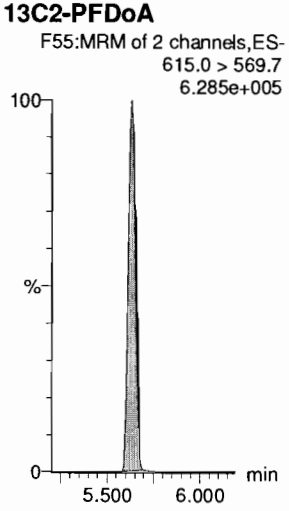




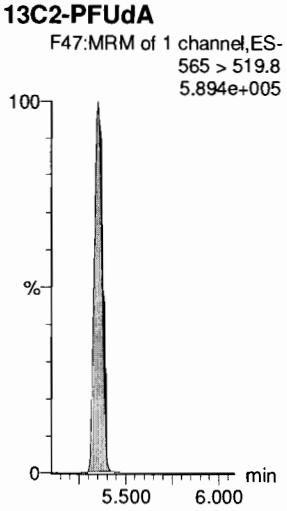
d5-N-EtFOSAA



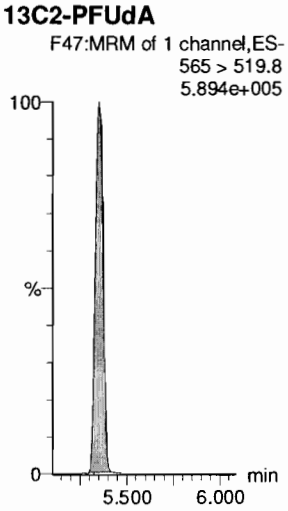
13C2-PFDoA



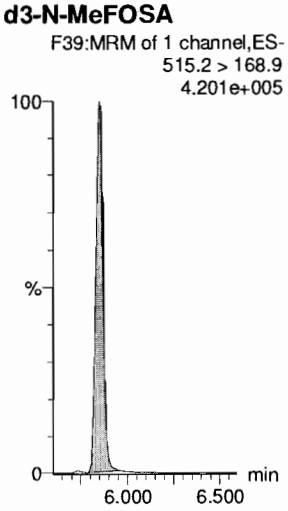
13C2-PFUdA



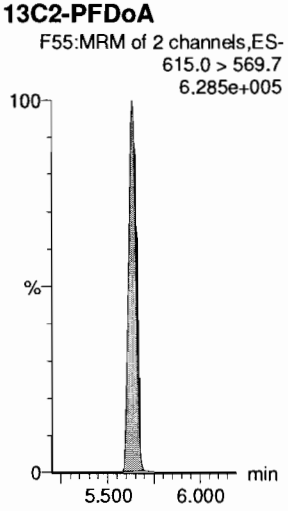
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA

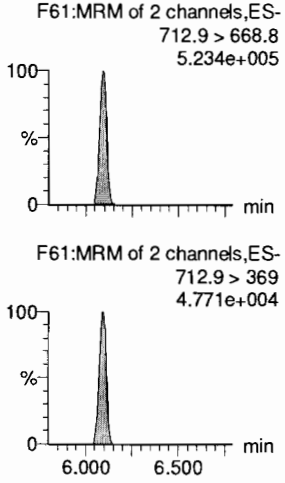


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

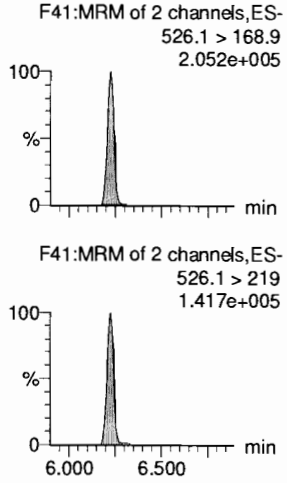
Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

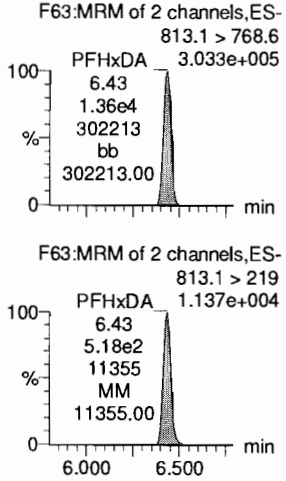
PFTeDA



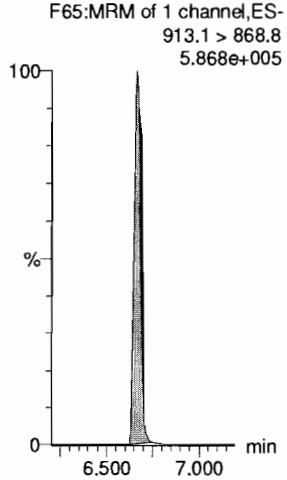
N-EtFOSA



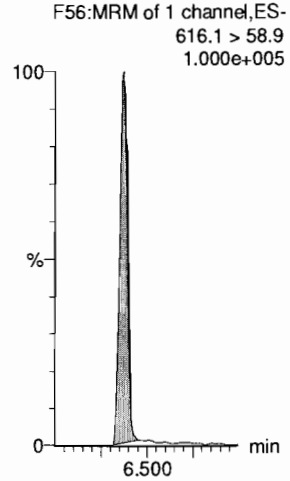
PFHxDA



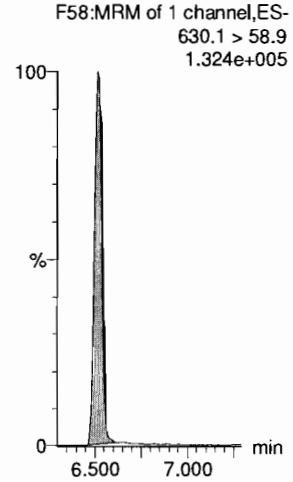
PFODA



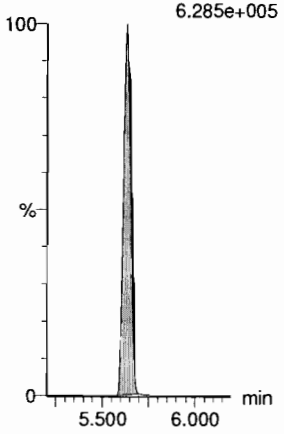
N-MeFOSE



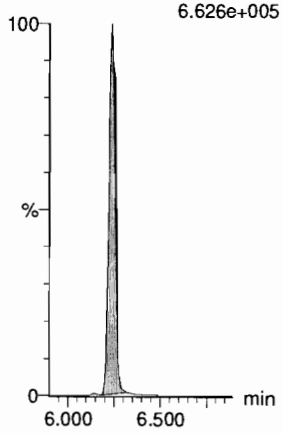
N-EtFOSE



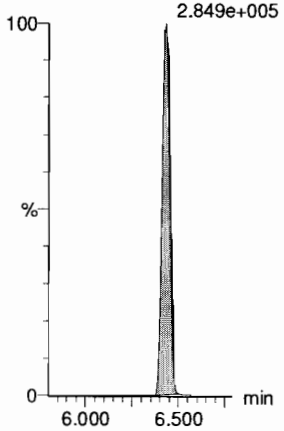
13C2-PFDoA



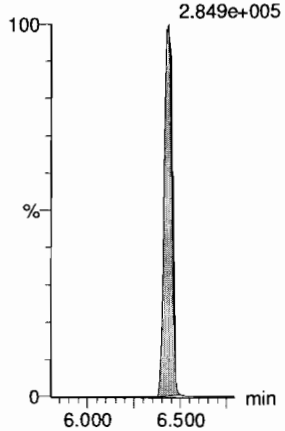
d5-N-ETFOSA



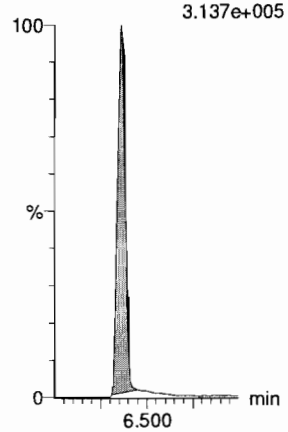
13C2-PFHxDA



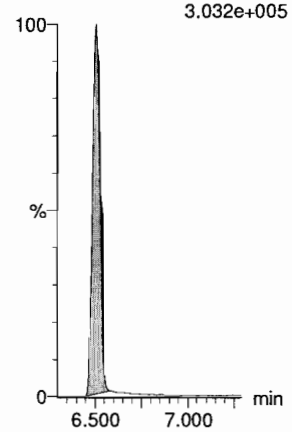
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

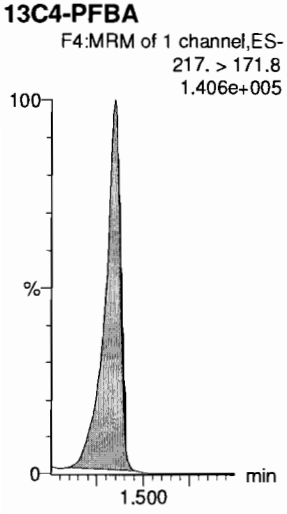


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-34.qld

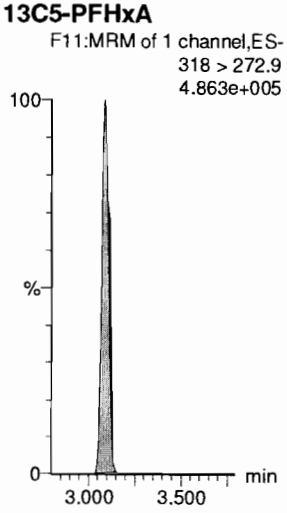
Last Altered: Tuesday, June 05, 2018 11:34:46 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:35:44 Pacific Daylight Time

Name: 180604M2_34, Date: 05-Jun-2018, Time: 00:46:37, ID: ST180604M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

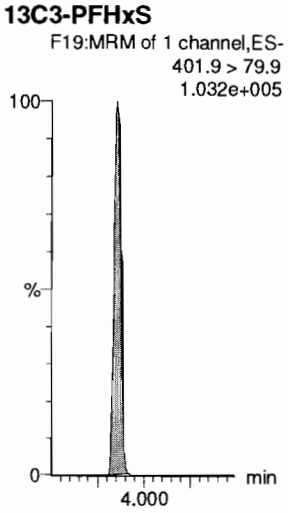
13C4-PFBA



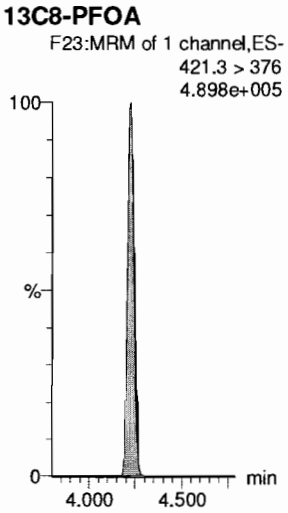
13C5-PFHxA



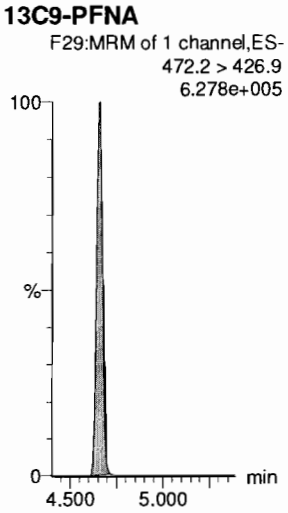
13C3-PFHxS



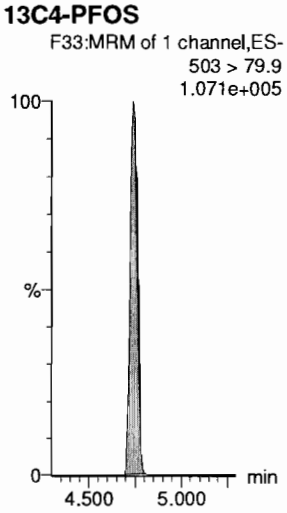
13C8-PFOA



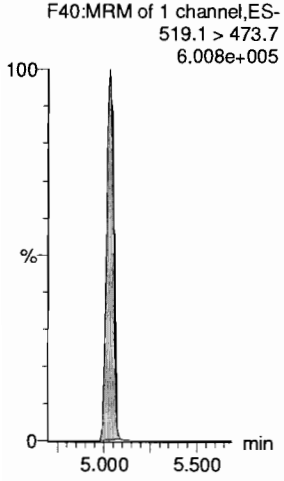
13C9-PFNA



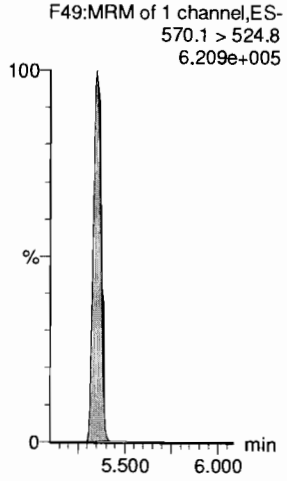
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

Last Altered: Wednesday, June 06, 2018 14:05:22 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:05:30 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_RS-5-19-18.mdb 20 May 2018 12:59:37
Calibration: 06 Jun 2018 13:41:40

Name: 180605M2_7, Date: 05-Jun-2018, Time: 17:30:59, ID: ST180605M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-6 PFC CS3 18E2907	1.00e4	100.0	NO
2	2	13C5-PFHxA	ST180605M2-6 PFC CS3 18E2907	1.39e4	100.0	NO
3	3	13C3-PFHxS	ST180605M2-6 PFC CS3 18E2907	2.89e3	100.0	NO
4	4	13C8-PFOA	ST180605M2-6 PFC CS3 18E2907	1.40e4	100.0	NO
5	5	13C9-PFNA	ST180605M2-6 PFC CS3 18E2907	1.69e4	100.0	NO
6	6	13C4-PFOS	ST180605M2-6 PFC CS3 18E2907	2.89e3	100.0	NO
7	7	13C6-PFDA	ST180605M2-6 PFC CS3 18E2907	2.14e4	100.0	NO
8	8	13C7-PFUdA	ST180605M2-6 PFC CS3 18E2907	2.44e4	100.0	NO

Name: 180605M2_8, Date: 05-Jun-2018, Time: 17:41:30, ID: ST180605M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-7 PFC CS4 18E2908	9.35e3	93.5	NO
2	2	13C5-PFHxA	ST180605M2-7 PFC CS4 18E2908	1.34e4	96.1	NO
3	3	13C3-PFHxS	ST180605M2-7 PFC CS4 18E2908	2.69e3	93.4	NO
4	4	13C8-PFOA	ST180605M2-7 PFC CS4 18E2908	1.38e4	98.5	NO
5	5	13C9-PFNA	ST180605M2-7 PFC CS4 18E2908	1.75e4	103.7	NO
6	6	13C4-PFOS	ST180605M2-7 PFC CS4 18E2908	2.69e3	93.2	NO
7	7	13C6-PFDA	ST180605M2-7 PFC CS4 18E2908	1.85e4	86.4	NO
8	8	13C7-PFUdA	ST180605M2-7 PFC CS4 18E2908	2.19e4	89.5	NO

Name: 180605M2_9, Date: 05-Jun-2018, Time: 17:52:00, ID: ST180605M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-8 PFC CS5 18E2909	9.64e3	96.4	NO
2	2	13C5-PFHxA	ST180605M2-8 PFC CS5 18E2909	1.33e4	95.8	NO
3	3	13C3-PFHxS	ST180605M2-8 PFC CS5 18E2909	2.82e3	97.7	NO
4	4	13C8-PFOA	ST180605M2-8 PFC CS5 18E2909	1.49e4	106.1	NO
5	5	13C9-PFNA	ST180605M2-8 PFC CS5 18E2909	1.71e4	101.1	NO
6	6	13C4-PFOS	ST180605M2-8 PFC CS5 18E2909	2.71e3	93.9	NO
7	7	13C6-PFDA	ST180605M2-8 PFC CS5 18E2909	2.01e4	93.8	NO
8	8	13C7-PFUdA	ST180605M2-8 PFC CS5 18E2909	2.36e4	96.9	NO

Name: 180605M2_10, Date: 05-Jun-2018, Time: 18:02:25, ID: ST180605M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-9 PFC CS6 18E2910	8.86e3	88.6	NO
2	2	13C5-PFHxA	ST180605M2-9 PFC CS6 18E2910	1.37e4	98.3	NO
3	3	13C3-PFHxS	ST180605M2-9 PFC CS6 18E2910	2.81e3	97.5	NO
4	4	13C8-PFOA	ST180605M2-9 PFC CS6 18E2910	1.55e4	110.2	NO
5	5	13C9-PFNA	ST180605M2-9 PFC CS6 18E2910	1.76e4	104.3	NO
6	6	13C4-PFOS	ST180605M2-9 PFC CS6 18E2910	2.87e3	99.2	NO
7	7	13C6-PFDA	ST180605M2-9 PFC CS6 18E2910	1.93e4	90.1	NO
8	8	13C7-PFUdA	ST180605M2-9 PFC CS6 18E2910	2.24e4	91.9	NO

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

Last Altered: Wednesday, June 06, 2018 14:05:22 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:05:30 Pacific Daylight Time

Name: 180605M2_11, Date: 05-Jun-2018, Time: 18:12:47, ID: ST180605M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-10 PFC CS7 18E2911	9.65e3	96.4	NO
2	2	13C5-PFHxA	ST180605M2-10 PFC CS7 18E2911	1.13e4	81.0	NO
3	3	13C3-PFHxS	ST180605M2-10 PFC CS7 18E2911	2.42e3	84.0	NO
4	4	13C8-PFOA	ST180605M2-10 PFC CS7 18E2911	1.30e4	92.6	NO
5	5	13C9-PFNA	ST180605M2-10 PFC CS7 18E2911	1.25e4	74.3	NO
6	6	13C4-PFOS	ST180605M2-10 PFC CS7 18E2911	2.39e3	82.7	NO
7	7	13C6-PFDA	ST180605M2-10 PFC CS7 18E2911	1.87e4	87.2	NO
8	8	13C7-PFUdA	ST180605M2-10 PFC CS7 18E2911	1.80e4	73.8	NO

Name: 180605M2_12, Date: 05-Jun-2018, Time: 18:23:17, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_13, Date: 05-Jun-2018, Time: 18:33:43, ID: ICV180605M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ICV180605M2-1 PFC 537 ICV 18E2901	9.64e3	96.3	NO
2	2	13C5-PFHxA	ICV180605M2-1 PFC 537 ICV 18E2901	1.32e4	94.6	NO
3	3	13C3-PFHxS	ICV180605M2-1 PFC 537 ICV 18E2901	2.81e3	97.2	NO
4	4	13C8-PFOA	ICV180605M2-1 PFC 537 ICV 18E2901	1.55e4	110.3	NO
5	5	13C9-PFNA	ICV180605M2-1 PFC 537 ICV 18E2901	1.69e4	99.9	NO
6	6	13C4-PFOS	ICV180605M2-1 PFC 537 ICV 18E2901	2.62e3	90.5	NO
7	7	13C6-PFDA	ICV180605M2-1 PFC 537 ICV 18E2901	1.97e4	92.2	NO
8	8	13C7-PFUdA	ICV180605M2-1 PFC 537 ICV 18E2901	2.33e4	95.4	NO

Name: 180605M2_14, Date: 05-Jun-2018, Time: 18:44:13, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

Last Altered: Wednesday, June 06, 2018 14:05:22 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 14:05:30 Pacific Daylight Time

Name: 180605M2_15, Date: 05-Jun-2018, Time: 18:54:40, ID: B8E0097-BS1 OPR 0.25, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0097-BS1 OPR 0.25	7.06e3	70.6	NO
2	2	13C5-PFHxA	B8E0097-BS1 OPR 0.25	9.46e3	68.0	NO
3	3	13C3-PFHxS	B8E0097-BS1 OPR 0.25	2.16e3	75.0	NO
4	4	13C8-PFOA	B8E0097-BS1 OPR 0.25	1.04e4	74.0	NO
5	5	13C9-PFNA	B8E0097-BS1 OPR 0.25	1.24e4	73.3	NO
6	6	13C4-PFOS	B8E0097-BS1 OPR 0.25	2.34e3	81.0	NO
7	7	13C6-PFDA	B8E0097-BS1 OPR 0.25	1.56e4	73.1	NO
8	8	13C7-PFUdA	B8E0097-BS1 OPR 0.25	1.66e4	68.2	NO

Name: 180605M2_16, Date: 05-Jun-2018, Time: 19:05:08, ID: B8E0097-BSD1 LCSD 0.25, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0097-BSD1 LCSD 0.25	7.61e3	76.1	NO
2	2	13C5-PFHxA	B8E0097-BSD1 LCSD 0.25	1.10e4	78.9	NO
3	3	13C3-PFHxS	B8E0097-BSD1 LCSD 0.25	2.40e3	83.1	NO
4	4	13C8-PFOA	B8E0097-BSD1 LCSD 0.25	1.22e4	86.8	NO
5	5	13C9-PFNA	B8E0097-BSD1 LCSD 0.25	1.51e4	89.7	NO
6	6	13C4-PFOS	B8E0097-BSD1 LCSD 0.25	2.26e3	78.4	NO
7	7	13C6-PFDA	B8E0097-BSD1 LCSD 0.25	1.81e4	84.4	NO
8	8	13C7-PFUdA	B8E0097-BSD1 LCSD 0.25	2.00e4	82.1	NO

Name: 180605M2_17, Date: 05-Jun-2018, Time: 19:15:33, ID: B8E0097-BLK1 Method Blank 0.25, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0097-BLK1 Method Blank 0.25	7.76e3	77.6	NO
2	2	13C5-PFHxA	B8E0097-BLK1 Method Blank 0.25	1.08e4	77.5	NO
3	3	13C3-PFHxS	B8E0097-BLK1 Method Blank 0.25	2.28e3	78.9	NO
4	4	13C8-PFOA	B8E0097-BLK1 Method Blank 0.25	1.25e4	88.9	NO
5	5	13C9-PFNA	B8E0097-BLK1 Method Blank 0.25	1.38e4	81.6	NO
6	6	13C4-PFOS	B8E0097-BLK1 Method Blank 0.25	2.23e3	77.2	NO
7	7	13C6-PFDA	B8E0097-BLK1 Method Blank 0.25	1.53e4	71.5	NO
8	8	13C7-PFUdA	B8E0097-BLK1 Method Blank 0.25	2.01e4	82.3	NO

Name: 180605M2_18, Date: 05-Jun-2018, Time: 19:26:03, ID: 1800863-01 Bemidji Pilot APR2 lead 0.25765, Description: Bemidji Pilot APR2 lead

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800863-01 Bemidji Pilot APR2 lead 0.2...	7.01e3	70.1	NO
2	2	13C5-PFHxA	1800863-01 Bemidji Pilot APR2 lead 0.2...	9.67e3	69.5	NO
3	3	13C3-PFHxS	1800863-01 Bemidji Pilot APR2 lead 0.2...	2.14e3	74.0	NO
4	4	13C8-PFOA	1800863-01 Bemidji Pilot APR2 lead 0.2...	1.12e4	79.5	NO
5	5	13C9-PFNA	1800863-01 Bemidji Pilot APR2 lead 0.2...	1.28e4	75.7	NO
6	6	13C4-PFOS	1800863-01 Bemidji Pilot APR2 lead 0.2...	2.20e3	76.3	NO
7	7	13C6-PFDA	1800863-01 Bemidji Pilot APR2 lead 0.2...	1.49e4	69.5	NO
8	8	13C7-PFUdA	1800863-01 Bemidji Pilot APR2 lead 0.2...	1.71e4	70.0	NO

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Name: 180605M2_19, Date: 05-Jun-2018, Time: 19:36:27, ID: 1800863-02 Bemidji Pilot PSR2 + 0.26433, Description: Bemidji Pilot PSR2 +

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800863-02 Bemidji Pilot PSR2 + 0.26433	7.35e3	73.5	NO
2	2	13C5-PFHxA	1800863-02 Bemidji Pilot PSR2 + 0.26433	9.54e3	68.5	NO
3	3	13C3-PFHxS	1800863-02 Bemidji Pilot PSR2 + 0.26433	2.34e3	81.0	NO
4	4	13C8-PFOA	1800863-02 Bemidji Pilot PSR2 + 0.26433	1.21e4	86.3	NO
5	5	13C9-PFNA	1800863-02 Bemidji Pilot PSR2 + 0.26433	1.35e4	79.8	NO
6	6	13C4-PFOS	1800863-02 Bemidji Pilot PSR2 + 0.26433	2.21e3	76.6	NO
7	7	13C6-PFDA	1800863-02 Bemidji Pilot PSR2 + 0.26433	1.69e4	78.9	NO
8	8	13C7-PFUdA	1800863-02 Bemidji Pilot PSR2 + 0.26433	1.66e4	67.8	NO

Name: 180605M2_20, Date: 05-Jun-2018, Time: 19:46:57, ID: 1800863-03 Bemidji Pilot INF 0.26399, Description: Bemidji Pilot INF

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800863-03 Bemidji Pilot INF 0.26399	7.14e3	71.4	NO
2	2	13C5-PFHxA	1800863-03 Bemidji Pilot INF 0.26399	9.37e3	67.3	NO
3	3	13C3-PFHxS	1800863-03 Bemidji Pilot INF 0.26399	2.04e3	70.8	NO
4	4	13C8-PFOA	1800863-03 Bemidji Pilot INF 0.26399	1.14e4	81.3	NO
5	5	13C9-PFNA	1800863-03 Bemidji Pilot INF 0.26399	1.24e4	73.6	NO
6	6	13C4-PFOS	1800863-03 Bemidji Pilot INF 0.26399	2.21e3	76.5	NO
7	7	13C6-PFDA	1800863-03 Bemidji Pilot INF 0.26399	1.52e4	71.0	NO
8	8	13C7-PFUdA	1800863-03 Bemidji Pilot INF 0.26399	1.78e4	73.0	NO

Name: 180605M2_21, Date: 05-Jun-2018, Time: 19:57:21, ID: 1800901-01 ACT Sample -16 0.23838, Description: ACT Sample -16

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800901-01 ACT Sample -16 0.23838	7.24e3	72.4	NO
2	2	13C5-PFHxA	1800901-01 ACT Sample -16 0.23838	1.02e4	73.2	NO
3	3	13C3-PFHxS	1800901-01 ACT Sample -16 0.23838	2.48e3	86.1	NO
4	4	13C8-PFOA	1800901-01 ACT Sample -16 0.23838	1.14e4	81.0	NO
5	5	13C9-PFNA	1800901-01 ACT Sample -16 0.23838	1.40e4	82.7	NO
6	6	13C4-PFOS	1800901-01 ACT Sample -16 0.23838	2.52e3	87.1	NO
7	7	13C6-PFDA	1800901-01 ACT Sample -16 0.23838	1.54e4	71.7	NO
8	8	13C7-PFUdA	1800901-01 ACT Sample -16 0.23838	1.90e4	77.8	NO

Name: 180605M2_22, Date: 05-Jun-2018, Time: 20:07:52, ID: 1800901-02 ACT Sample -19 0.23487, Description: ACT Sample -19

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800901-02 ACT Sample -19 0.23487	7.04e3	70.4	NO
2	2	13C5-PFHxA	1800901-02 ACT Sample -19 0.23487	9.91e3	71.2	NO
3	3	13C3-PFHxS	1800901-02 ACT Sample -19 0.23487	2.28e3	79.2	NO
4	4	13C8-PFOA	1800901-02 ACT Sample -19 0.23487	1.08e4	76.9	NO
5	5	13C9-PFNA	1800901-02 ACT Sample -19 0.23487	1.27e4	75.5	NO
6	6	13C4-PFOS	1800901-02 ACT Sample -19 0.23487	2.28e3	78.7	NO
7	7	13C6-PFDA	1800901-02 ACT Sample -19 0.23487	1.38e4	64.5	NO
8	8	13C7-PFUdA	1800901-02 ACT Sample -19 0.23487	1.88e4	76.8	NO

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Name: 180605M2_23, Date: 05-Jun-2018, Time: 20:18:16, ID: 1801071-02 A1-MW-55-SA1 0.11428, Description: A1-MW-55-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-02 A1-MW-55-SA1 0.11428	6.08e3	60.8	NO
2	2	13C5-PFHxA	1801071-02 A1-MW-55-SA1 0.11428	8.13e3	58.4	NO
3	3	13C3-PFHxS	1801071-02 A1-MW-55-SA1 0.11428	2.85e3	98.7	NO
4	4	13C8-PFOA	1801071-02 A1-MW-55-SA1 0.11428	1.09e4	77.7	NO
5	5	13C9-PFNA	1801071-02 A1-MW-55-SA1 0.11428	1.25e4	73.8	NO
6	6	13C4-PFOS	1801071-02 A1-MW-55-SA1 0.11428	2.75e3	95.3	NO
7	7	13C6-PFDA	1801071-02 A1-MW-55-SA1 0.11428	1.62e4	75.8	NO
8	8	13C7-PFUdA	1801071-02 A1-MW-55-SA1 0.11428	2.13e4	87.4	NO

Name: 180605M2_24, Date: 05-Jun-2018, Time: 20:28:47, ID: 1801071-03 A1-MW-23-SA1 0.11436, Description: A1-MW-23-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-03 A1-MW-23-SA1 0.11436	6.22e3	62.2	NO
2	2	13C5-PFHxA	1801071-03 A1-MW-23-SA1 0.11436	1.02e4	73.3	NO
3	3	13C3-PFHxS	1801071-03 A1-MW-23-SA1 0.11436	3.02e3	104.6	NO
4	4	13C8-PFOA	1801071-03 A1-MW-23-SA1 0.11436	1.32e4	94.0	NO
5	5	13C9-PFNA	1801071-03 A1-MW-23-SA1 0.11436	1.46e4	86.3	NO
6	6	13C4-PFOS	1801071-03 A1-MW-23-SA1 0.11436	2.97e3	102.9	NO
7	7	13C6-PFDA	1801071-03 A1-MW-23-SA1 0.11436	1.81e4	84.6	NO
8	8	13C7-PFUdA	1801071-03 A1-MW-23-SA1 0.11436	2.28e4	93.4	NO

Name: 180605M2_25, Date: 05-Jun-2018, Time: 20:39:12, ID: 1801071-04 A1-MW-07-SA1 0.11908, Description: A1-MW-07-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801071-04 A1-MW-07-SA1 0.11908	5.68e3	56.8	NO
2	2	13C5-PFHxA	1801071-04 A1-MW-07-SA1 0.11908	7.27e3	52.2	NO
3	3	13C3-PFHxS	1801071-04 A1-MW-07-SA1 0.11908	3.16e3	109.5	NO
4	4	13C8-PFOA	1801071-04 A1-MW-07-SA1 0.11908	9.00e3	64.2	NO
5	5	13C9-PFNA	1801071-04 A1-MW-07-SA1 0.11908	1.16e4	69.0	NO
6	6	13C4-PFOS	1801071-04 A1-MW-07-SA1 0.11908	3.27e3	113.2	NO
7	7	13C6-PFDA	1801071-04 A1-MW-07-SA1 0.11908	1.47e4	68.5	NO
8	8	13C7-PFUdA	1801071-04 A1-MW-07-SA1 0.11908	1.82e4	74.4	NO

Name: 180605M2_26, Date: 05-Jun-2018, Time: 20:49:42, ID: 1801039-01 A1-MW-13-SA1 0.10967, Description: A1-MW-13-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-01 A1-MW-13-SA1 0.10967	3.07e3	30.7	YES
2	2	13C5-PFHxA	1801039-01 A1-MW-13-SA1 0.10967	4.88e3	35.0	YES
3	3	13C3-PFHxS	1801039-01 A1-MW-13-SA1 0.10967	4.13e3	143.3	NO
4	4	13C8-PFOA	1801039-01 A1-MW-13-SA1 0.10967	8.00e3	57.1	NO
5	5	13C9-PFNA	1801039-01 A1-MW-13-SA1 0.10967	1.23e4	72.8	NO
6	6	13C4-PFOS	1801039-01 A1-MW-13-SA1 0.10967	4.20e3	145.4	NO
7	7	13C6-PFDA	1801039-01 A1-MW-13-SA1 0.10967	1.81e4	84.8	NO
8	8	13C7-PFUdA	1801039-01 A1-MW-13-SA1 0.10967	2.65e4	108.6	NO

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Name: 180605M2_27, Date: 05-Jun-2018, Time: 21:00:07, ID: 1801039-02 A1-MW-11-SA1 0.11624, Description: A1-MW-11-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-02 A1-MW-11-SA1 0.11624	4.60e3	46.0	YES
2	2	13C5-PFHxA	1801039-02 A1-MW-11-SA1 0.11624	6.51e3	46.8	YES
3	3	13C3-PFHxS	1801039-02 A1-MW-11-SA1 0.11624	3.84e3	133.0	NO
4	4	13C8-PFOA	1801039-02 A1-MW-11-SA1 0.11624	8.95e3	63.8	NO
5	5	13C9-PFNA	1801039-02 A1-MW-11-SA1 0.11624	1.22e4	72.4	NO
6	6	13C4-PFOS	1801039-02 A1-MW-11-SA1 0.11624	3.79e3	131.0	NO
7	7	13C6-PFDA	1801039-02 A1-MW-11-SA1 0.11624	1.44e4	67.3	NO
8	8	13C7-PFUdA	1801039-02 A1-MW-11-SA1 0.11624	2.49e4	102.0	NO

Name: 180605M2_28, Date: 05-Jun-2018, Time: 21:10:37, ID: 1801039-03 A1-MW-14-SA1 0.11194, Description: A1-MW-14-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-03 A1-MW-14-SA1 0.11194	2.44e3	24.3	YES
2	2	13C5-PFHxA	1801039-03 A1-MW-14-SA1 0.11194	3.78e3	27.1	YES
3	3	13C3-PFHxS	1801039-03 A1-MW-14-SA1 0.11194	4.67e3	161.7	YES
4	4	13C8-PFOA	1801039-03 A1-MW-14-SA1 0.11194	7.12e3	50.8	NO
5	5	13C9-PFNA	1801039-03 A1-MW-14-SA1 0.11194	8.67e3	51.4	NO
6	6	13C4-PFOS	1801039-03 A1-MW-14-SA1 0.11194	4.48e3	155.1	YES
7	7	13C6-PFDA	1801039-03 A1-MW-14-SA1 0.11194	1.31e4	61.3	NO
8	8	13C7-PFUdA	1801039-03 A1-MW-14-SA1 0.11194	2.36e4	96.5	NO

Name: 180605M2_29, Date: 05-Jun-2018, Time: 21:21:07, ID: 1801039-04 A1-MW-15-SA1 0.11248, Description: A1-MW-15-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-04 A1-MW-15-SA1 0.11248	4.70e3	47.0	YES
2	2	13C5-PFHxA	1801039-04 A1-MW-15-SA1 0.11248	7.74e3	55.6	NO
3	3	13C3-PFHxS	1801039-04 A1-MW-15-SA1 0.11248	3.96e3	137.4	NO
4	4	13C8-PFOA	1801039-04 A1-MW-15-SA1 0.11248	1.28e4	91.3	NO
5	5	13C9-PFNA	1801039-04 A1-MW-15-SA1 0.11248	1.59e4	94.2	NO
6	6	13C4-PFOS	1801039-04 A1-MW-15-SA1 0.11248	3.95e3	136.5	NO
7	7	13C6-PFDA	1801039-04 A1-MW-15-SA1 0.11248	2.03e4	94.9	NO
8	8	13C7-PFUdA	1801039-04 A1-MW-15-SA1 0.11248	2.53e4	103.6	NO

Name: 180605M2_30, Date: 05-Jun-2018, Time: 21:31:32, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

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Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-11 PFC CS3 18E2907	9.00e3	90.0	NO
2	2	13C5-PFHxA	ST180605M2-11 PFC CS3 18E2907	1.48e4	106.6	NO
3	3	13C3-PFHxS	ST180605M2-11 PFC CS3 18E2907	3.26e3	113.1	NO
4	4	13C8-PFOA	ST180605M2-11 PFC CS3 18E2907	1.71e4	121.6	NO
5	5	13C9-PFNA	ST180605M2-11 PFC CS3 18E2907	1.96e4	116.1	NO
6	6	13C4-PFOS	ST180605M2-11 PFC CS3 18E2907	3.25e3	112.4	NO
7	7	13C6-PFDA	ST180605M2-11 PFC CS3 18E2907	2.49e4	116.3	NO
8	8	13C7-PFUdA	ST180605M2-11 PFC CS3 18E2907	2.67e4	109.5	NO

Name: 180605M2_32, Date: 05-Jun-2018, Time: 21:52:27, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_33, Date: 05-Jun-2018, Time: 22:02:57, ID: 1801039-07 A1-MW-25-SA1 0.11252, Description: A1-MW-25-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801039-07 A1-MW-25-SA1 0.11252	2.63e3	26.2	YES
2	2	13C5-PFHxA	1801039-07 A1-MW-25-SA1 0.11252	4.03e3	28.9	YES
3	3	13C3-PFHxS	1801039-07 A1-MW-25-SA1 0.11252	3.65e3	126.6	NO
4	4	13C8-PFOA	1801039-07 A1-MW-25-SA1 0.11252	5.58e3	39.8	YES
5	5	13C9-PFNA	1801039-07 A1-MW-25-SA1 0.11252	9.32e3	55.2	NO
6	6	13C4-PFOS	1801039-07 A1-MW-25-SA1 0.11252	3.89e3	134.7	NO
7	7	13C6-PFDA	1801039-07 A1-MW-25-SA1 0.11252	1.41e4	65.9	NO
8	8	13C7-PFUdA	1801039-07 A1-MW-25-SA1 0.11252	1.70e4	69.6	NO

Name: 180605M2_34, Date: 05-Jun-2018, Time: 22:13:21, ID: 1801024-01 A1-MW-51-SA1 0.11961, Description: A1-MW-51-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-01 A1-MW-51-SA1 0.11961	3.50e3	35.0	YES
2	2	13C5-PFHxA	1801024-01 A1-MW-51-SA1 0.11961	4.37e3	31.4	YES
3	3	13C3-PFHxS	1801024-01 A1-MW-51-SA1 0.11961	2.37e3	82.2	NO
4	4	13C8-PFOA	1801024-01 A1-MW-51-SA1 0.11961	5.30e3	37.8	YES
5	5	13C9-PFNA	1801024-01 A1-MW-51-SA1 0.11961	6.11e3	36.2	YES
6	6	13C4-PFOS	1801024-01 A1-MW-51-SA1 0.11961	2.36e3	81.8	NO
7	7	13C6-PFDA	1801024-01 A1-MW-51-SA1 0.11961	5.78e3	27.0	YES
8	8	13C7-PFUdA	1801024-01 A1-MW-51-SA1 0.11961	8.85e3	36.3	YES

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Name: 180605M2_35, Date: 05-Jun-2018, Time: 22:23:52, ID: 1801024-02 A1-MW-50-SA1 0.12082, Description: A1-MW-50-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-02 A1-MW-50-SA1 0.12082	8.68e3	86.8	NO
2	2	13C5-PFHxA	1801024-02 A1-MW-50-SA1 0.12082	1.15e4	82.8	NO
3	3	13C3-PFHxS	1801024-02 A1-MW-50-SA1 0.12082	2.74e3	95.0	NO
4	4	13C8-PFOA	1801024-02 A1-MW-50-SA1 0.12082	1.30e4	92.6	NO
5	5	13C9-PFNA	1801024-02 A1-MW-50-SA1 0.12082	1.57e4	92.8	NO
6	6	13C4-PFOS	1801024-02 A1-MW-50-SA1 0.12082	2.59e3	89.5	NO
7	7	13C6-PFDA	1801024-02 A1-MW-50-SA1 0.12082	1.59e4	74.2	NO
8	8	13C7-PFUdA	1801024-02 A1-MW-50-SA1 0.12082	2.02e4	82.7	NO

Name: 180605M2_36, Date: 05-Jun-2018, Time: 22:34:22, ID: 1801024-05 A1-MW-04-SA1 0.12315, Description: A1-MW-04-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801024-05 A1-MW-04-SA1 0.12315	6.30e3	63.0	NO
2	2	13C5-PFHxA	1801024-05 A1-MW-04-SA1 0.12315	8.42e3	60.4	NO
3	3	13C3-PFHxS	1801024-05 A1-MW-04-SA1 0.12315	2.52e3	87.3	NO
4	4	13C8-PFOA	1801024-05 A1-MW-04-SA1 0.12315	9.62e3	68.6	NO
5	5	13C9-PFNA	1801024-05 A1-MW-04-SA1 0.12315	1.06e4	62.8	NO
6	6	13C4-PFOS	1801024-05 A1-MW-04-SA1 0.12315	2.79e3	96.7	NO
7	7	13C6-PFDA	1801024-05 A1-MW-04-SA1 0.12315	1.20e4	56.3	NO
8	8	13C7-PFUdA	1801024-05 A1-MW-04-SA1 0.12315	1.53e4	62.6	NO

Name: 180605M2_37, Date: 05-Jun-2018, Time: 22:44:46, ID: B8E0078-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0078-BS1 OPR 0.125	5.57e3	55.7	NO
2	2	13C5-PFHxA	B8E0078-BS1 OPR 0.125	8.53e3	61.2	NO
3	3	13C3-PFHxS	B8E0078-BS1 OPR 0.125	2.30e3	79.9	NO
4	4	13C8-PFOA	B8E0078-BS1 OPR 0.125	1.11e4	79.0	NO
5	5	13C9-PFNA	B8E0078-BS1 OPR 0.125	1.28e4	75.9	NO
6	6	13C4-PFOS	B8E0078-BS1 OPR 0.125	2.25e3	77.8	NO
7	7	13C6-PFDA	B8E0078-BS1 OPR 0.125	1.34e4	62.8	NO
8	8	13C7-PFUdA	B8E0078-BS1 OPR 0.125	1.76e4	72.1	NO

Name: 180605M2_38, Date: 05-Jun-2018, Time: 22:55:16, ID: B8E0078-BSD1 LCSD 0.125, Description: LCSD

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0078-BSD1 LCSD 0.125	4.71e3	47.1	YES
2	2	13C5-PFHxA	B8E0078-BSD1 LCSD 0.125	8.79e3	63.1	NO
3	3	13C3-PFHxS	B8E0078-BSD1 LCSD 0.125	2.19e3	76.1	NO
4	4	13C8-PFOA	B8E0078-BSD1 LCSD 0.125	1.09e4	77.6	NO
5	5	13C9-PFNA	B8E0078-BSD1 LCSD 0.125	1.33e4	78.6	NO
6	6	13C4-PFOS	B8E0078-BSD1 LCSD 0.125	2.12e3	73.3	NO
7	7	13C6-PFDA	B8E0078-BSD1 LCSD 0.125	1.62e4	75.6	NO
8	8	13C7-PFUdA	B8E0078-BSD1 LCSD 0.125	1.85e4	75.8	NO

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Name: 180605M2_39, Date: 05-Jun-2018, Time: 23:05:40, ID: B8E0078-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0078-BLK1 Method Blank 0.125	6.78e3	67.7	NO
2	2	13C5-PFHxA	B8E0078-BLK1 Method Blank 0.125	1.05e4	75.3	NO
3	3	13C3-PFHxS	B8E0078-BLK1 Method Blank 0.125	2.46e3	85.2	NO
4	4	13C8-PFOA	B8E0078-BLK1 Method Blank 0.125	1.25e4	89.4	NO
5	5	13C9-PFNA	B8E0078-BLK1 Method Blank 0.125	1.42e4	84.3	NO
6	6	13C4-PFOS	B8E0078-BLK1 Method Blank 0.125	2.49e3	86.0	NO
7	7	13C6-PFDA	B8E0078-BLK1 Method Blank 0.125	1.78e4	83.3	NO
8	8	13C7-PFUdA	B8E0078-BLK1 Method Blank 0.125	1.94e4	79.5	NO

Name: 180605M2_40, Date: 05-Jun-2018, Time: 23:16:11, ID: 1800862-01 REEPDW451FRB 0.11732, Description: REEPDW451FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-01 REEPDW451FRB 0.11732	6.66e3	66.6	NO
2	2	13C5-PFHxA	1800862-01 REEPDW451FRB 0.11732	9.43e3	67.7	NO
3	3	13C3-PFHxS	1800862-01 REEPDW451FRB 0.11732	2.36e3	81.9	NO
4	4	13C8-PFOA	1800862-01 REEPDW451FRB 0.11732	1.07e4	76.6	NO
5	5	13C9-PFNA	1800862-01 REEPDW451FRB 0.11732	1.43e4	84.5	NO
6	6	13C4-PFOS	1800862-01 REEPDW451FRB 0.11732	2.32e3	80.1	NO
7	7	13C6-PFDA	1800862-01 REEPDW451FRB 0.11732	1.52e4	70.8	NO
8	8	13C7-PFUdA	1800862-01 REEPDW451FRB 0.11732	1.53e4	62.8	NO

Name: 180605M2_41, Date: 05-Jun-2018, Time: 23:26:35, ID: 1800862-02 REEPDW452FRB 0.11393, Description: REEPDW452FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-02 REEPDW452FRB 0.11393	5.92e3	59.2	NO
2	2	13C5-PFHxA	1800862-02 REEPDW452FRB 0.11393	9.99e3	71.8	NO
3	3	13C3-PFHxS	1800862-02 REEPDW452FRB 0.11393	2.43e3	84.1	NO
4	4	13C8-PFOA	1800862-02 REEPDW452FRB 0.11393	1.26e4	89.7	NO
5	5	13C9-PFNA	1800862-02 REEPDW452FRB 0.11393	1.38e4	81.9	NO
6	6	13C4-PFOS	1800862-02 REEPDW452FRB 0.11393	2.38e3	82.3	NO
7	7	13C6-PFDA	1800862-02 REEPDW452FRB 0.11393	1.51e4	70.6	NO
8	8	13C7-PFUdA	1800862-02 REEPDW452FRB 0.11393	2.05e4	84.0	NO

Name: 180605M2_42, Date: 05-Jun-2018, Time: 23:37:05, ID: 1800862-03 REEPDW453FRB 0.11381, Description: REEPDW453FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-03 REEPDW453FRB 0.11381	5.06e3	50.5	NO
2	2	13C5-PFHxA	1800862-03 REEPDW453FRB 0.11381	8.57e3	61.5	NO
3	3	13C3-PFHxS	1800862-03 REEPDW453FRB 0.11381	2.25e3	77.9	NO
4	4	13C8-PFOA	1800862-03 REEPDW453FRB 0.11381	1.03e4	73.5	NO
5	5	13C9-PFNA	1800862-03 REEPDW453FRB 0.11381	1.16e4	68.8	NO
6	6	13C4-PFOS	1800862-03 REEPDW453FRB 0.11381	2.28e3	78.9	NO
7	7	13C6-PFDA	1800862-03 REEPDW453FRB 0.11381	1.54e4	71.7	NO
8	8	13C7-PFUdA	1800862-03 REEPDW453FRB 0.11381	1.63e4	66.7	NO

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Name: 180605M2_43, Date: 05-Jun-2018, Time: 23:47:29, ID: 1800862-04 REEPDW454FRB 0.11483, Description: REEPDW454FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-04 REEPDW454FRB 0.11483	5.90e3	58.9	NO
2	2	13C5-PFHxA	1800862-04 REEPDW454FRB 0.11483	8.89e3	63.8	NO
3	3	13C3-PFHxS	1800862-04 REEPDW454FRB 0.11483	2.33e3	80.7	NO
4	4	13C8-PFOA	1800862-04 REEPDW454FRB 0.11483	1.09e4	77.4	NO
5	5	13C9-PFNA	1800862-04 REEPDW454FRB 0.11483	1.17e4	69.3	NO
6	6	13C4-PFOS	1800862-04 REEPDW454FRB 0.11483	2.34e3	81.1	NO
7	7	13C6-PFDA	1800862-04 REEPDW454FRB 0.11483	1.50e4	70.2	NO
8	8	13C7-PFUdA	1800862-04 REEPDW454FRB 0.11483	1.71e4	69.9	NO

Name: 180605M2_44, Date: 05-Jun-2018, Time: 23:58:00, ID: 1800862-05 REEPDW456FRB 0.1202, Description: REEPDW456FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-05 REEPDW456FRB 0.1202	6.32e3	63.1	NO
2	2	13C5-PFHxA	1800862-05 REEPDW456FRB 0.1202	8.62e3	61.9	NO
3	3	13C3-PFHxS	1800862-05 REEPDW456FRB 0.1202	2.09e3	72.5	NO
4	4	13C8-PFOA	1800862-05 REEPDW456FRB 0.1202	8.77e3	62.5	NO
5	5	13C9-PFNA	1800862-05 REEPDW456FRB 0.1202	1.19e4	70.5	NO
6	6	13C4-PFOS	1800862-05 REEPDW456FRB 0.1202	2.18e3	75.6	NO
7	7	13C6-PFDA	1800862-05 REEPDW456FRB 0.1202	1.04e4	48.7	YES
8	8	13C7-PFUdA	1800862-05 REEPDW456FRB 0.1202	1.43e4	58.8	NO

Name: 180605M2_45, Date: 06-Jun-2018, Time: 00:08:25, ID: 1800862-06 REEPDW446FRB 0.11919, Description: REEPDW446FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-06 REEPDW446FRB 0.11919	5.56e3	55.6	NO
2	2	13C5-PFHxA	1800862-06 REEPDW446FRB 0.11919	9.00e3	64.6	NO
3	3	13C3-PFHxS	1800862-06 REEPDW446FRB 0.11919	2.20e3	76.4	NO
4	4	13C8-PFOA	1800862-06 REEPDW446FRB 0.11919	1.11e4	79.4	NO
5	5	13C9-PFNA	1800862-06 REEPDW446FRB 0.11919	1.23e4	72.8	NO
6	6	13C4-PFOS	1800862-06 REEPDW446FRB 0.11919	2.21e3	76.5	NO
7	7	13C6-PFDA	1800862-06 REEPDW446FRB 0.11919	1.44e4	67.1	NO
8	8	13C7-PFUdA	1800862-06 REEPDW446FRB 0.11919	1.95e4	79.8	NO

Name: 180605M2_46, Date: 06-Jun-2018, Time: 00:18:55, ID: 1800862-07 REEPDW455FRB 0.12259, Description: REEPDW455FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-07 REEPDW455FRB 0.12259	5.25e3	52.5	NO
2	2	13C5-PFHxA	1800862-07 REEPDW455FRB 0.12259	8.44e3	60.6	NO
3	3	13C3-PFHxS	1800862-07 REEPDW455FRB 0.12259	2.27e3	78.7	NO
4	4	13C8-PFOA	1800862-07 REEPDW455FRB 0.12259	1.04e4	74.4	NO
5	5	13C9-PFNA	1800862-07 REEPDW455FRB 0.12259	1.28e4	75.9	NO
6	6	13C4-PFOS	1800862-07 REEPDW455FRB 0.12259	2.13e3	73.7	NO
7	7	13C6-PFDA	1800862-07 REEPDW455FRB 0.12259	1.50e4	70.1	NO
8	8	13C7-PFUdA	1800862-07 REEPDW455FRB 0.12259	1.61e4	66.1	NO

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Name: 180605M2_47, Date: 06-Jun-2018, Time: 00:29:20, ID: 1800862-08 REEPDW447FRB 0.11683, Description: REEPDW447FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-08 REEPDW447FRB 0.11683	4.34e3	43.4	YES
2	2	13C5-PFHxA	1800862-08 REEPDW447FRB 0.11683	7.20e3	51.7	NO
3	3	13C3-PFHxS	1800862-08 REEPDW447FRB 0.11683	1.89e3	65.5	NO
4	4	13C8-PFOA	1800862-08 REEPDW447FRB 0.11683	9.87e3	70.3	NO
5	5	13C9-PFNA	1800862-08 REEPDW447FRB 0.11683	1.10e4	65.0	NO
6	6	13C4-PFOS	1800862-08 REEPDW447FRB 0.11683	1.92e3	66.6	NO
7	7	13C6-PFDA	1800862-08 REEPDW447FRB 0.11683	1.34e4	62.5	NO
8	8	13C7-PFUdA	1800862-08 REEPDW447FRB 0.11683	1.60e4	65.4	NO

Name: 180605M2_48, Date: 06-Jun-2018, Time: 00:39:51, ID: 1800862-09 REEPDW448FRB 0.12114, Description: REEPDW448FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-09 REEPDW448FRB 0.12114	6.10e3	61.0	NO
2	2	13C5-PFHxA	1800862-09 REEPDW448FRB 0.12114	9.74e3	69.9	NO
3	3	13C3-PFHxS	1800862-09 REEPDW448FRB 0.12114	2.37e3	82.2	NO
4	4	13C8-PFOA	1800862-09 REEPDW448FRB 0.12114	1.12e4	79.7	NO
5	5	13C9-PFNA	1800862-09 REEPDW448FRB 0.12114	1.28e4	76.1	NO
6	6	13C4-PFOS	1800862-09 REEPDW448FRB 0.12114	2.43e3	84.2	NO
7	7	13C6-PFDA	1800862-09 REEPDW448FRB 0.12114	1.44e4	67.4	NO
8	8	13C7-PFUdA	1800862-09 REEPDW448FRB 0.12114	1.94e4	79.6	NO

Name: 180605M2_49, Date: 06-Jun-2018, Time: 00:50:16, ID: 1800862-10 REEPDW449FRB 0.11798, Description: REEPDW449FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-10 REEPDW449FRB 0.11798	6.56e3	65.6	NO
2	2	13C5-PFHxA	1800862-10 REEPDW449FRB 0.11798	9.07e3	65.1	NO
3	3	13C3-PFHxS	1800862-10 REEPDW449FRB 0.11798	2.08e3	71.9	NO
4	4	13C8-PFOA	1800862-10 REEPDW449FRB 0.11798	1.16e4	82.4	NO
5	5	13C9-PFNA	1800862-10 REEPDW449FRB 0.11798	1.05e4	62.1	NO
6	6	13C4-PFOS	1800862-10 REEPDW449FRB 0.11798	2.26e3	78.3	NO
7	7	13C6-PFDA	1800862-10 REEPDW449FRB 0.11798	1.52e4	71.1	NO
8	8	13C7-PFUdA	1800862-10 REEPDW449FRB 0.11798	1.75e4	71.8	NO

Name: 180605M2_50, Date: 06-Jun-2018, Time: 01:00:38, ID: 1800862-11 REEPDW450FRB 0.12118, Description: REEPDW450FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-11 REEPDW450FRB 0.12118	6.64e3	66.4	NO
2	2	13C5-PFHxA	1800862-11 REEPDW450FRB 0.12118	9.47e3	68.0	NO
3	3	13C3-PFHxS	1800862-11 REEPDW450FRB 0.12118	2.35e3	81.5	NO
4	4	13C8-PFOA	1800862-11 REEPDW450FRB 0.12118	1.06e4	75.6	NO
5	5	13C9-PFNA	1800862-11 REEPDW450FRB 0.12118	1.08e4	63.7	NO
6	6	13C4-PFOS	1800862-11 REEPDW450FRB 0.12118	2.19e3	75.9	NO
7	7	13C6-PFDA	1800862-11 REEPDW450FRB 0.12118	1.29e4	60.1	NO
8	8	13C7-PFUdA	1800862-11 REEPDW450FRB 0.12118	1.61e4	65.9	NO

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Name: 180605M2_51, Date: 06-Jun-2018, Time: 01:11:08, ID: 1800862-12 REEPDW457FRB 0.12446, Description: REEPDW457FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-12 REEPDW457FRB 0.12446	6.33e3	63.3	NO
2	2	13C5-PFHxA	1800862-12 REEPDW457FRB 0.12446	9.53e3	68.4	NO
3	3	13C3-PFHxS	1800862-12 REEPDW457FRB 0.12446	2.31e3	80.2	NO
4	4	13C8-PFOA	1800862-12 REEPDW457FRB 0.12446	1.19e4	85.1	NO
5	5	13C9-PFNA	1800862-12 REEPDW457FRB 0.12446	1.08e4	63.9	NO
6	6	13C4-PFOS	1800862-12 REEPDW457FRB 0.12446	2.42e3	83.7	NO
7	7	13C6-PFDA	1800862-12 REEPDW457FRB 0.12446	1.26e4	59.0	NO
8	8	13C7-PFUdA	1800862-12 REEPDW457FRB 0.12446	1.58e4	64.6	NO

Name: 180605M2_52, Date: 06-Jun-2018, Time: 01:21:33, ID: 1800862-13 REEPDW459FRB 0.12147, Description: REEPDW459FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-13 REEPDW459FRB 0.12147	6.33e3	63.3	NO
2	2	13C5-PFHxA	1800862-13 REEPDW459FRB 0.12147	9.67e3	69.5	NO
3	3	13C3-PFHxS	1800862-13 REEPDW459FRB 0.12147	2.25e3	78.0	NO
4	4	13C8-PFOA	1800862-13 REEPDW459FRB 0.12147	1.10e4	78.5	NO
5	5	13C9-PFNA	1800862-13 REEPDW459FRB 0.12147	1.31e4	77.5	NO
6	6	13C4-PFOS	1800862-13 REEPDW459FRB 0.12147	2.23e3	77.2	NO
7	7	13C6-PFDA	1800862-13 REEPDW459FRB 0.12147	1.54e4	71.8	NO
8	8	13C7-PFUdA	1800862-13 REEPDW459FRB 0.12147	1.46e4	59.9	NO

Name: 180605M2_53, Date: 06-Jun-2018, Time: 01:32:03, ID: 1800862-14 REEPDW458FRB 0.11703, Description: REEPDW458FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-14 REEPDW458FRB 0.11703	5.40e3	54.0	NO
2	2	13C5-PFHxA	1800862-14 REEPDW458FRB 0.11703	8.89e3	63.8	NO
3	3	13C3-PFHxS	1800862-14 REEPDW458FRB 0.11703	2.29e3	79.5	NO
4	4	13C8-PFOA	1800862-14 REEPDW458FRB 0.11703	1.14e4	81.2	NO
5	5	13C9-PFNA	1800862-14 REEPDW458FRB 0.11703	1.22e4	72.1	NO
6	6	13C4-PFOS	1800862-14 REEPDW458FRB 0.11703	2.24e3	77.5	NO
7	7	13C6-PFDA	1800862-14 REEPDW458FRB 0.11703	1.41e4	65.8	NO
8	8	13C7-PFUdA	1800862-14 REEPDW458FRB 0.11703	1.75e4	71.7	NO

Name: 180605M2_54, Date: 06-Jun-2018, Time: 01:42:28, ID: 1800862-15 REEPDW460FRB 0.11944, Description: REEPDW460FRB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800862-15 REEPDW460FRB 0.11944	4.83e3	48.3	YES
2	2	13C5-PFHxA	1800862-15 REEPDW460FRB 0.11944	7.56e3	54.3	NO
3	3	13C3-PFHxS	1800862-15 REEPDW460FRB 0.11944	1.89e3	65.3	NO
4	4	13C8-PFOA	1800862-15 REEPDW460FRB 0.11944	9.07e3	64.6	NO
5	5	13C9-PFNA	1800862-15 REEPDW460FRB 0.11944	8.96e3	53.1	NO
6	6	13C4-PFOS	1800862-15 REEPDW460FRB 0.11944	1.90e3	65.8	NO
7	7	13C6-PFDA	1800862-15 REEPDW460FRB 0.11944	1.21e4	56.4	NO
8	8	13C7-PFUdA	1800862-15 REEPDW460FRB 0.11944	1.37e4	56.1	NO

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Name: 180605M2_55, Date: 06-Jun-2018, Time: 01:52:59, ID: B8E0244-BS1 OPR 0.125, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-BS1 OPR 0.125	7.12e3	71.2	NO
2	2	13C5-PFHxA	B8E0244-BS1 OPR 0.125	1.13e4	81.1	NO
3	3	13C3-PFHxS	B8E0244-BS1 OPR 0.125	2.63e3	91.0	NO
4	4	13C8-PFOA	B8E0244-BS1 OPR 0.125	1.30e4	92.9	NO
5	5	13C9-PFNA	B8E0244-BS1 OPR 0.125	1.60e4	95.0	NO
6	6	13C4-PFOS	B8E0244-BS1 OPR 0.125	2.65e3	91.6	NO
7	7	13C6-PFDA	B8E0244-BS1 OPR 0.125	1.57e4	73.5	NO
8	8	13C7-PFUdA	B8E0244-BS1 OPR 0.125	1.93e4	79.2	NO

Name: 180605M2_56, Date: 06-Jun-2018, Time: 02:03:23, ID: B8E0244-BLK1 Method Blank 0.125, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-BLK1 Method Blank 0.125	8.94e3	89.4	NO
2	2	13C5-PFHxA	B8E0244-BLK1 Method Blank 0.125	1.17e4	84.3	NO
3	3	13C3-PFHxS	B8E0244-BLK1 Method Blank 0.125	2.79e3	96.6	NO
4	4	13C8-PFOA	B8E0244-BLK1 Method Blank 0.125	1.46e4	103.9	NO
5	5	13C9-PFNA	B8E0244-BLK1 Method Blank 0.125	1.57e4	92.9	NO
6	6	13C4-PFOS	B8E0244-BLK1 Method Blank 0.125	2.67e3	92.5	NO
7	7	13C6-PFDA	B8E0244-BLK1 Method Blank 0.125	1.72e4	80.5	NO
8	8	13C7-PFUdA	B8E0244-BLK1 Method Blank 0.125	2.20e4	90.1	NO

Name: 180605M2_57, Date: 06-Jun-2018, Time: 02:13:53, ID: B8E0244-MS1 Matrix Spike 0.11028, Description: Matrix Spike

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-MS1 Matrix Spike 0.11028	8.15e3	81.4	NO
2	2	13C5-PFHxA	B8E0244-MS1 Matrix Spike 0.11028	9.91e3	71.1	NO
3	3	13C3-PFHxS	B8E0244-MS1 Matrix Spike 0.11028	3.74e3	129.6	NO
4	4	13C8-PFOA	B8E0244-MS1 Matrix Spike 0.11028	1.58e4	112.9	NO
5	5	13C9-PFNA	B8E0244-MS1 Matrix Spike 0.11028	1.84e4	109.3	NO
6	6	13C4-PFOS	B8E0244-MS1 Matrix Spike 0.11028	3.71e3	128.4	NO
7	7	13C6-PFDA	B8E0244-MS1 Matrix Spike 0.11028	2.25e4	105.1	NO
8	8	13C7-PFUdA	B8E0244-MS1 Matrix Spike 0.11028	2.54e4	104.2	NO

Name: 180605M2_58, Date: 06-Jun-2018, Time: 02:24:17, ID: B8E0244-MSD1 Matrix Spike Dup 0.11324, Description: Matrix Spike Dup

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-MSD1 Matrix Spike Dup 0.113...	5.81e3	58.1	NO
2	2	13C5-PFHxA	B8E0244-MSD1 Matrix Spike Dup 0.113...	6.73e3	48.3	YES
3	3	13C3-PFHxS	B8E0244-MSD1 Matrix Spike Dup 0.113...	2.69e3	93.3	NO
4	4	13C8-PFOA	B8E0244-MSD1 Matrix Spike Dup 0.113...	1.03e4	73.3	NO
5	5	13C9-PFNA	B8E0244-MSD1 Matrix Spike Dup 0.113...	1.01e4	59.8	NO
6	6	13C4-PFOS	B8E0244-MSD1 Matrix Spike Dup 0.113...	2.60e3	89.8	NO
7	7	13C6-PFDA	B8E0244-MSD1 Matrix Spike Dup 0.113...	1.56e4	72.7	NO
8	8	13C7-PFUdA	B8E0244-MSD1 Matrix Spike Dup 0.113...	1.65e4	67.7	NO

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Name: 180605M2_59, Date: 06-Jun-2018, Time: 02:34:48, ID: B8E0244-MS2 Matrix Spike 0.11122, Description: Matrix Spike

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-MS2 Matrix Spike 0.11122	4.07e3	40.7	YES
2	2	13C5-PFHxA	B8E0244-MS2 Matrix Spike 0.11122	6.19e3	44.5	YES
3	3	13C3-PFHxS	B8E0244-MS2 Matrix Spike 0.11122	2.37e3	82.2	NO
4	4	13C8-PFOA	B8E0244-MS2 Matrix Spike 0.11122	9.31e3	66.3	NO
5	5	13C9-PFNA	B8E0244-MS2 Matrix Spike 0.11122	1.01e4	59.8	NO
6	6	13C4-PFOS	B8E0244-MS2 Matrix Spike 0.11122	2.34e3	81.1	NO
7	7	13C6-PFDA	B8E0244-MS2 Matrix Spike 0.11122	1.09e4	50.8	NO
8	8	13C7-PFUdA	B8E0244-MS2 Matrix Spike 0.11122	1.36e4	55.8	NO

Name: 180605M2_60, Date: 06-Jun-2018, Time: 02:45:18, ID: B8E0244-MSD2 Matrix Spike Dup 0.11512, Description: Matrix Spike Dup

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0244-MSD2 Matrix Spike Dup 0.115...	5.24e3	52.4	NO
2	2	13C5-PFHxA	B8E0244-MSD2 Matrix Spike Dup 0.115...	8.01e3	57.5	NO
3	3	13C3-PFHxS	B8E0244-MSD2 Matrix Spike Dup 0.115...	2.65e3	91.9	NO
4	4	13C8-PFOA	B8E0244-MSD2 Matrix Spike Dup 0.115...	1.05e4	74.8	NO
5	5	13C9-PFNA	B8E0244-MSD2 Matrix Spike Dup 0.115...	1.15e4	68.4	NO
6	6	13C4-PFOS	B8E0244-MSD2 Matrix Spike Dup 0.115...	3.10e3	107.3	NO
7	7	13C6-PFDA	B8E0244-MSD2 Matrix Spike Dup 0.115...	1.42e4	66.5	NO
8	8	13C7-PFUdA	B8E0244-MSD2 Matrix Spike Dup 0.115...	1.67e4	68.4	NO

Name: 180605M2_61, Date: 06-Jun-2018, Time: 02:55:42, ID: 1801037-01 A1-MW-18-SA1 0.11265, Description: A1-MW-18-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-01 A1-MW-18-SA1 0.11265	5.85e3	58.5	NO
2	2	13C5-PFHxA	1801037-01 A1-MW-18-SA1 0.11265	7.59e3	54.5	NO
3	3	13C3-PFHxS	1801037-01 A1-MW-18-SA1 0.11265	2.81e3	97.3	NO
4	4	13C8-PFOA	1801037-01 A1-MW-18-SA1 0.11265	9.72e3	69.3	NO
5	5	13C9-PFNA	1801037-01 A1-MW-18-SA1 0.11265	1.09e4	64.8	NO
6	6	13C4-PFOS	1801037-01 A1-MW-18-SA1 0.11265	2.88e3	99.5	NO
7	7	13C6-PFDA	1801037-01 A1-MW-18-SA1 0.11265	1.22e4	57.2	NO
8	8	13C7-PFUdA	1801037-01 A1-MW-18-SA1 0.11265	1.62e4	66.2	NO

Name: 180605M2_62, Date: 06-Jun-2018, Time: 03:06:13, ID: 1801037-02 16-MW-08-SA1 0.11493, Description: 16-MW-08-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-02 16-MW-08-SA1 0.11493	5.47e3	54.7	NO
2	2	13C5-PFHxA	1801037-02 16-MW-08-SA1 0.11493	6.53e3	46.9	YES
3	3	13C3-PFHxS	1801037-02 16-MW-08-SA1 0.11493	2.91e3	101.0	NO
4	4	13C8-PFOA	1801037-02 16-MW-08-SA1 0.11493	9.09e3	64.8	NO
5	5	13C9-PFNA	1801037-02 16-MW-08-SA1 0.11493	1.11e4	65.7	NO
6	6	13C4-PFOS	1801037-02 16-MW-08-SA1 0.11493	2.80e3	96.8	NO
7	7	13C6-PFDA	1801037-02 16-MW-08-SA1 0.11493	9.64e3	45.0	YES
8	8	13C7-PFUdA	1801037-02 16-MW-08-SA1 0.11493	1.73e4	70.8	NO

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Name: 180605M2_63, Date: 06-Jun-2018, Time: 03:16:38, ID: 1801037-03 A1-MW-19-SA1 0.11827, Description: A1-MW-19-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-03 A1-MW-19-SA1 0.11827	4.90e3	49.0	YES
2	2	13C5-PFHxA	1801037-03 A1-MW-19-SA1 0.11827	6.32e3	45.4	YES
3	3	13C3-PFHxS	1801037-03 A1-MW-19-SA1 0.11827	2.76e3	95.5	NO
4	4	13C8-PFOA	1801037-03 A1-MW-19-SA1 0.11827	6.90e3	49.2	YES
5	5	13C9-PFNA	1801037-03 A1-MW-19-SA1 0.11827	7.39e3	43.8	YES
6	6	13C4-PFOS	1801037-03 A1-MW-19-SA1 0.11827	2.83e3	97.9	NO
7	7	13C6-PFDA	1801037-03 A1-MW-19-SA1 0.11827	1.01e4	47.3	YES
8	8	13C7-PFUdA	1801037-03 A1-MW-19-SA1 0.11827	1.31e4	53.5	NO

Name: 180605M2_64, Date: 06-Jun-2018, Time: 03:27:09, ID: 1801037-04 A1-MW-37-SA1 0.11915, Description: A1-MW-37-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-04 A1-MW-37-SA1 0.11915	3.78e3	37.8	YES
2	2	13C5-PFHxA	1801037-04 A1-MW-37-SA1 0.11915	4.69e3	33.7	YES
3	3	13C3-PFHxS	1801037-04 A1-MW-37-SA1 0.11915	2.31e3	80.2	NO
4	4	13C8-PFOA	1801037-04 A1-MW-37-SA1 0.11915	5.85e3	41.7	YES
5	5	13C9-PFNA	1801037-04 A1-MW-37-SA1 0.11915	5.45e3	32.3	YES
6	6	13C4-PFOS	1801037-04 A1-MW-37-SA1 0.11915	2.20e3	76.1	NO
7	7	13C6-PFDA	1801037-04 A1-MW-37-SA1 0.11915	6.33e3	29.6	YES
8	8	13C7-PFUdA	1801037-04 A1-MW-37-SA1 0.11915	1.01e4	41.3	YES

Name: 180605M2_65, Date: 06-Jun-2018, Time: 03:37:33, ID: 1801037-05 A1-MW-37-SA1D 0.11595, Description: A1-MW-37-SA1D

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-05 A1-MW-37-SA1D 0.11595	6.65e3	66.5	NO
2	2	13C5-PFHxA	1801037-05 A1-MW-37-SA1D 0.11595	8.48e3	60.9	NO
3	3	13C3-PFHxS	1801037-05 A1-MW-37-SA1D 0.11595	2.97e3	102.9	NO
4	4	13C8-PFOA	1801037-05 A1-MW-37-SA1D 0.11595	9.70e3	69.1	NO
5	5	13C9-PFNA	1801037-05 A1-MW-37-SA1D 0.11595	1.21e4	71.7	NO
6	6	13C4-PFOS	1801037-05 A1-MW-37-SA1D 0.11595	3.03e3	104.8	NO
7	7	13C6-PFDA	1801037-05 A1-MW-37-SA1D 0.11595	1.38e4	64.4	NO
8	8	13C7-PFUdA	1801037-05 A1-MW-37-SA1D 0.11595	1.67e4	68.3	NO

Name: 180605M2_66, Date: 06-Jun-2018, Time: 03:48:03, ID: 1801037-06 16-H5-03-SA1 0.12456, Description: 16-H5-03-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-06 16-H5-03-SA1 0.12456	6.80e3	68.0	NO
2	2	13C5-PFHxA	1801037-06 16-H5-03-SA1 0.12456	7.66e3	55.0	NO
3	3	13C3-PFHxS	1801037-06 16-H5-03-SA1 0.12456	2.52e3	87.2	NO
4	4	13C8-PFOA	1801037-06 16-H5-03-SA1 0.12456	1.05e4	75.1	NO
5	5	13C9-PFNA	1801037-06 16-H5-03-SA1 0.12456	1.05e4	62.2	NO
6	6	13C4-PFOS	1801037-06 16-H5-03-SA1 0.12456	2.64e3	91.2	NO
7	7	13C6-PFDA	1801037-06 16-H5-03-SA1 0.12456	1.39e4	64.9	NO
8	8	13C7-PFUdA	1801037-06 16-H5-03-SA1 0.12456	1.60e4	65.4	NO

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Name: 180605M2_67, Date: 06-Jun-2018, Time: 03:58:29, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA	8.53e0	0.1	YES
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-12 PFC CS3 18E2907	1.03e4	103.1	NO
2	2	13C5-PFHxA	ST180605M2-12 PFC CS3 18E2907	1.62e4	116.3	NO
3	3	13C3-PFHxS	ST180605M2-12 PFC CS3 18E2907	3.57e3	123.7	NO
4	4	13C8-PFOA	ST180605M2-12 PFC CS3 18E2907	1.93e4	137.3	NO
5	5	13C9-PFNA	ST180605M2-12 PFC CS3 18E2907	2.00e4	118.2	NO
6	6	13C4-PFOS	ST180605M2-12 PFC CS3 18E2907	3.42e3	118.4	NO
7	7	13C6-PFDA	ST180605M2-12 PFC CS3 18E2907	2.26e4	105.8	NO
8	8	13C7-PFUdA	ST180605M2-12 PFC CS3 18E2907	2.80e4	114.6	NO

Name: 180605M2_69, Date: 06-Jun-2018, Time: 04:19:24, ID: ST180605M2-13 PFC CS0 18E2904, Description: PFC CS0 18E2904

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-13 PFC CS0 18E2904	1.07e4	106.9	NO
2	2	13C5-PFHxA	ST180605M2-13 PFC CS0 18E2904	1.61e4	115.8	NO
3	3	13C3-PFHxS	ST180605M2-13 PFC CS0 18E2904	3.53e3	122.4	NO
4	4	13C8-PFOA	ST180605M2-13 PFC CS0 18E2904	1.66e4	118.6	NO
5	5	13C9-PFNA	ST180605M2-13 PFC CS0 18E2904	1.84e4	109.2	NO
6	6	13C4-PFOS	ST180605M2-13 PFC CS0 18E2904	3.35e3	115.9	NO
7	7	13C6-PFDA	ST180605M2-13 PFC CS0 18E2904	2.05e4	96.0	NO
8	8	13C7-PFUdA	ST180605M2-13 PFC CS0 18E2904	2.73e4	111.6	NO

Name: 180605M2_70, Date: 06-Jun-2018, Time: 04:29:54, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

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Name: 180605M2_71, Date: 06-Jun-2018, Time: 04:40:20, ID: 1801037-07 16-MW-09-SA1 0.1148, Description: 16-MW-09-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-07 16-MW-09-SA1 0.1148	6.32e3	63.2	NO
2	2	13C5-PFHxA	1801037-07 16-MW-09-SA1 0.1148	8.30e3	59.6	NO
3	3	13C3-PFHxS	1801037-07 16-MW-09-SA1 0.1148	2.94e3	101.9	NO
4	4	13C8-PFOA	1801037-07 16-MW-09-SA1 0.1148	9.38e3	66.9	NO
5	5	13C9-PFNA	1801037-07 16-MW-09-SA1 0.1148	9.68e3	57.4	NO
6	6	13C4-PFOS	1801037-07 16-MW-09-SA1 0.1148	2.96e3	102.5	NO
7	7	13C6-PFDA	1801037-07 16-MW-09-SA1 0.1148	1.07e4	50.0	NO
8	8	13C7-PFUdA	1801037-07 16-MW-09-SA1 0.1148	1.48e4	60.8	NO

Name: 180605M2_72, Date: 06-Jun-2018, Time: 04:50:50, ID: 1801037-08 16-MW-06-5A1 0.11143, Description: 16-MW-06-5A1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-08 16-MW-06-5A1 0.11143	4.79e3	47.9	YES
2	2	13C5-PFHxA	1801037-08 16-MW-06-5A1 0.11143	6.03e3	43.3	YES
3	3	13C3-PFHxS	1801037-08 16-MW-06-5A1 0.11143	2.79e3	96.8	NO
4	4	13C8-PFOA	1801037-08 16-MW-06-5A1 0.11143	7.54e3	53.7	NO
5	5	13C9-PFNA	1801037-08 16-MW-06-5A1 0.11143	9.19e3	54.5	NO
6	6	13C4-PFOS	1801037-08 16-MW-06-5A1 0.11143	3.01e3	104.2	NO
7	7	13C6-PFDA	1801037-08 16-MW-06-5A1 0.11143	1.02e4	47.5	YES
8	8	13C7-PFUdA	1801037-08 16-MW-06-5A1 0.11143	1.31e4	53.5	NO

Name: 180605M2_73, Date: 06-Jun-2018, Time: 05:01:15, ID: 1801037-09 FRB-20180523 0.11719, Description: FRB-20180523

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801037-09 FRB-20180523 0.11719	6.15e3	61.5	NO
2	2	13C5-PFHxA	1801037-09 FRB-20180523 0.11719	8.66e3	62.2	NO
3	3	13C3-PFHxS	1801037-09 FRB-20180523 0.11719	2.72e3	94.1	NO
4	4	13C8-PFOA	1801037-09 FRB-20180523 0.11719	1.01e4	71.9	NO
5	5	13C9-PFNA	1801037-09 FRB-20180523 0.11719	1.22e4	72.1	NO
6	6	13C4-PFOS	1801037-09 FRB-20180523 0.11719	2.63e3	91.0	NO
7	7	13C6-PFDA	1801037-09 FRB-20180523 0.11719	1.44e4	67.2	NO
8	8	13C7-PFUdA	1801037-09 FRB-20180523 0.11719	1.94e4	79.5	NO

Name: 180605M2_74, Date: 06-Jun-2018, Time: 05:11:45, ID: 1801054-01 A1-MW-42-SA1 0.11279, Description: A1-MW-42-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-01 A1-MW-42-SA1 0.11279	3.39e3	33.9	YES
2	2	13C5-PFHxA	1801054-01 A1-MW-42-SA1 0.11279	4.45e3	32.0	YES
3	3	13C3-PFHxS	1801054-01 A1-MW-42-SA1 0.11279	2.73e3	94.6	NO
4	4	13C8-PFOA	1801054-01 A1-MW-42-SA1 0.11279	4.52e3	32.2	YES
5	5	13C9-PFNA	1801054-01 A1-MW-42-SA1 0.11279	5.18e3	30.7	YES
6	6	13C4-PFOS	1801054-01 A1-MW-42-SA1 0.11279	2.69e3	93.1	NO
7	7	13C6-PFDA	1801054-01 A1-MW-42-SA1 0.11279	6.69e3	31.2	YES
8	8	13C7-PFUdA	1801054-01 A1-MW-42-SA1 0.11279	9.43e3	38.6	YES

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Name: 180605M2_75, Date: 06-Jun-2018, Time: 05:22:09, ID: 1801054-02 A1-MW-54-SA1 0.11211, Description: A1-MW-54-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-02 A1-MW-54-SA1 0.11211	5.50e3	55.0	NO
2	2	13C5-PFHxA	1801054-02 A1-MW-54-SA1 0.11211	6.77e3	48.6	YES
3	3	13C3-PFHxS	1801054-02 A1-MW-54-SA1 0.11211	2.58e3	89.3	NO
4	4	13C8-PFOA	1801054-02 A1-MW-54-SA1 0.11211	8.47e3	60.4	NO
5	5	13C9-PFNA	1801054-02 A1-MW-54-SA1 0.11211	9.09e3	53.9	NO
6	6	13C4-PFOS	1801054-02 A1-MW-54-SA1 0.11211	2.75e3	95.1	NO
7	7	13C6-PFDA	1801054-02 A1-MW-54-SA1 0.11211	1.18e4	55.3	NO
8	8	13C7-PFUdA	1801054-02 A1-MW-54-SA1 0.11211	1.46e4	59.8	NO

Name: 180605M2_76, Date: 06-Jun-2018, Time: 05:32:40, ID: 1801054-03 A1-MW-53-SA1 0.1139, Description: A1-MW-53-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-03 A1-MW-53-SA1 0.1139	7.14e3	71.4	NO
2	2	13C5-PFHxA	1801054-03 A1-MW-53-SA1 0.1139	8.98e3	64.5	NO
3	3	13C3-PFHxS	1801054-03 A1-MW-53-SA1 0.1139	3.01e3	104.4	NO
4	4	13C8-PFOA	1801054-03 A1-MW-53-SA1 0.1139	1.13e4	80.8	NO
5	5	13C9-PFNA	1801054-03 A1-MW-53-SA1 0.1139	1.32e4	78.4	NO
6	6	13C4-PFOS	1801054-03 A1-MW-53-SA1 0.1139	3.10e3	107.2	NO
7	7	13C6-PFDA	1801054-03 A1-MW-53-SA1 0.1139	1.63e4	76.1	NO
8	8	13C7-PFUdA	1801054-03 A1-MW-53-SA1 0.1139	1.95e4	80.0	NO

Name: 180605M2_77, Date: 06-Jun-2018, Time: 05:43:10, ID: 1801054-04 A1-P2-19-SA1 0.11736, Description: A1-P2-19-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-04 A1-P2-19-SA1 0.11736	5.13e3	51.2	NO
2	2	13C5-PFHxA	1801054-04 A1-P2-19-SA1 0.11736	6.56e3	47.1	YES
3	3	13C3-PFHxS	1801054-04 A1-P2-19-SA1 0.11736	2.76e3	95.6	NO
4	4	13C8-PFOA	1801054-04 A1-P2-19-SA1 0.11736	7.25e3	51.7	NO
5	5	13C9-PFNA	1801054-04 A1-P2-19-SA1 0.11736	8.07e3	47.8	YES
6	6	13C4-PFOS	1801054-04 A1-P2-19-SA1 0.11736	2.75e3	95.1	NO
7	7	13C6-PFDA	1801054-04 A1-P2-19-SA1 0.11736	1.06e4	49.7	YES
8	8	13C7-PFUdA	1801054-04 A1-P2-19-SA1 0.11736	1.23e4	50.3	NO

Name: 180605M2_78, Date: 06-Jun-2018, Time: 05:53:35, ID: 1801054-05 A1-MW-52-SA1 0.11509, Description: A1-MW-52-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-05 A1-MW-52-SA1 0.11509	4.90e3	49.0	YES
2	2	13C5-PFHxA	1801054-05 A1-MW-52-SA1 0.11509	6.43e3	46.2	YES
3	3	13C3-PFHxS	1801054-05 A1-MW-52-SA1 0.11509	2.76e3	95.6	NO
4	4	13C8-PFOA	1801054-05 A1-MW-52-SA1 0.11509	7.41e3	52.9	NO
5	5	13C9-PFNA	1801054-05 A1-MW-52-SA1 0.11509	9.14e3	54.2	NO
6	6	13C4-PFOS	1801054-05 A1-MW-52-SA1 0.11509	2.68e3	92.9	NO
7	7	13C6-PFDA	1801054-05 A1-MW-52-SA1 0.11509	8.09e3	37.8	YES
8	8	13C7-PFUdA	1801054-05 A1-MW-52-SA1 0.11509	1.37e4	56.3	NO

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Name: 180605M2_79, Date: 06-Jun-2018, Time: 06:04:05, ID: 1801054-06 A1-MW-01-SA1 0.1102, Description: A1-MW-01-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-06 A1-MW-01-SA1 0.1102	5.07e3	50.7	NO
2	2	13C5-PFHxA	1801054-06 A1-MW-01-SA1 0.1102	6.24e3	44.8	YES
3	3	13C3-PFHxS	1801054-06 A1-MW-01-SA1 0.1102	2.64e3	91.6	NO
4	4	13C8-PFOA	1801054-06 A1-MW-01-SA1 0.1102	7.74e3	55.1	NO
5	5	13C9-PFNA	1801054-06 A1-MW-01-SA1 0.1102	8.57e3	50.8	NO
6	6	13C4-PFOS	1801054-06 A1-MW-01-SA1 0.1102	2.52e3	87.2	NO
7	7	13C6-PFDA	1801054-06 A1-MW-01-SA1 0.1102	1.05e4	49.2	YES
8	8	13C7-PFUdA	1801054-06 A1-MW-01-SA1 0.1102	1.26e4	51.5	NO

Name: 180605M2_80, Date: 06-Jun-2018, Time: 06:14:31, ID: 1801054-07 A1-MW-01-SA1D 0.11715, Description: A1-MW-01-SA1D

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-07 A1-MW-01-SA1D 0.11715	4.94e3	49.4	YES
2	2	13C5-PFHxA	1801054-07 A1-MW-01-SA1D 0.11715	6.15e3	44.2	YES
3	3	13C3-PFHxS	1801054-07 A1-MW-01-SA1D 0.11715	2.90e3	100.6	NO
4	4	13C8-PFOA	1801054-07 A1-MW-01-SA1D 0.11715	7.76e3	55.3	NO
5	5	13C9-PFNA	1801054-07 A1-MW-01-SA1D 0.11715	9.09e3	53.8	NO
6	6	13C4-PFOS	1801054-07 A1-MW-01-SA1D 0.11715	3.00e3	103.9	NO
7	7	13C6-PFDA	1801054-07 A1-MW-01-SA1D 0.11715	9.57e3	44.7	YES
8	8	13C7-PFUdA	1801054-07 A1-MW-01-SA1D 0.11715	1.32e4	54.1	NO

Name: 180605M2_81, Date: 06-Jun-2018, Time: 06:25:01, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_82, Date: 06-Jun-2018, Time: 06:35:26, ID: ST180605M2-14 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-14 PFC CS3 18E2907	1.06e4	105.5	NO
2	2	13C5-PFHxA	ST180605M2-14 PFC CS3 18E2907	1.67e4	120.2	NO
3	3	13C3-PFHxS	ST180605M2-14 PFC CS3 18E2907	3.58e3	124.2	NO
4	4	13C8-PFOA	ST180605M2-14 PFC CS3 18E2907	1.77e4	125.8	NO
5	5	13C9-PFNA	ST180605M2-14 PFC CS3 18E2907	1.80e4	106.9	NO
6	6	13C4-PFOS	ST180605M2-14 PFC CS3 18E2907	3.41e3	118.1	NO
7	7	13C6-PFDA	ST180605M2-14 PFC CS3 18E2907	2.12e4	99.0	NO
8	8	13C7-PFUdA	ST180605M2-14 PFC CS3 18E2907	2.58e4	105.8	NO

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Name: 180605M2_83, Date: 06-Jun-2018, Time: 06:45:57, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_84, Date: 06-Jun-2018, Time: 06:56:27, ID: 1801054-08 A1-MW-31-SA1 0.11276, Description: A1-MW-31-SA1

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-08 A1-MW-31-SA1 0.11276	4.33e3	43.3	YES
2	2	13C5-PFHxA	1801054-08 A1-MW-31-SA1 0.11276	5.42e3	38.9	YES
3	3	13C3-PFHxS	1801054-08 A1-MW-31-SA1 0.11276	2.97e3	103.1	NO
4	4	13C8-PFOA	1801054-08 A1-MW-31-SA1 0.11276	6.01e3	42.8	YES
5	5	13C9-PFNA	1801054-08 A1-MW-31-SA1 0.11276	8.44e3	50.0	NO
6	6	13C4-PFOS	1801054-08 A1-MW-31-SA1 0.11276	2.84e3	98.4	NO
7	7	13C6-PFDA	1801054-08 A1-MW-31-SA1 0.11276	1.06e4	49.7	YES
8	8	13C7-PFUdA	1801054-08 A1-MW-31-SA1 0.11276	1.33e4	54.6	NO

Name: 180605M2_85, Date: 06-Jun-2018, Time: 07:06:52, ID: 1801054-09 FRB-20180525 0.11663, Description: FRB-20180525

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1801054-09 FRB-20180525 0.11663	6.72e3	67.2	NO
2	2	13C5-PFHxA	1801054-09 FRB-20180525 0.11663	9.55e3	68.6	NO
3	3	13C3-PFHxS	1801054-09 FRB-20180525 0.11663	2.70e3	93.5	NO
4	4	13C8-PFOA	1801054-09 FRB-20180525 0.11663	1.14e4	81.1	NO
5	5	13C9-PFNA	1801054-09 FRB-20180525 0.11663	1.37e4	81.1	NO
6	6	13C4-PFOS	1801054-09 FRB-20180525 0.11663	2.52e3	87.2	NO
7	7	13C6-PFDA	1801054-09 FRB-20180525 0.11663	1.68e4	78.3	NO
8	8	13C7-PFUdA	1801054-09 FRB-20180525 0.11663	1.98e4	81.3	NO

Name: 180605M2_86, Date: 06-Jun-2018, Time: 07:17:22, ID: B8E0161-BS1 OPR 0.25, Description: OPR

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0161-BS1 OPR 0.25	8.78e3	87.8	NO
2	2	13C5-PFHxA	B8E0161-BS1 OPR 0.25	1.19e4	85.2	NO
3	3	13C3-PFHxS	B8E0161-BS1 OPR 0.25	2.75e3	95.2	NO
4	4	13C8-PFOA	B8E0161-BS1 OPR 0.25	1.35e4	96.5	NO
5	5	13C9-PFNA	B8E0161-BS1 OPR 0.25	1.54e4	91.1	NO
6	6	13C4-PFOS	B8E0161-BS1 OPR 0.25	2.61e3	90.4	NO
7	7	13C6-PFDA	B8E0161-BS1 OPR 0.25	1.81e4	84.5	NO
8	8	13C7-PFUdA	B8E0161-BS1 OPR 0.25	1.88e4	77.2	NO

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Name: 180605M2_87, Date: 06-Jun-2018, Time: 07:27:47, ID: B8E0161-BLK1 Method Blank 0.25, Description: Method Blank

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	B8E0161-BLK1 Method Blank 0.25	8.59e3	85.9	NO
2	2	13C5-PFHxA	B8E0161-BLK1 Method Blank 0.25	1.21e4	86.6	NO
3	3	13C3-PFHxS	B8E0161-BLK1 Method Blank 0.25	2.73e3	94.5	NO
4	4	13C8-PFOA	B8E0161-BLK1 Method Blank 0.25	1.39e4	99.0	NO
5	5	13C9-PFNA	B8E0161-BLK1 Method Blank 0.25	1.47e4	87.1	NO
6	6	13C4-PFOS	B8E0161-BLK1 Method Blank 0.25	2.82e3	97.7	NO
7	7	13C6-PFDA	B8E0161-BLK1 Method Blank 0.25	1.47e4	68.8	NO
8	8	13C7-PFUdA	B8E0161-BLK1 Method Blank 0.25	2.02e4	82.7	NO

Name: 180605M2_88, Date: 06-Jun-2018, Time: 07:38:17, ID: 1800989-01 KE-RD6954-MW01 0.11761, Description: KE-RD6954-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-01 KE-RD6954-MW01 0.11761	7.98e3	79.7	NO
2	2	13C5-PFHxA	1800989-01 KE-RD6954-MW01 0.11761	1.03e4	74.2	NO
3	3	13C3-PFHxS	1800989-01 KE-RD6954-MW01 0.11761	2.68e3	92.9	NO
4	4	13C8-PFOA	1800989-01 KE-RD6954-MW01 0.11761	1.29e4	92.0	NO
5	5	13C9-PFNA	1800989-01 KE-RD6954-MW01 0.11761	1.33e4	79.0	NO
6	6	13C4-PFOS	1800989-01 KE-RD6954-MW01 0.11761	2.75e3	95.2	NO
7	7	13C6-PFDA	1800989-01 KE-RD6954-MW01 0.11761	1.46e4	68.2	NO
8	8	13C7-PFUdA	1800989-01 KE-RD6954-MW01 0.11761	1.59e4	65.0	NO

Name: 180605M2_89, Date: 06-Jun-2018, Time: 07:48:48, ID: 1800989-02 KE-BBW-MW01 0.11717, Description: KE-BBW-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-02 KE-BBW-MW01 0.11717	8.07e3	80.7	NO
2	2	13C5-PFHxA	1800989-02 KE-BBW-MW01 0.11717	1.05e4	75.6	NO
3	3	13C3-PFHxS	1800989-02 KE-BBW-MW01 0.11717	2.55e3	88.2	NO
4	4	13C8-PFOA	1800989-02 KE-BBW-MW01 0.11717	1.25e4	88.8	NO
5	5	13C9-PFNA	1800989-02 KE-BBW-MW01 0.11717	1.31e4	77.9	NO
6	6	13C4-PFOS	1800989-02 KE-BBW-MW01 0.11717	2.47e3	85.4	NO
7	7	13C6-PFDA	1800989-02 KE-BBW-MW01 0.11717	1.43e4	66.7	NO
8	8	13C7-PFUdA	1800989-02 KE-BBW-MW01 0.11717	1.87e4	76.7	NO

Name: 180605M2_90, Date: 06-Jun-2018, Time: 07:59:12, ID: 1800989-03 KE-6954-MW01 0.11556, Description: KE-6954-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-03 KE-6954-MW01 0.11556	7.48e3	74.8	NO
2	2	13C5-PFHxA	1800989-03 KE-6954-MW01 0.11556	1.02e4	72.9	NO
3	3	13C3-PFHxS	1800989-03 KE-6954-MW01 0.11556	2.61e3	90.5	NO
4	4	13C8-PFOA	1800989-03 KE-6954-MW01 0.11556	1.19e4	84.9	NO
5	5	13C9-PFNA	1800989-03 KE-6954-MW01 0.11556	1.33e4	79.0	NO
6	6	13C4-PFOS	1800989-03 KE-6954-MW01 0.11556	2.57e3	89.1	NO
7	7	13C6-PFDA	1800989-03 KE-6954-MW01 0.11556	1.39e4	64.7	NO
8	8	13C7-PFUdA	1800989-03 KE-6954-MW01 0.11556	1.74e4	71.5	NO

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Name: 180605M2_91, Date: 06-Jun-2018, Time: 08:09:43, ID: 1800989-04 KE-APN-MW01 0.11557, Description: KE-APN-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-04 KE-APN-MW01 0.11557	8.58e3	85.8	NO
2	2	13C5-PFHxA	1800989-04 KE-APN-MW01 0.11557	1.15e4	82.4	NO
3	3	13C3-PFHxS	1800989-04 KE-APN-MW01 0.11557	2.50e3	86.8	NO
4	4	13C8-PFOA	1800989-04 KE-APN-MW01 0.11557	1.36e4	96.7	NO
5	5	13C9-PFNA	1800989-04 KE-APN-MW01 0.11557	1.46e4	86.6	NO
6	6	13C4-PFOS	1800989-04 KE-APN-MW01 0.11557	2.56e3	88.7	NO
7	7	13C6-PFDA	1800989-04 KE-APN-MW01 0.11557	1.60e4	74.8	NO
8	8	13C7-PFUdA	1800989-04 KE-APN-MW01 0.11557	1.77e4	72.4	NO

Name: 180605M2_92, Date: 06-Jun-2018, Time: 08:20:06, ID: 1800989-05 KE-FBA-MW01 0.11631, Description: KE-FBA-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-05 KE-FBA-MW01 0.11631	8.23e3	82.3	NO
2	2	13C5-PFHxA	1800989-05 KE-FBA-MW01 0.11631	1.04e4	74.4	NO
3	3	13C3-PFHxS	1800989-05 KE-FBA-MW01 0.11631	2.35e3	81.5	NO
4	4	13C8-PFOA	1800989-05 KE-FBA-MW01 0.11631	1.18e4	84.2	NO
5	5	13C9-PFNA	1800989-05 KE-FBA-MW01 0.11631	1.43e4	84.6	NO
6	6	13C4-PFOS	1800989-05 KE-FBA-MW01 0.11631	2.49e3	86.3	NO
7	7	13C6-PFDA	1800989-05 KE-FBA-MW01 0.11631	1.54e4	71.9	NO
8	8	13C7-PFUdA	1800989-05 KE-FBA-MW01 0.11631	1.68e4	68.8	NO

Name: 180605M2_93, Date: 06-Jun-2018, Time: 08:30:37, ID: 1800989-06 KE-FBA-MW01D 0.11705, Description: KE-FBA-MW01D

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-06 KE-FBA-MW01D 0.11705	8.37e3	83.7	NO
2	2	13C5-PFHxA	1800989-06 KE-FBA-MW01D 0.11705	1.13e4	81.2	NO
3	3	13C3-PFHxS	1800989-06 KE-FBA-MW01D 0.11705	2.39e3	82.7	NO
4	4	13C8-PFOA	1800989-06 KE-FBA-MW01D 0.11705	1.26e4	89.8	NO
5	5	13C9-PFNA	1800989-06 KE-FBA-MW01D 0.11705	1.31e4	77.5	NO
6	6	13C4-PFOS	1800989-06 KE-FBA-MW01D 0.11705	2.57e3	89.0	NO
7	7	13C6-PFDA	1800989-06 KE-FBA-MW01D 0.11705	1.58e4	73.8	NO
8	8	13C7-PFUdA	1800989-06 KE-FBA-MW01D 0.11705	1.74e4	71.3	NO

Name: 180605M2_94, Date: 06-Jun-2018, Time: 08:41:02, ID: 1800989-07 KE-NNTA-MW01 0.11356, Description: KE-NNTA-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-07 KE-NNTA-MW01 0.11356	8.56e3	85.5	NO
2	2	13C5-PFHxA	1800989-07 KE-NNTA-MW01 0.11356	1.15e4	82.8	NO
3	3	13C3-PFHxS	1800989-07 KE-NNTA-MW01 0.11356	2.19e3	76.1	NO
4	4	13C8-PFOA	1800989-07 KE-NNTA-MW01 0.11356	1.25e4	89.4	NO
5	5	13C9-PFNA	1800989-07 KE-NNTA-MW01 0.11356	1.43e4	84.6	NO
6	6	13C4-PFOS	1800989-07 KE-NNTA-MW01 0.11356	2.41e3	83.5	NO
7	7	13C6-PFDA	1800989-07 KE-NNTA-MW01 0.11356	1.53e4	71.4	NO
8	8	13C7-PFUdA	1800989-07 KE-NNTA-MW01 0.11356	2.04e4	83.6	NO

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Name: 180605M2_95, Date: 06-Jun-2018, Time: 08:51:32, ID: 1800989-08 KE-6918-MW01 0.11438, Description: KE-6918-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-08 KE-6918-MW01 0.11438	9.09e3	90.9	NO
2	2	13C5-PFHxA	1800989-08 KE-6918-MW01 0.11438	1.22e4	87.5	NO
3	3	13C3-PFHxS	1800989-08 KE-6918-MW01 0.11438	2.59e3	89.8	NO
4	4	13C8-PFOA	1800989-08 KE-6918-MW01 0.11438	1.41e4	100.4	NO
5	5	13C9-PFNA	1800989-08 KE-6918-MW01 0.11438	1.58e4	93.3	NO
6	6	13C4-PFOS	1800989-08 KE-6918-MW01 0.11438	1.44e3	49.8	YES
7	7	13C6-PFDA	1800989-08 KE-6918-MW01 0.11438	1.64e4	76.8	NO
8	8	13C7-PFUdA	1800989-08 KE-6918-MW01 0.11438	2.23e4	91.4	NO

Name: 180605M2_96, Date: 06-Jun-2018, Time: 09:01:58, ID: 1800989-09 KE-6917-MW01 0.11542, Description: KE-6917-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-09 KE-6917-MW01 0.11542	8.13e3	81.3	NO
2	2	13C5-PFHxA	1800989-09 KE-6917-MW01 0.11542	1.09e4	78.5	NO
3	3	13C3-PFHxS	1800989-09 KE-6917-MW01 0.11542	2.69e3	93.1	NO
4	4	13C8-PFOA	1800989-09 KE-6917-MW01 0.11542	1.33e4	94.7	NO
5	5	13C9-PFNA	1800989-09 KE-6917-MW01 0.11542	1.35e4	79.8	NO
6	6	13C4-PFOS	1800989-09 KE-6917-MW01 0.11542	2.48e3	85.9	NO
7	7	13C6-PFDA	1800989-09 KE-6917-MW01 0.11542	1.52e4	71.0	NO
8	8	13C7-PFUdA	1800989-09 KE-6917-MW01 0.11542	1.81e4	73.9	NO

Name: 180605M2_97, Date: 06-Jun-2018, Time: 09:12:28, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_98, Date: 06-Jun-2018, Time: 09:22:52, ID: ST180605M2-15 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-15 PFC CS3 18E2907	1.07e4	107.4	NO
2	2	13C5-PFHxA	ST180605M2-15 PFC CS3 18E2907	1.65e4	118.7	NO
3	3	13C3-PFHxS	ST180605M2-15 PFC CS3 18E2907	3.39e3	117.6	NO
4	4	13C8-PFOA	ST180605M2-15 PFC CS3 18E2907	1.88e4	133.7	NO
5	5	13C9-PFNA	ST180605M2-15 PFC CS3 18E2907	2.22e4	131.8	NO
6	6	13C4-PFOS	ST180605M2-15 PFC CS3 18E2907	3.68e3	127.3	NO
7	7	13C6-PFDA	ST180605M2-15 PFC CS3 18E2907	2.15e4	100.2	NO
8	8	13C7-PFUdA	ST180605M2-15 PFC CS3 18E2907	2.87e4	117.5	NO

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

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Name: 180605M2_99, Date: 06-Jun-2018, Time: 09:33:23, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_100, Date: 06-Jun-2018, Time: 09:43:53, ID: 1800989-10 KE-EB-5-11-18 0.26165, Description: KE-EB-5-11-18

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-10 KE-EB-5-11-18 0.26165	8.22e3	82.2	NO
2	2	13C5-PFHxA	1800989-10 KE-EB-5-11-18 0.26165	1.04e4	74.5	NO
3	3	13C3-PFHxS	1800989-10 KE-EB-5-11-18 0.26165	2.58e3	89.6	NO
4	4	13C8-PFOA	1800989-10 KE-EB-5-11-18 0.26165	1.34e4	95.3	NO
5	5	13C9-PFNA	1800989-10 KE-EB-5-11-18 0.26165	1.42e4	84.4	NO
6	6	13C4-PFOS	1800989-10 KE-EB-5-11-18 0.26165	2.37e3	82.0	NO
7	7	13C6-PFDA	1800989-10 KE-EB-5-11-18 0.26165	1.62e4	75.6	NO
8	8	13C7-PFUdA	1800989-10 KE-EB-5-11-18 0.26165	1.72e4	70.3	NO

Name: 180605M2_101, Date: 06-Jun-2018, Time: 09:54:18, ID: 1800989-11 KE-FTA-MW01 0.1098, Description: KE-FTA-MW01

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800989-11 KE-FTA-MW01 0.1098	7.88e3	78.8	NO
2	2	13C5-PFHxA	1800989-11 KE-FTA-MW01 0.1098	6.70e3	48.1	YES
3	3	13C3-PFHxS	1800989-11 KE-FTA-MW01 0.1098	1.00e3	34.8	YES
4	4	13C8-PFOA	1800989-11 KE-FTA-MW01 0.1098	7.31e3	52.1	NO
5	5	13C9-PFNA	1800989-11 KE-FTA-MW01 0.1098	1.13e4	67.1	NO
6	6	13C4-PFOS	1800989-11 KE-FTA-MW01 0.1098	1.21e3	42.0	YES
7	7	13C6-PFDA	1800989-11 KE-FTA-MW01 0.1098	1.62e4	75.7	NO
8	8	13C7-PFUdA	1800989-11 KE-FTA-MW01 0.1098	1.74e4	71.1	NO

Name: 180605M2_102, Date: 06-Jun-2018, Time: 10:04:48, ID: 1800986-01 FR Fld Blk 0.25955, Description: FR Fld Blk

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800986-01 FR Fld Blk 0.25955	9.45e3	94.5	NO
2	2	13C5-PFHxA	1800986-01 FR Fld Blk 0.25955	1.23e4	88.0	NO
3	3	13C3-PFHxS	1800986-01 FR Fld Blk 0.25955	2.80e3	97.2	NO
4	4	13C8-PFOA	1800986-01 FR Fld Blk 0.25955	1.38e4	98.1	NO
5	5	13C9-PFNA	1800986-01 FR Fld Blk 0.25955	1.58e4	93.9	NO
6	6	13C4-PFOS	1800986-01 FR Fld Blk 0.25955	2.84e3	98.3	NO
7	7	13C6-PFDA	1800986-01 FR Fld Blk 0.25955	1.74e4	81.5	NO
8	8	13C7-PFUdA	1800986-01 FR Fld Blk 0.25955	2.19e4	89.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

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Name: 180605M2_103, Date: 06-Jun-2018, Time: 10:27:41, ID: IS SUP TESTER, Description: IS SUP TESTER

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IS SUP TESTER	7.67e3	76.7	NO
2	2	13C5-PFHxA	IS SUP TESTER	1.27e4	91.2	NO
3	3	13C3-PFHxS	IS SUP TESTER	2.89e3	100.3	NO
4	4	13C8-PFOA	IS SUP TESTER	1.45e4	103.2	NO
5	5	13C9-PFNA	IS SUP TESTER	1.66e4	98.6	NO
6	6	13C4-PFOS	IS SUP TESTER	2.79e3	96.4	NO
7	7	13C6-PFDA	IS SUP TESTER	1.86e4	87.1	NO
8	8	13C7-PFUdA	IS SUP TESTER	2.64e4	108.3	NO

Name: 180605M2_104, Date: 06-Jun-2018, Time: 10:38:06, ID: 1800986-02 Forest Ridge 0.27675, Description: Forest Ridge

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800986-02 Forest Ridge 0.27675	7.92e3	79.1	NO
2	2	13C5-PFHxA	1800986-02 Forest Ridge 0.27675	1.02e4	73.4	NO
3	3	13C3-PFHxS	1800986-02 Forest Ridge 0.27675	2.47e3	85.8	NO
4	4	13C8-PFOA	1800986-02 Forest Ridge 0.27675	1.18e4	84.2	NO
5	5	13C9-PFNA	1800986-02 Forest Ridge 0.27675	1.55e4	92.0	NO
6	6	13C4-PFOS	1800986-02 Forest Ridge 0.27675	2.48e3	85.8	NO
7	7	13C6-PFDA	1800986-02 Forest Ridge 0.27675	1.53e4	71.6	NO
8	8	13C7-PFUdA	1800986-02 Forest Ridge 0.27675	2.03e4	83.3	NO

Name: 180605M2_105, Date: 06-Jun-2018, Time: 10:48:37, ID: 1800986-03 K & V Fld Blk 0.25454, Description: K & V Fld Blk

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800986-03 K_V Fld Blk 0.25454	8.95e3	89.5	NO
2	2	13C5-PFHxA	1800986-03 K_V Fld Blk 0.25454	1.25e4	89.7	NO
3	3	13C3-PFHxS	1800986-03 K_V Fld Blk 0.25454	2.72e3	94.2	NO
4	4	13C8-PFOA	1800986-03 K_V Fld Blk 0.25454	1.43e4	101.8	NO
5	5	13C9-PFNA	1800986-03 K_V Fld Blk 0.25454	1.47e4	87.3	NO
6	6	13C4-PFOS	1800986-03 K_V Fld Blk 0.25454	2.74e3	94.8	NO
7	7	13C6-PFDA	1800986-03 K_V Fld Blk 0.25454	1.80e4	83.9	NO
8	8	13C7-PFUdA	1800986-03 K_V Fld Blk 0.25454	2.09e4	85.5	NO

Name: 180605M2_106, Date: 06-Jun-2018, Time: 10:59:02, ID: 1800986-04 K & V 0.27397, Description: K & V

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800986-04 K_V 0.27397	9.86e3	98.6	NO
2	2	13C5-PFHxA	1800986-04 K_V 0.27397	1.06e4	75.9	NO
3	3	13C3-PFHxS	1800986-04 K_V 0.27397	2.97e3	103.1	NO
4	4	13C8-PFOA	1800986-04 K_V 0.27397	1.59e4	113.6	NO
5	5	13C9-PFNA	1800986-04 K_V 0.27397	1.59e4	94.0	NO
6	6	13C4-PFOS	1800986-04 K_V 0.27397	2.91e3	100.8	NO
7	7	13C6-PFDA	1800986-04 K_V 0.27397	1.91e4	89.1	NO
8	8	13C7-PFUdA	1800986-04 K_V 0.27397	2.19e4	89.6	NO

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\AREAS.qld

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Name: 180605M2_107, Date: 06-Jun-2018, Time: 11:09:32, ID: 1800990-01 WIRR1805171315JLB 0.24616, Description: WIRR1805171315JLB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800990-01 WIRR1805171315JLB 0.2...	8.35e3	83.5	NO
2	2	13C5-PFHxA	1800990-01 WIRR1805171315JLB 0.2...	1.20e4	86.5	NO
3	3	13C3-PFHxS	1800990-01 WIRR1805171315JLB 0.2...	2.96e3	102.4	NO
4	4	13C8-PFOA	1800990-01 WIRR1805171315JLB 0.2...	1.34e4	95.6	NO
5	5	13C9-PFNA	1800990-01 WIRR1805171315JLB 0.2...	1.55e4	91.8	NO
6	6	13C4-PFOS	1800990-01 WIRR1805171315JLB 0.2...	2.89e3	100.1	NO
7	7	13C6-PFDA	1800990-01 WIRR1805171315JLB 0.2...	1.76e4	82.1	NO
8	8	13C7-PFUdA	1800990-01 WIRR1805171315JLB 0.2...	2.00e4	82.0	NO

Name: 180605M2_108, Date: 06-Jun-2018, Time: 11:19:56, ID: 1800990-02 FB1805171320JLB 0.25861, Description: FB1805171320JLB

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	1800990-02 FB1805171320JLB 0.25861	8.59e3	85.9	NO
2	2	13C5-PFHxA	1800990-02 FB1805171320JLB 0.25861	1.25e4	89.6	NO
3	3	13C3-PFHxS	1800990-02 FB1805171320JLB 0.25861	2.81e3	97.3	NO
4	4	13C8-PFOA	1800990-02 FB1805171320JLB 0.25861	1.49e4	106.4	NO
5	5	13C9-PFNA	1800990-02 FB1805171320JLB 0.25861	1.41e4	83.7	NO
6	6	13C4-PFOS	1800990-02 FB1805171320JLB 0.25861	2.93e3	101.4	NO
7	7	13C6-PFDA	1800990-02 FB1805171320JLB 0.25861	1.90e4	88.8	NO
8	8	13C7-PFUdA	1800990-02 FB1805171320JLB 0.25861	2.24e4	91.8	NO

Name: 180605M2_109, Date: 06-Jun-2018, Time: 11:30:26, ID: IPA, Description: IPA

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	IPA			NO
2	2	13C5-PFHxA	IPA			NO
3	3	13C3-PFHxS	IPA			NO
4	4	13C8-PFOA	IPA			NO
5	5	13C9-PFNA	IPA			NO
6	6	13C4-PFOS	IPA			NO
7	7	13C6-PFDA	IPA			NO
8	8	13C7-PFUdA	IPA			NO

Name: 180605M2_110, Date: 06-Jun-2018, Time: 11:40:57, ID: ST180605M2-16 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	ID	Area	%Rec	Area Out
1	1	13C4-PFBA	ST180605M2-16 PFC CS3 18E2907	1.09e4	108.5	NO
2	2	13C5-PFHxA	ST180605M2-16 PFC CS3 18E2907	1.67e4	119.8	NO
3	3	13C3-PFHxS	ST180605M2-16 PFC CS3 18E2907	3.57e3	123.7	NO
4	4	13C8-PFOA	ST180605M2-16 PFC CS3 18E2907	1.83e4	130.7	NO
5	5	13C9-PFNA	ST180605M2-16 PFC CS3 18E2907	2.22e4	131.3	NO
6	6	13C4-PFOS	ST180605M2-16 PFC CS3 18E2907	3.72e3	128.9	NO
7	7	13C6-PFDA	ST180605M2-16 PFC CS3 18E2907	2.45e4	114.6	NO
8	8	13C7-PFUdA	ST180605M2-16 PFC CS3 18E2907	2.87e4	117.6	NO

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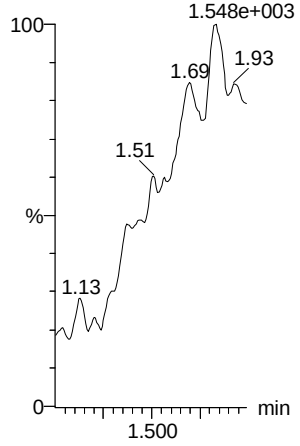
Calibration: Z:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_12, Date: 05-Jun-2018, Time: 18:23:17, ID: IPA, Description: IPA

PFBA



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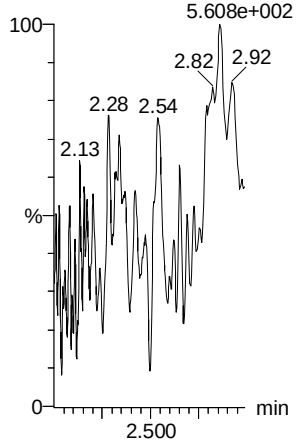

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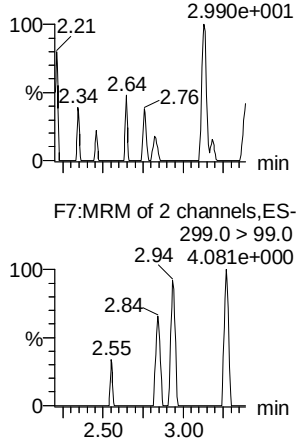

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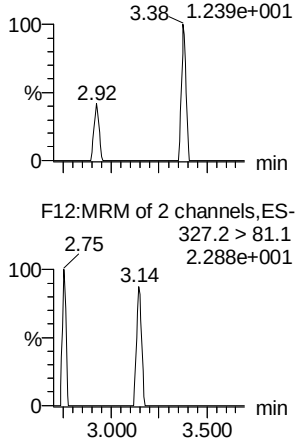

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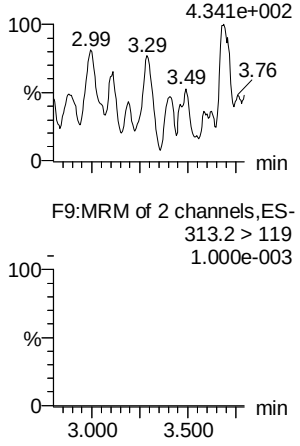

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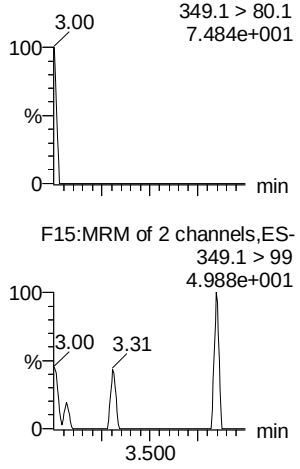

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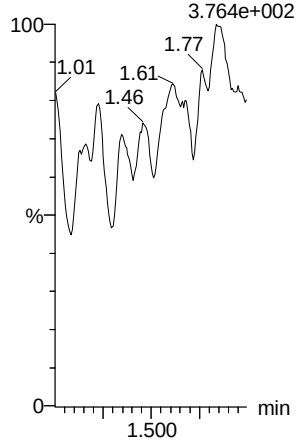

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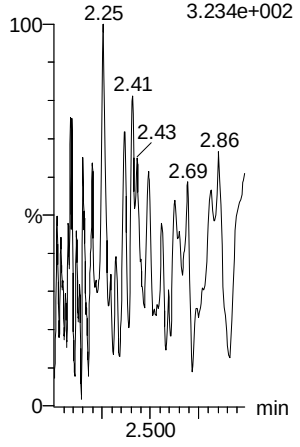

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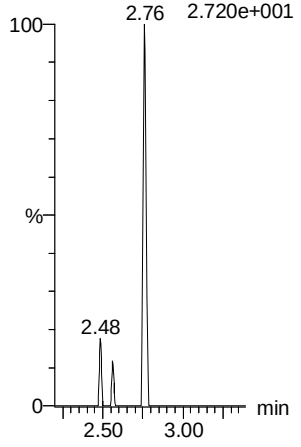

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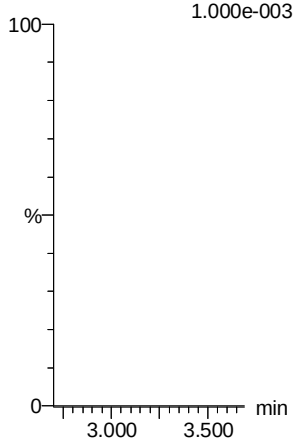

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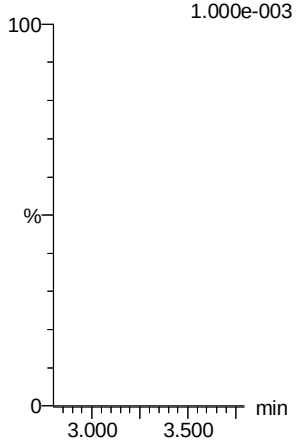
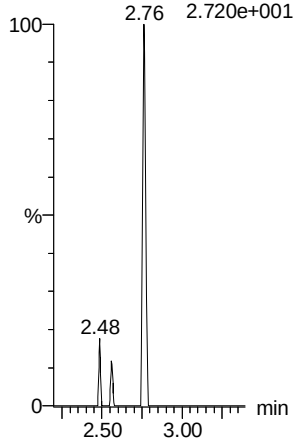


13C3-PFBS



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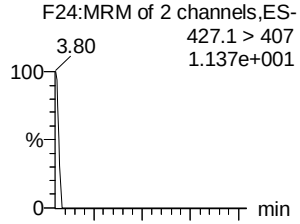
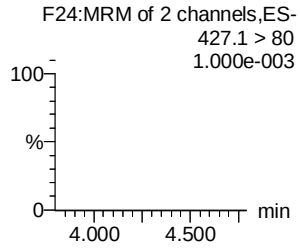
6:2 FTS





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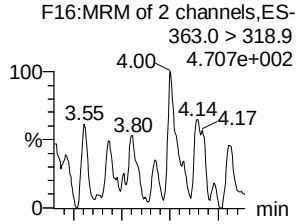

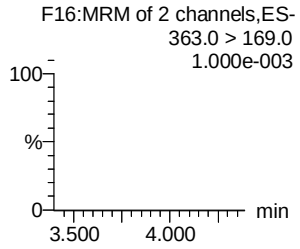

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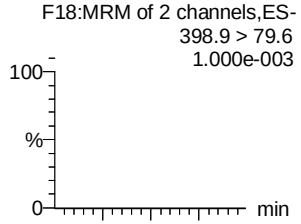

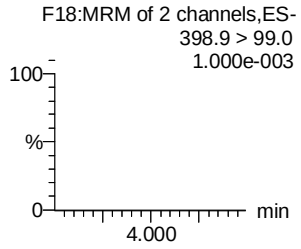

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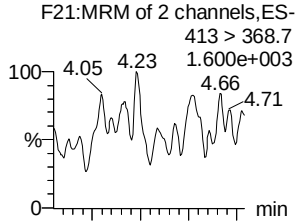

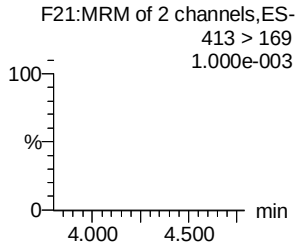

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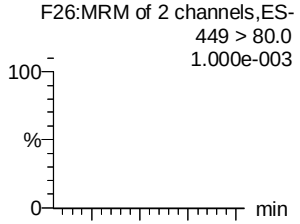

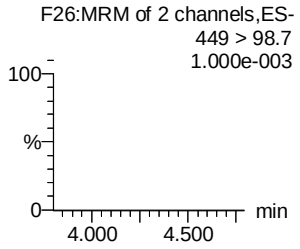

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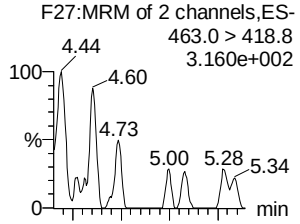

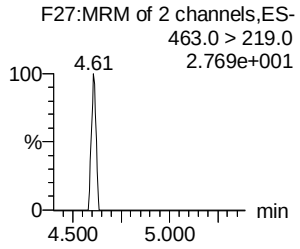

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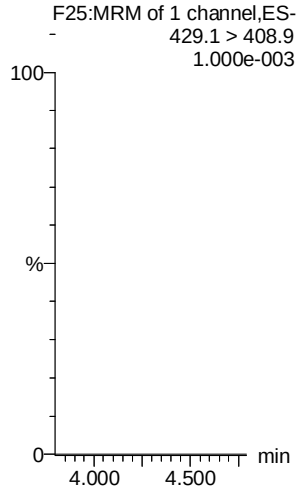
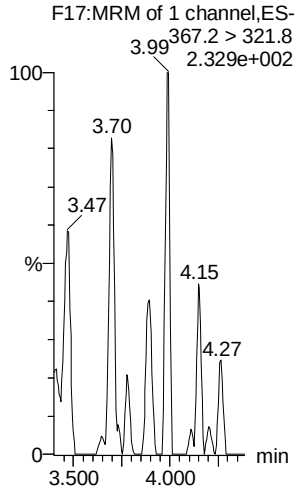


13C4-PFHpA



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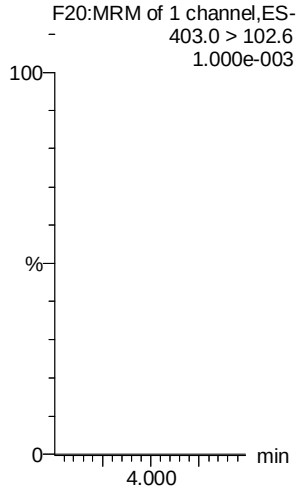

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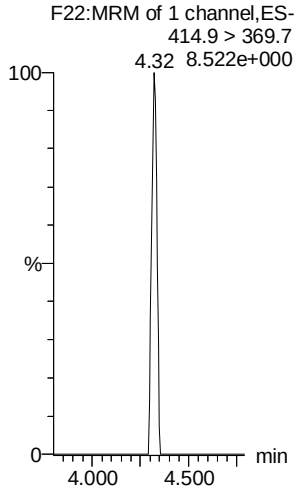

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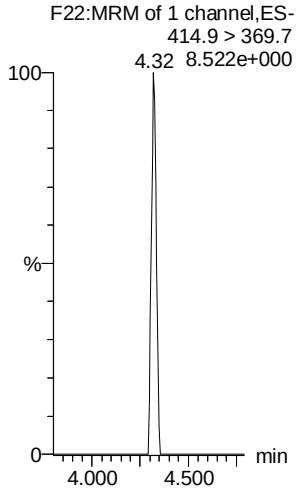

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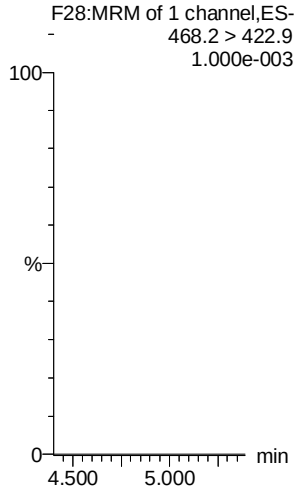

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Name: 180605M2_12, Date: 05-Jun-2018, Time: 18:23:17, ID: IPA, Description: IPA

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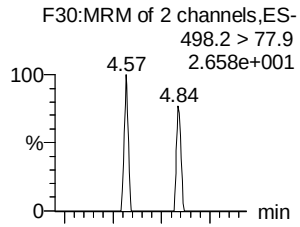

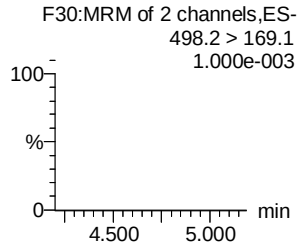

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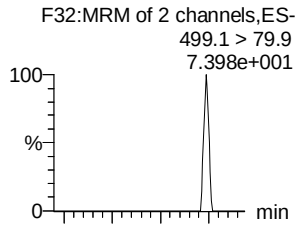

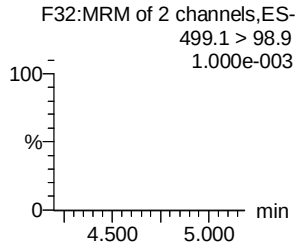

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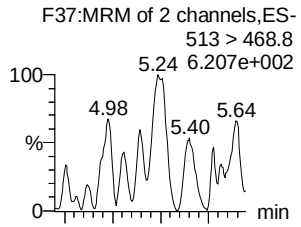
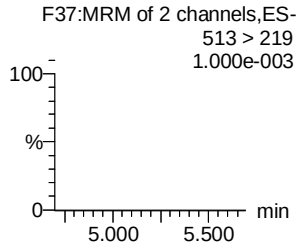
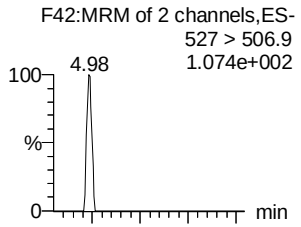
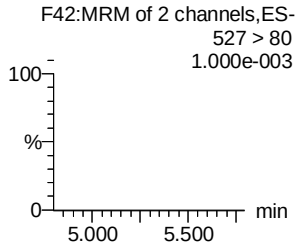




8:2 FTS





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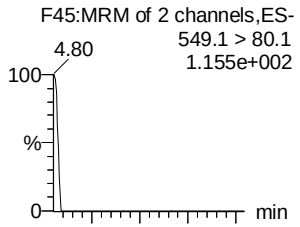

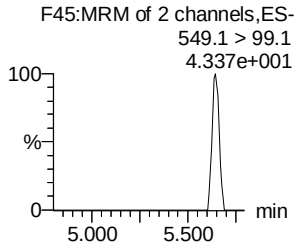

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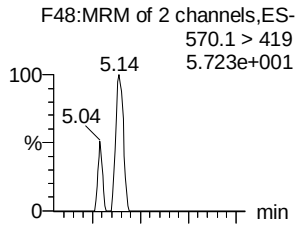

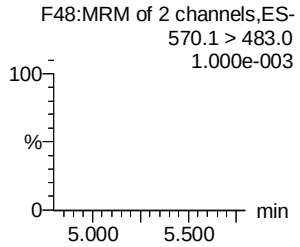

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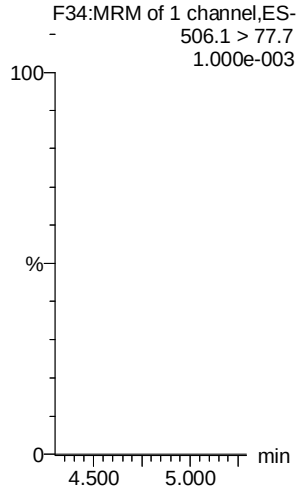

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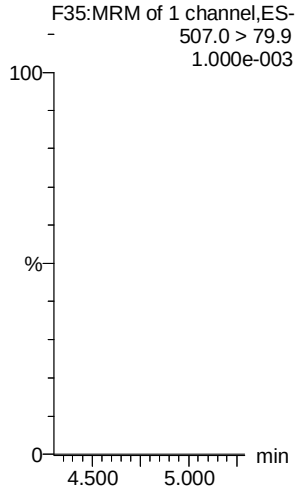

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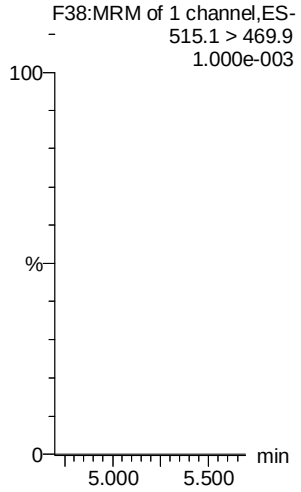
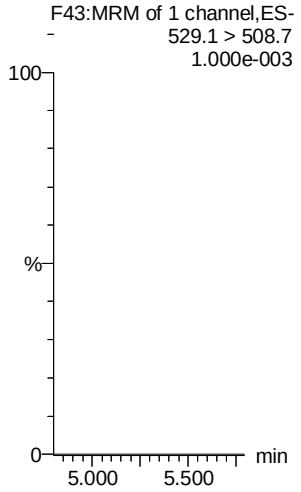


13C2-8:2 FTS



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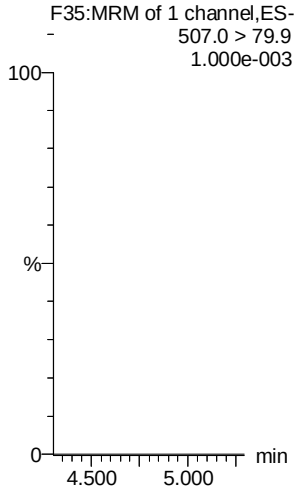

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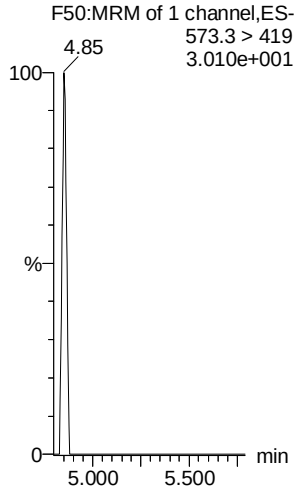

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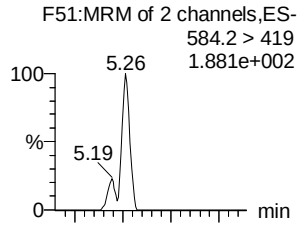

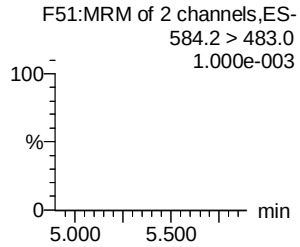

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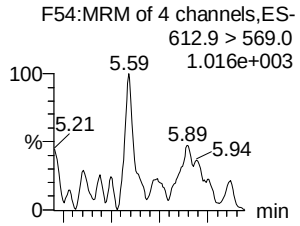

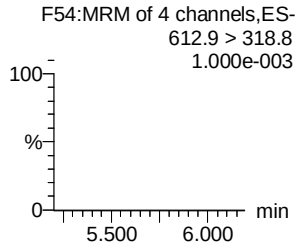

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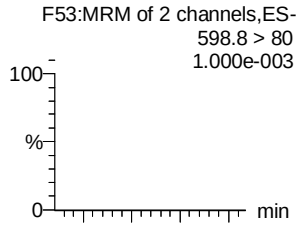

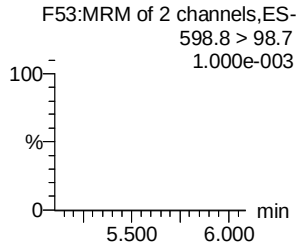

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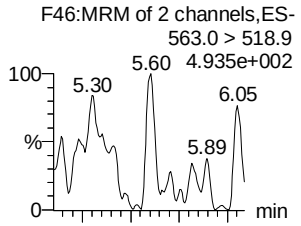

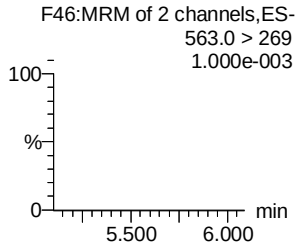

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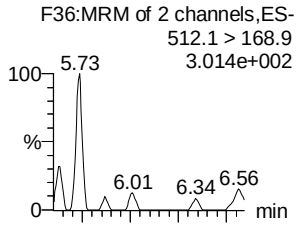

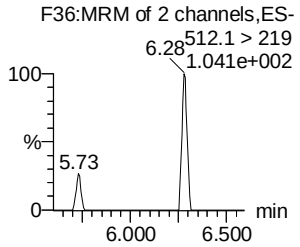

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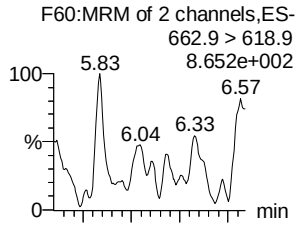

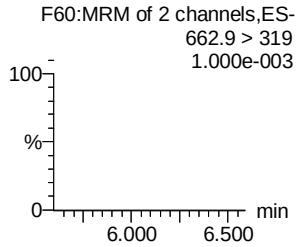

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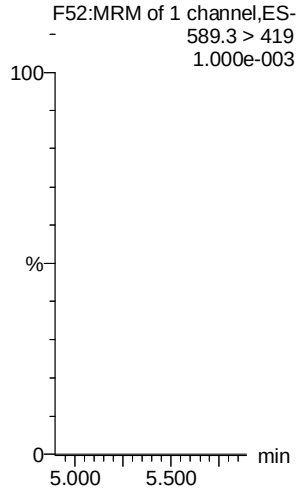

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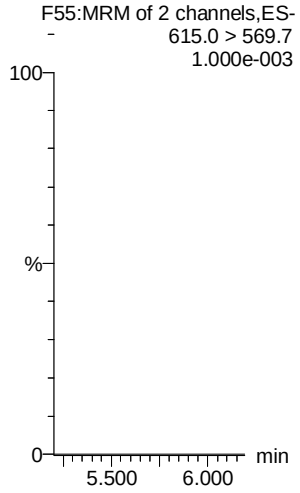

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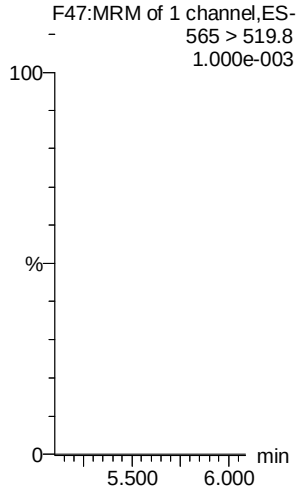

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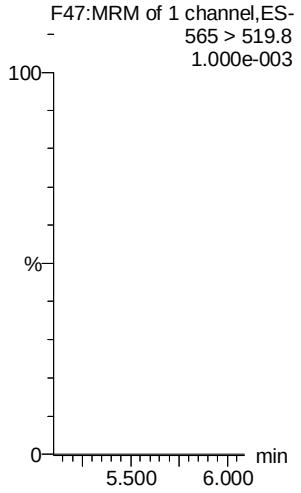

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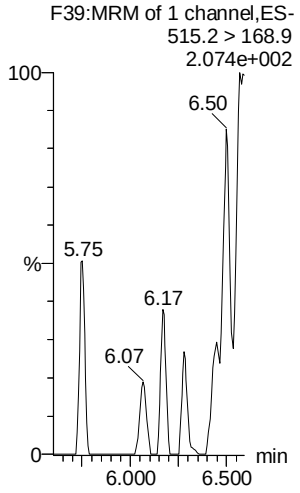

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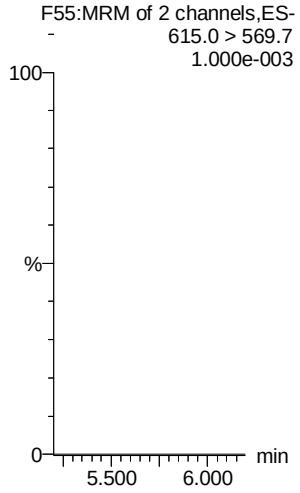

Vista Analytical Laboratory

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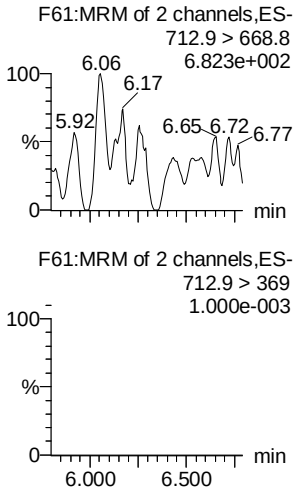
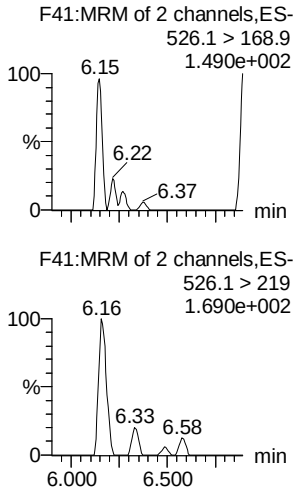
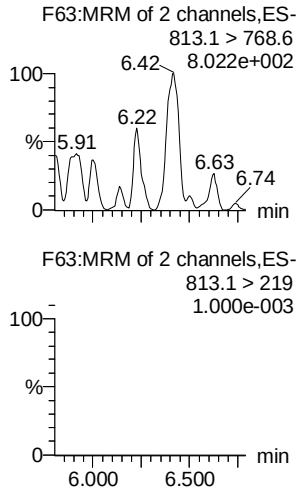


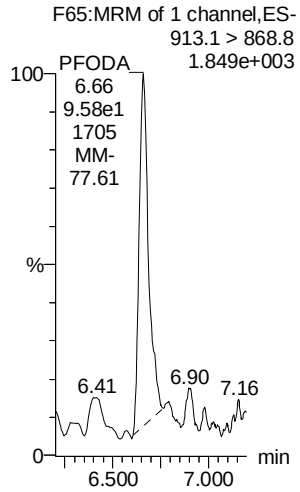
N-EtFOSA



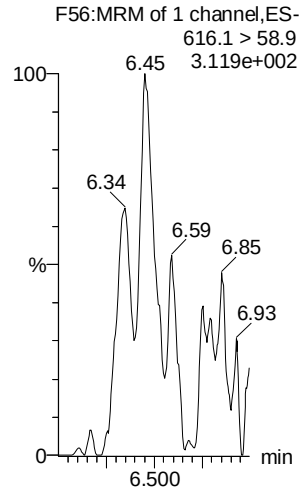
PFHxDA



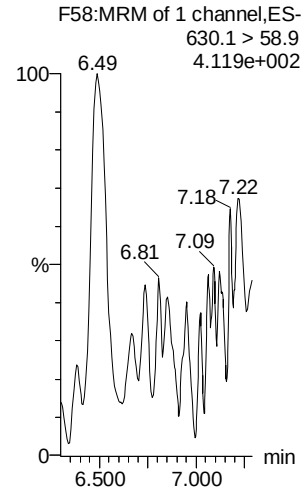
PFODA



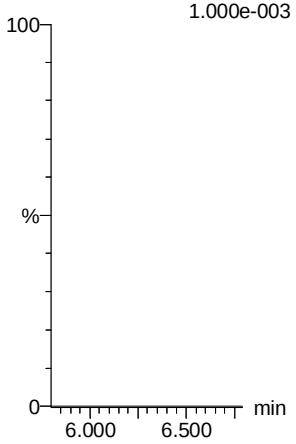
N-MeFOSE



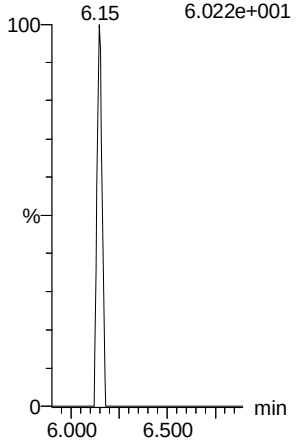
N-EtFOSE



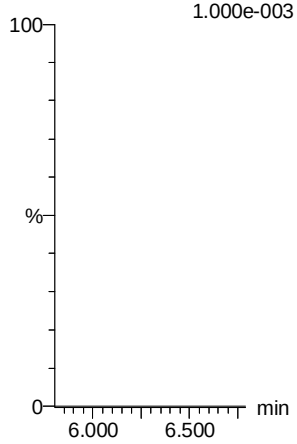
13C2-PFTeDA



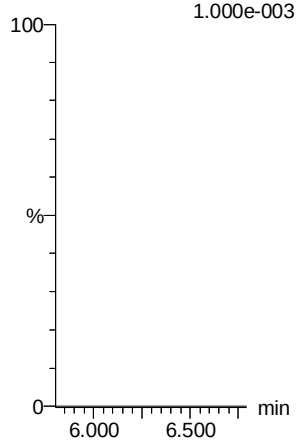
d5-N-ETFOSA



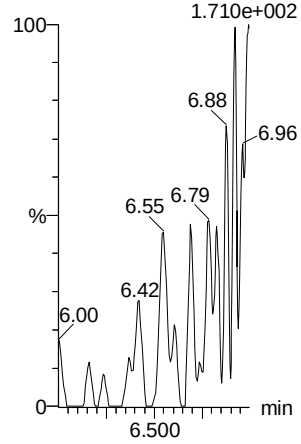
13C2-PFHxDA



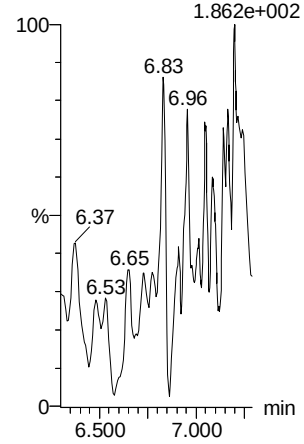
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



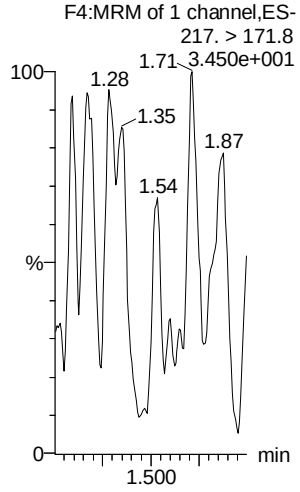
Vista Analytical Laboratory

Dataset: Untitled

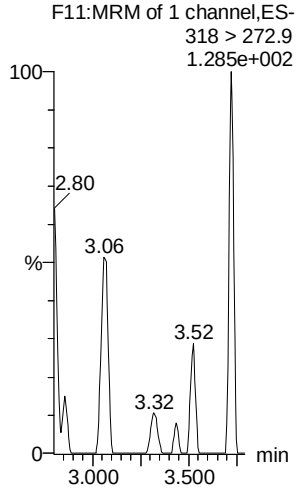
Last Altered: Thursday, June 07, 2018 11:05:46 Pacific Daylight Time
Printed: Thursday, June 07, 2018 11:05:53 Pacific Daylight Time

Name: 180605M2_12, Date: 05-Jun-2018, Time: 18:23:17, ID: IPA, Description: IPA

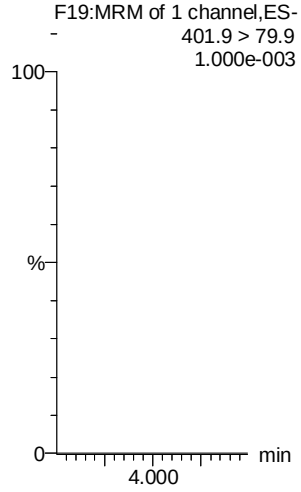
13C4-PFBA



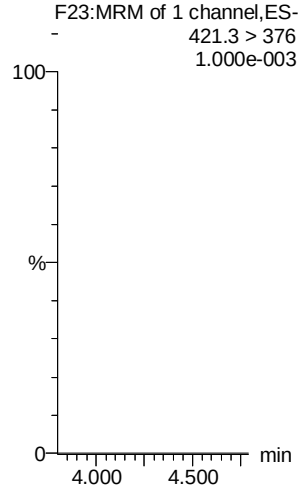
13C5-PFHxA



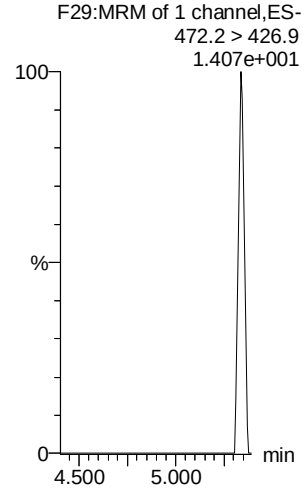
13C3-PFHxS



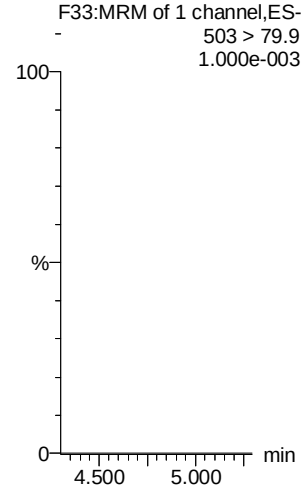
13C8-PFOA



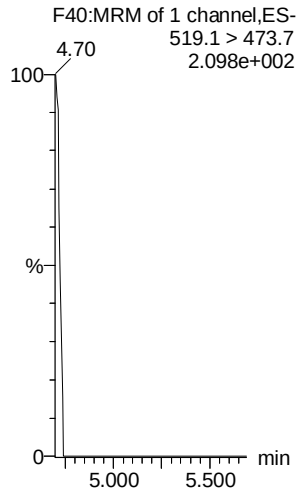
13C9-PFNA



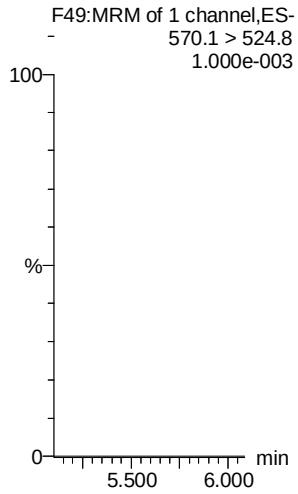
13C4-PFOS



13C6-PFDA



13C7-PFUdA



LC Calibration Standards Review Checklist CCV

		ION Ratio	Concentration	C-Cals Name	Sign Date	Correct I-Cal	Manual Integrations	GM 6/6/18
Calibration ID: STL80605M23	L M H	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -11	L M H	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -12	L M H	☑	☑ (A)	☑	☑	☑	☑	☐
Calibration ID: -13	L M H	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -14	L M H	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -15	L M H	☑	☑	☑	☑	☑	☑	☐
Calibration ID: -16	L M H	☑	☑ (A)	☑	☒	☑	☑	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐
Calibration ID:	L M H	☐	☐	☐	☐	☐	☐	☐

Full Mass Cal. Date: 6/5/18 GM 6/6/18

Run Log Present: ☑

# of Samples per Sequence Checked: ☑

Instrument Blank Saved ☑

IIS Area Saved ☑

Reviewed By: KBF 6/7/18
Initials/Date

Comments:
(A) ~~DFTPP~~ PFTPDA >130%

ID: LR - LCSRC *Rev. No.:* 1 *Rev. Date:* 02/06/2018 *Page:* 1 of 1

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

Last Altered: Wednesday, June 06, 2018 17:12:46 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:12:49 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	1	PFBA	213.0 > 16...	7.84e2	8.88e3		1.36	1.36	1.10	0.991	99.1	NO		
2	2	PFPeA	263.1 > 21...	1.03e3	1.23e4		2.32	2.32	1.04	0.993	99.3	NO		
3	3	PFBS	299.0 > 79.7	2.25e2	1.48e3		2.61	2.61	1.91	0.960	96.0	NO	2.438	NO
4	4	4:2 FTS	327.2>307.2	2.68e2	3.26e3		3.01	3.01	1.03	0.933	93.3	NO	1.485	NO
5	5	PFHxA	313.2 > 26...	1.44e3	4.21e3		3.10	3.10	1.71	1.05	104.8	NO	1569.429	YES
6	6	PFPeS	349.1>80.1	2.15e2	1.48e3		3.30	3.30	1.82	0.967	96.7	NO	2.096	NO
7	7	PFHpA	363.0 > 31...	1.15e3	1.13e4		3.71	3.72	1.27	1.03	103.4	NO	20.867	YES
8	8	L-PFHxS	398.9 > 79.6	2.03e2	1.29e3		3.86	3.86	1.96	1.03	102.6	NO	1.778	NO
9	10	6:2 FTS	427.1 > 407	3.18e2	3.34e3		4.17	4.18	1.19	0.963	96.3	NO	3.036	NO
10	11	L-PFOA	413 > 368.7	1.52e3	1.84e4		4.25	4.23	1.04	1.06	106.3	NO	3.846	NO
11	13	PFHpS	449 > 80.0	2.20e2	1.84e4		4.33	4.34	0.150	0.933	93.3	NO	1.924	NO
12	14	PFNA	463.0 > 41...	1.57e3	1.56e4		4.66	4.66	1.26	0.914	91.4	NO	4.676	NO
13	15	PFOSA	498.2 > 77.9	2.10e2	3.01e3		4.73	4.73	0.872	0.951	95.1	NO		
14	16	L-PFOS	499.1 > 79.9	2.38e2	2.91e3		4.74	4.75	1.02	1.16	116.1	NO	2.350	NO
15	18	PFDA	513 > 468.8	1.79e3	1.82e4		5.03	5.03	1.22	1.10	110.4	NO	5.911	NO
16	19	8:2 FTS	527 > 506.9	3.25e2	3.18e3		5.00	5.00	1.28	0.862	86.2	NO	2.981	NO
17	20	PFNS	549.1>80.1	1.85e2	2.91e3		5.09	5.10	0.796	1.05	104.8	NO	1.404	NO
18	21	L-MeFOSAA	570.1 > 419	5.67e2	4.82e3		5.18	5.18	1.47	0.869	86.9	NO	37.909	YES
19	23	L-EtFOSAA	584.2 > 419	3.81e2	5.95e3		5.37	5.34	0.801	0.749	74.9	NO	122.940	YES

6/6/18
GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	25	PFUdA	563.0 > 51...	1.89e3	2.21e4		5.35	5.35	1.07	1.06	106.4	NO	16.478	YES
2	26	PFDS	598.8 > 80	2.45e2	2.21e4		5.40	5.41	0.139	0.992	99.2	NO	2.705	YES
3	27	PFDoA	612.9 > 56...	2.07e3	2.04e4		5.63	5.63	1.27	1.07	107.5	NO	10.395	NO
4	28	N-MeFOSA	512.1 > 16...	4.19e2	1.24e4		5.82	5.84	5.05	4.80	95.9	NO	1.454	NO
5	29	PFTrDA	662.9 > 61...	2.24e3	2.04e4		5.88	5.88	1.37	1.15	114.9	NO	25.760	NO
6	30	PFTeDA	712.9 > 66...	1.65e3	1.50e4		6.10	6.09	1.37	1.02	101.7	NO	11.476	NO
7	31	N-EtFOSA	526.1 > 16...	5.67e2	1.79e4		6.23	6.23	4.75	5.10	102.0	NO	1.551	NO
8	32	PFHxDA	813.1 > 76...	1.17e3	1.00e4		6.43	6.43	0.581	0.896	89.6	NO	26.770	NO
9	33	PFODA	913.1 > 86...	1.38e3	1.00e4		6.67	6.67	0.689	0.796	79.6	NO		
10	34	N-MeFOSE	616.1 > 58.9	3.03e2	1.00e4		6.37	6.37	4.54	4.91	98.1	NO		
11	35	N-EtFOSE	630.1 > 58.9	3.59e2	9.70e3		6.52	6.51	5.55	4.74	94.9	NO		
12	36	13C3-PFBA	216.1 > 17...	8.88e3	1.02e4	0.885	1.34	1.36	10.9	12.3	98.2	NO		
13	37	13C3-PFPeA	266. > 221.8	1.23e4	1.42e4	0.849	2.31	2.32	10.9	12.8	102.3	NO		
14	38	13C3-PFBS	302. > 98.8	1.48e3	1.42e4	0.104	2.60	2.61	1.30	12.5	100.0	NO		
15	39	13C2-4:2 FTS	329.2>308.9	3.26e3	1.42e4	0.248	3.01	3.01	2.87	11.6	92.6	NO		
16	40	13C2-PFHxA	315 > 269.8	4.21e3	1.42e4	0.729	3.09	3.10	3.70	5.07	101.5	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.13e4	1.42e4	0.836	3.71	3.71	9.92	11.9	94.9	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.29e3	2.82e3	0.443	3.86	3.86	5.72	12.9	103.4	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	3.34e3	1.69e4	0.249	4.17	4.18	2.47	9.94	79.5	NO		
20	44	13C2-PFOA	414.9 > 36...	1.84e4	1.69e4	1.332	4.23	4.23	13.6	10.2	81.8	NO		
21	45	13C5-PFNA	468.2 > 42...	1.56e4	1.74e4	0.951	4.66	4.67	11.2	11.8	94.1	NO		
22	46	13C8-PFOSA	506.1 > 77.7	3.01e3	2.25e4	0.140	4.73	4.74	1.68	12.0	96.1	NO		
23	47	13C8-PFOS	507.0 > 79.9	2.91e3	2.97e3	1.060	4.74	4.75	12.2	11.5	92.4	NO		
24	48	13C2-PFDA	515.1 > 46...	1.82e4	2.04e4	1.130	5.03	5.03	11.2	9.90	79.2	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.18e3	1.42e4	0.217	5.00	5.00	2.79	12.9	102.8	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	4.82e3	2.25e4	0.184	5.18	5.19	2.68	14.6	116.9	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	5.95e3	2.25e4	0.223	5.34	5.34	3.31	14.8	118.7	NO		
28	52	13C2-PFUdA	565 > 519.8	2.21e4	2.25e4	0.936	5.35	5.35	12.3	13.1	104.8	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.04e4	2.04e4	1.168	5.63	5.63	12.5	10.7	85.6	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.24e4	2.25e4	0.051	5.85	5.86	6.92	135	90.1	NO		
31	55	13C2-PFTeDA	714.8 > 66...	1.50e4	2.25e4	0.706	6.09	6.09	8.35	11.8	94.6	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	1.79e4	2.25e4	0.071	6.24	6.24	9.97	140	93.3	NO		

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
33	57	13C2-PFHxDA	815 > 769.7	1.00e4	2.25e4	1.079	6.43	6.43	5.58	5.17	103.4	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.00e4	2.25e4	0.041	6.37	6.36	5.57	135	90.1	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	9.70e3	2.25e4	0.038	6.51	6.51	5.40	141	93.9	NO		
36	60	13C4-PFBA	217. > 171.8	1.02e4	1.02e4	1.000	1.35	1.36	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.42e4	1.42e4	1.000	3.09	3.10	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	2.82e3	2.82e3	1.000	3.86	3.86	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	1.69e4	1.69e4	1.000	4.23	4.23	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	1.74e4	1.74e4	1.000	4.66	4.67	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	2.97e3	2.97e3	1.000	4.74	4.75	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.04e4	2.04e4	1.000	5.03	5.03	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.25e4	2.25e4	1.000	5.35	5.35	12.5	12.5	100.0	NO		

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180605M2_1	IPA	05-Jun-18	16:28:10
2	2	180605M2_2	ST180605M2-1 PFC CS-2 18E2902	05-Jun-18	16:38:43
3	3	180605M2_3	ST180605M2-2 PFC CS-1 18E2903	05-Jun-18	16:49:08
4	4	180605M2_4	ST180605M2-3 PFC CS0 18E2904 *	05-Jun-18	16:59:39
5	5	180605M2_5	ST180605M2-4 PFC CS1 18E2905	05-Jun-18	17:10:04
6	6	180605M2_6	ST180605M2-5 PFC CS2 18E2906	05-Jun-18	17:20:34
7	7	180605M2_7	ST180605M2-6 PFC CS3 18E2907	05-Jun-18	17:30:59
8	8	180605M2_8	ST180605M2-7 PFC CS4 18E2908	05-Jun-18	17:41:30
9	9	180605M2_9	ST180605M2-8 PFC CS5 18E2909	05-Jun-18	17:52:00
10	10	180605M2_10	ST180605M2-9 PFC CS6 18E2910	05-Jun-18	18:02:25
11	11	180605M2_11	ST180605M2-10 PFC CS7 18E2911	05-Jun-18	18:12:47
12	12	180605M2_12	IPA	05-Jun-18	18:23:17
13	13	180605M2_13	ICV180605M2-1 PFC 537 ICV 18E2901	05-Jun-18	18:33:43
14	14	180605M2_14	IPA	05-Jun-18	18:44:13
15	15	180605M2_15	B8E0097-BS1 OPR 0.25	05-Jun-18	18:54:40
16	16	180605M2_16	B8E0097-BSD1 LCSD 0.25	05-Jun-18	19:05:08
17	17	180605M2_17	B8E0097-BLK1 Method Blank 0.25	05-Jun-18	19:15:33
18	18	180605M2_18	1800863-01 Bemidji Pilot APR2 lead 0.2...	05-Jun-18	19:26:03
19	19	180605M2_19	1800863-02 Bemidji Pilot PSR2 + 0.26433	05-Jun-18	19:36:27
20	20	180605M2_20	1800863-03 Bemidji Pilot INF 0.26399	05-Jun-18	19:46:57
21	21	180605M2_21	1800901-01 ACT Sample -16 0.23838	05-Jun-18	19:57:21
22	22	180605M2_22	1800901-02 ACT Sample -19 0.23487	05-Jun-18	20:07:52
23	23	180605M2_23	1801071-02 A1-MW-55-SA1 0.11428	05-Jun-18	20:18:16
24	24	180605M2_24	1801071-03 A1-MW-23-SA1 0.11436	05-Jun-18	20:28:47
25	25	180605M2_25	1801071-04 A1-MW-07-SA1 0.11908	05-Jun-18	20:39:12
26	26	180605M2_26	1801039-01 A1-MW-13-SA1 0.10967	05-Jun-18	20:49:42
27	27	180605M2_27	1801039-02 A1-MW-11-SA1 0.11624	05-Jun-18	21:00:07
28	28	180605M2_28	1801039-03 A1-MW-14-SA1 0.11194	05-Jun-18	21:10:37
29	29	180605M2_29	1801039-04 A1-MW-15-SA1 0.11248	05-Jun-18	21:21:07
30	30	180605M2_30	IPA	05-Jun-18	21:31:32
31	31	180605M2_31	ST180605M2-11 PFC CS3 18E2907	05-Jun-18	21:42:02
32	32	180605M2_32	IPA	05-Jun-18	21:52:27

(R) aver 10 samples. All calcs

*CS0 fell in with previous calibration; curve not used KBF 6/8/18

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Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
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Compound name: PFBA

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33	33	180605M2_33	1801039-07 A1-MW-25-SA1 0.11252	05-Jun-18	22:02:57
34	34	180605M2_34	1801024-01 A1-MW-51-SA1 0.11961	05-Jun-18	22:13:21
35	35	180605M2_35	1801024-02 A1-MW-50-SA1 0.12082	05-Jun-18	22:23:52
36	36	180605M2_36	1801024-05 A1-MW-04-SA1 0.12315	05-Jun-18	22:34:22
37	37	180605M2_37	B8E0078-BS1 OPR 0.125	05-Jun-18	22:44:46
38	38	180605M2_38	B8E0078-BSD1 LCSD 0.125	05-Jun-18	22:55:16
39	39	180605M2_39	B8E0078-BLK1 Method Blank 0.125	05-Jun-18	23:05:40
40	40	180605M2_40	1800862-01 REEPDW451FRB 0.11732	05-Jun-18	23:16:11
41	41	180605M2_41	1800862-02 REEPDW452FRB 0.11393	05-Jun-18	23:26:35
42	42	180605M2_42	1800862-03 REEPDW453FRB 0.11381	05-Jun-18	23:37:05
43	43	180605M2_43	1800862-04 REEPDW454FRB 0.11483	05-Jun-18	23:47:29
44	44	180605M2_44	1800862-05 REEPDW456FRB 0.1202	05-Jun-18	23:58:00
45	45	180605M2_45	1800862-06 REEPDW446FRB 0.11919	06-Jun-18	00:08:25
46	46	180605M2_46	1800862-07 REEPDW455FRB 0.12259	06-Jun-18	00:18:55
47	47	180605M2_47	1800862-08 REEPDW447FRB 0.11683	06-Jun-18	00:29:20
48	48	180605M2_48	1800862-09 REEPDW448FRB 0.12114	06-Jun-18	00:39:51
49	49	180605M2_49	1800862-10 REEPDW449FRB 0.11798	06-Jun-18	00:50:16
50	50	180605M2_50	1800862-11 REEPDW450FRB 0.12118	06-Jun-18	01:00:38
51	51	180605M2_51	1800862-12 REEPDW457FRB 0.12446	06-Jun-18	01:11:08
52	52	180605M2_52	1800862-13 REEPDW459FRB 0.12147	06-Jun-18	01:21:33
53	53	180605M2_53	1800862-14 REEPDW458FRB 0.11703	06-Jun-18	01:32:03
54	54	180605M2_54	1800862-15 REEPDW460FRB 0.11944	06-Jun-18	01:42:28
55	55	180605M2_55	B8E0244-BS1 OPR 0.125	06-Jun-18	01:52:59
56	56	180605M2_56	B8E0244-BLK1 Method Blank 0.125	06-Jun-18	02:03:23
57	57	180605M2_57	B8E0244-MS1 Matrix Spike 0.11028	06-Jun-18	02:13:53
58	58	180605M2_58	B8E0244-MSD1 Matrix Spike Dup 0.113...	06-Jun-18	02:24:17
59	59	180605M2_59	B8E0244-MS2 Matrix Spike 0.11122	06-Jun-18	02:34:48
60	60	180605M2_60	B8E0244-MSD2 Matrix Spike Dup 0.115...	06-Jun-18	02:45:18
61	61	180605M2_61	1801037-01 A1-MW-18-SA1 0.11265	06-Jun-18	02:55:42
62	62	180605M2_62	1801037-02 16-MW-08-SA1 0.11493	06-Jun-18	03:06:13
63	63	180605M2_63	1801037-03 A1-MW-19-SA1 0.11827	06-Jun-18	03:16:38
64	64	180605M2_64	1801037-04 A1-MW-37-SA1 0.11915	06-Jun-18	03:27:09
65	65	180605M2_65	1801037-05 A1-MW-37-SA1D 0.11595	06-Jun-18	03:37:33
66	66	180605M2_66	1801037-06 16-H5-03-SA1 0.12456	06-Jun-18	03:48:03
67	67	180605M2_67	IPA	06-Jun-18	03:58:29
68	68	180605M2_68	ST180605M2-12 PFC CS3 18E2907	06-Jun-18	04:08:59

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Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
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Compound name: PFBA

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69	69	180605M2_69	ST180605M2-13 PFC CS0 18E2904	06-Jun-18	04:19:24
70	70	180605M2_70	IPA	06-Jun-18	04:29:54
71	71	180605M2_71	1801037-07 16-MW-09-SA1 0.1148	06-Jun-18	04:40:20
72	72	180605M2_72	1801037-08 16-MW-06-5A1 0.11143	06-Jun-18	04:50:50
73	73	180605M2_73	1801037-09 FRB-20180523 0.11719	06-Jun-18	05:01:15
74	74	180605M2_74	1801054-01 A1-MW-42-SA1 0.11279	06-Jun-18	05:11:45
75	75	180605M2_75	1801054-02 A1-MW-54-SA1 0.11211	06-Jun-18	05:22:09
76	76	180605M2_76	1801054-03 A1-MW-53-SA1 0.1139	06-Jun-18	05:32:40
77	77	180605M2_77	1801054-04 A1-P2-19-SA1 0.11736	06-Jun-18	05:43:10
78	78	180605M2_78	1801054-05 A1-MW-52-SA1 0.11509	06-Jun-18	05:53:35
79	79	180605M2_79	1801054-06 A1-MW-01-SA1 0.1102	06-Jun-18	06:04:05
80	80	180605M2_80	1801054-07 A1-MW-01-SA1D 0.11715	06-Jun-18	06:14:31
81	81	180605M2_81	IPA	06-Jun-18	06:25:01
82	82	180605M2_82	ST180605M2-14 PFC CS3 18E2907	06-Jun-18	06:35:26
83	83	180605M2_83	IPA	06-Jun-18	06:45:57
84	84	180605M2_84	1801054-08 A1-MW-31-SA1 0.11276	06-Jun-18	06:56:27
85	85	180605M2_85	1801054-09 FRB-20180525 0.11663	06-Jun-18	07:06:52
86	86	180605M2_86	B8E0161-BS1 OPR 0.25	06-Jun-18	07:17:22
87	87	180605M2_87	B8E0161-BLK1 Method Blank 0.25	06-Jun-18	07:27:47
88	88	180605M2_88	1800989-01 KE-RD6954-MW01 0.11761	06-Jun-18	07:38:17
89	89	180605M2_89	1800989-02 KE-BBW-MW01 0.11717	06-Jun-18	07:48:48
90	90	180605M2_90	1800989-03 KE-6954-MW01 0.11556	06-Jun-18	07:59:12
91	91	180605M2_91	1800989-04 KE-APN-MW01 0.11557	06-Jun-18	08:09:43
92	92	180605M2_92	1800989-05 KE-FBA-MW01 0.11631	06-Jun-18	08:20:06
93	93	180605M2_93	1800989-06 KE-FBA-MW01D 0.11705	06-Jun-18	08:30:37
94	94	180605M2_94	1800989-07 KE-NNTA-MW01 0.11356	06-Jun-18	08:41:02
95	95	180605M2_95	1800989-08 KE-6918-MW01 0.11438	06-Jun-18	08:51:32
96	96	180605M2_96	1800989-09 KE-6917-MW01 0.11542	06-Jun-18	09:01:58
97	97	180605M2_97	IPA	06-Jun-18	09:12:28
98	98	180605M2_98	ST180605M2-15 PFC CS3 18E2907	06-Jun-18	09:22:52
99	99	180605M2_99	IPA	06-Jun-18	09:33:23
100	1...	180605M2_100	1800989-10 KE-EB-5-11-18 0.26165	06-Jun-18	09:43:53
101	1...	180605M2_101	1800989-11 KE-FTA-MW01 0.1098	06-Jun-18	09:54:18
102	1...	180605M2_102	1800986-01 FR Fld Blk 0.25955	06-Jun-18	10:04:48
103	1...	180605M2_103	IS SUP TESTER	06-Jun-18	10:27:41
104	1...	180605M2_104	1800986-02 Forest Ridge 0.27675	06-Jun-18	10:38:06

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Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
105	1...	180605M2_105	1800986-03 K_V Fld Blk 0.25454	06-Jun-18	10:48:37
106	1...	180605M2_106	1800986-04 K_V 0.27397	06-Jun-18	10:59:02
107	1...	180605M2_107	1800990-01 WIRR1805171315JLB 0.2...	06-Jun-18	11:09:32
108	1...	180605M2_108	1800990-02 FB1805171320JLB 0.25861	06-Jun-18	11:19:56
109	1...	180605M2_109	IPA	06-Jun-18	11:30:26
110	1...	180605M2_110	ST180605M2-16 PFC CS3 18E2907	06-Jun-18	11:40:57
111	1...	180605M2_111	IPA	06-Jun-18	11:51:21

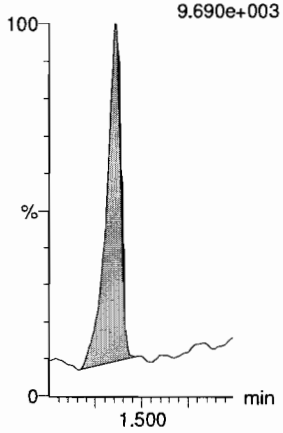
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

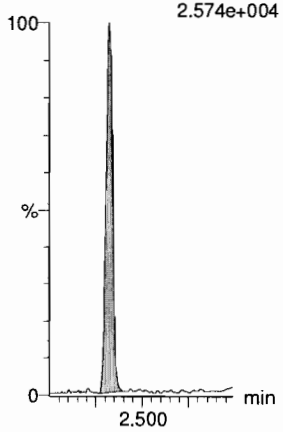
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

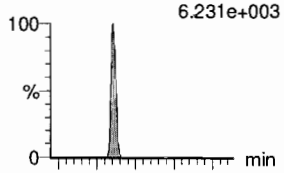
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
9.690e+003



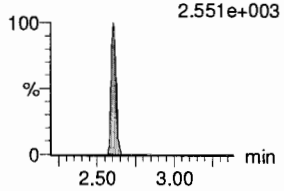
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
2.574e+004



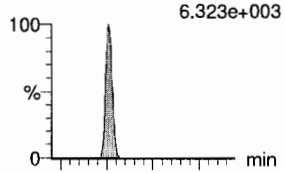
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
6.231e+003



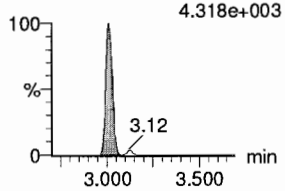
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.551e+003



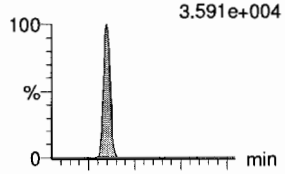
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
6.323e+003



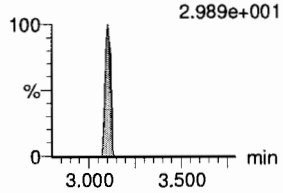
F12:MRM of 2 channels,ES-
327.2 > 81.1
4.318e+003



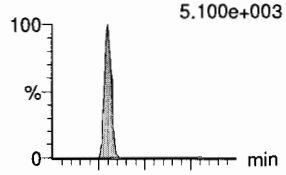
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
3.591e+004



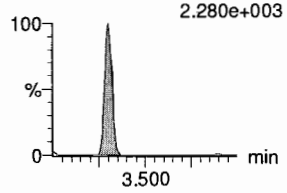
F9:MRM of 2 channels,ES-
313.2 > 119
2.989e+001



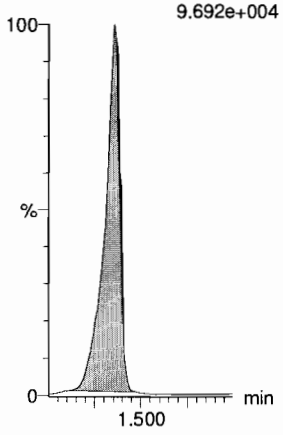
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
5.100e+003



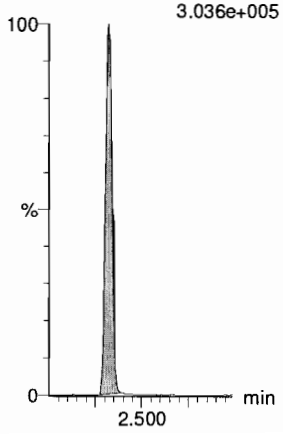
F15:MRM of 2 channels,ES-
349.1 > 99
2.280e+003



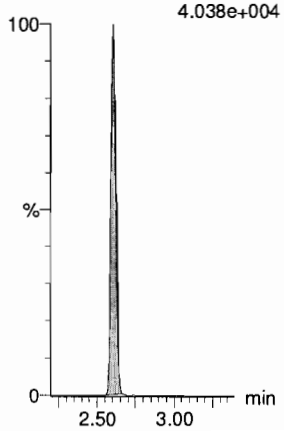
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
9.692e+004



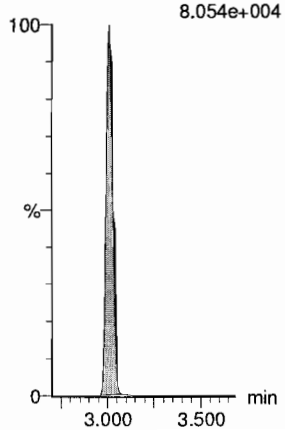
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.036e+005



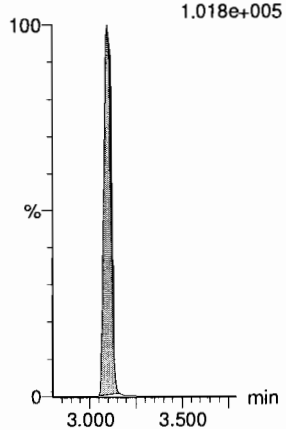
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.038e+004



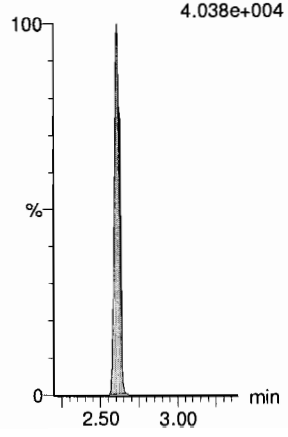
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
8.054e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.018e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.038e+004

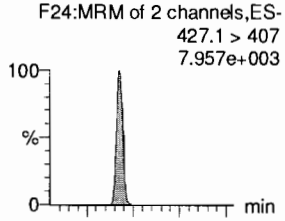


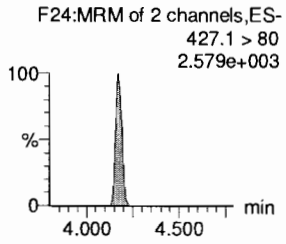
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

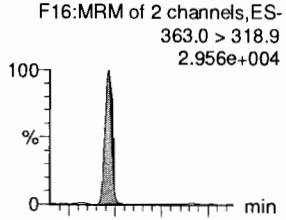
Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

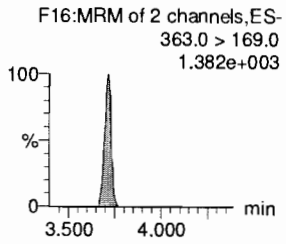
6:2 FTS



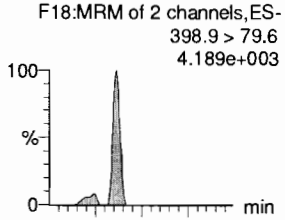


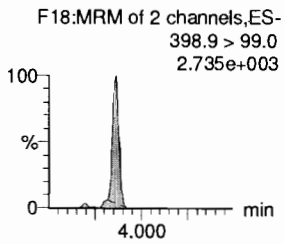
PFHpA





L-PFHxS





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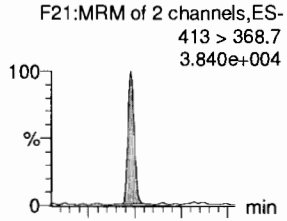

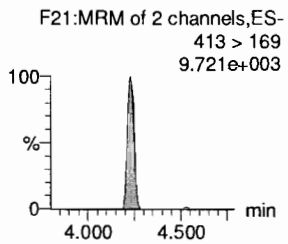

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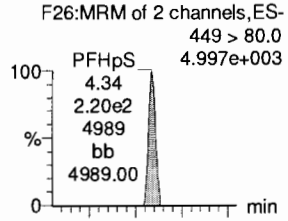

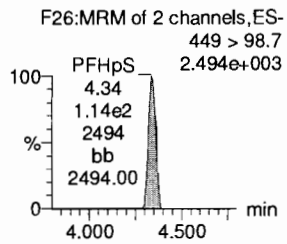

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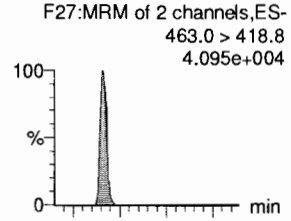
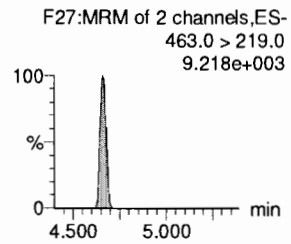
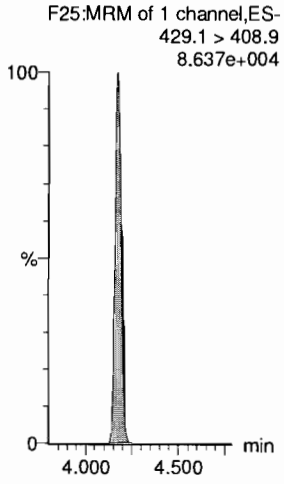
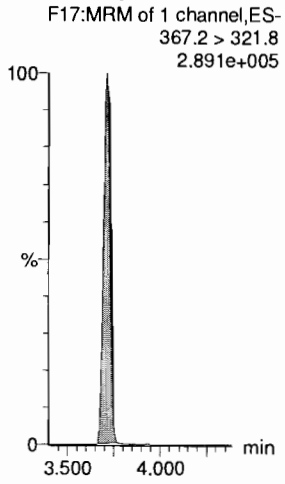




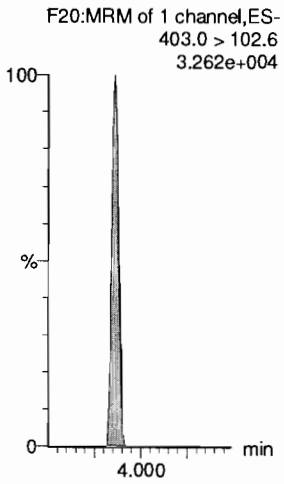
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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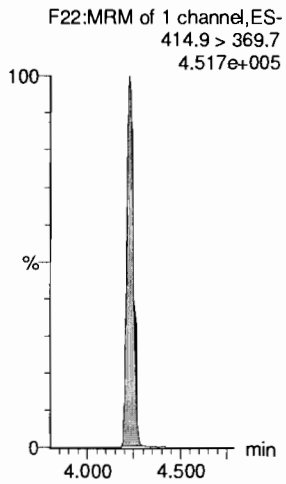

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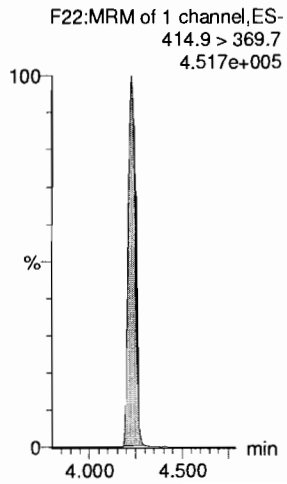
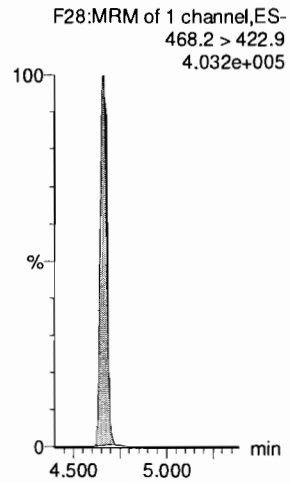


13C5-PFNA



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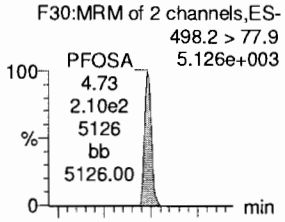
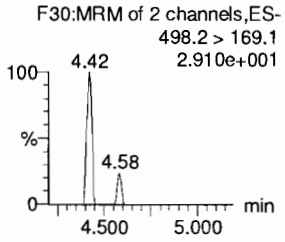
Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

PFOSA





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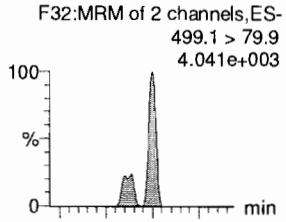

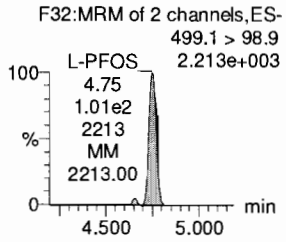

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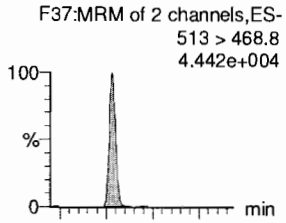
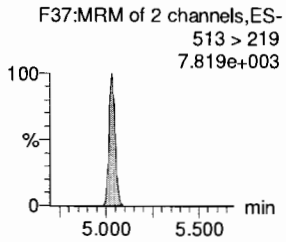
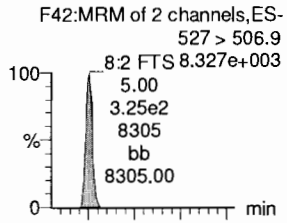
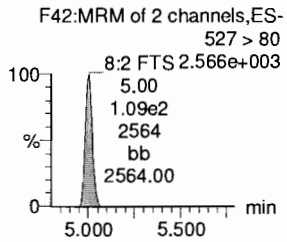




8:2 FTS





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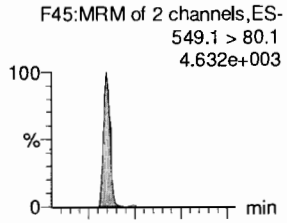

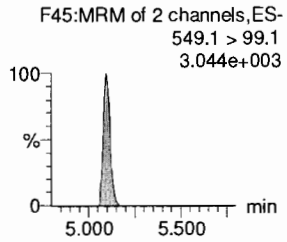

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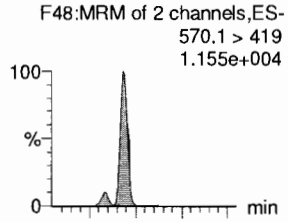

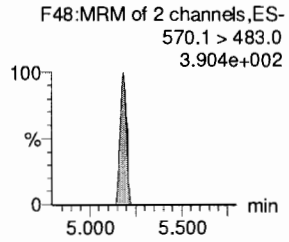

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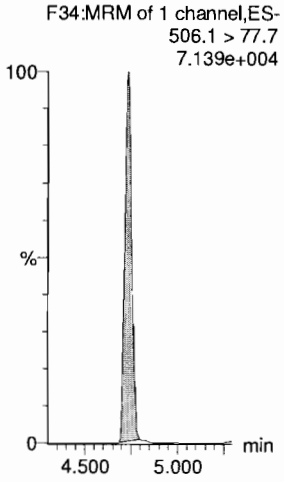
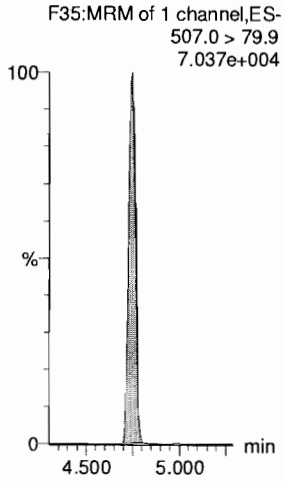
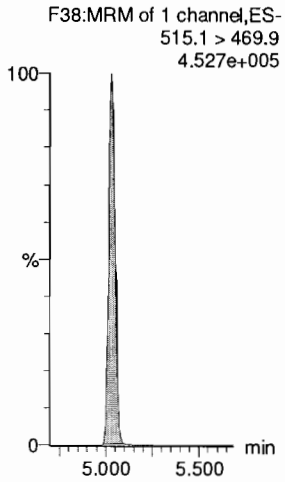


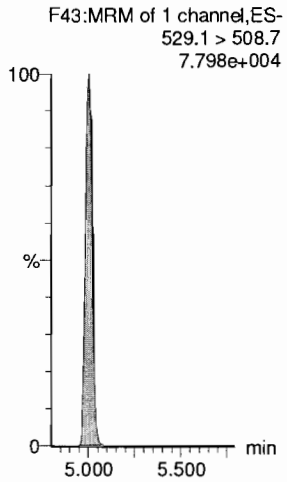
13C8-PFOS



13C2-PFDA



13C2-8:2 FTS



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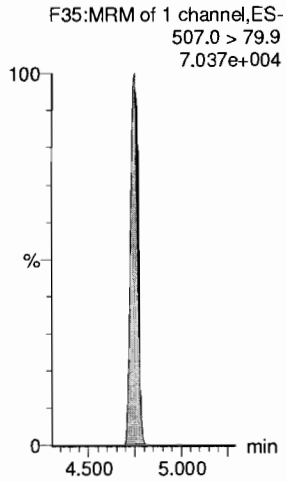
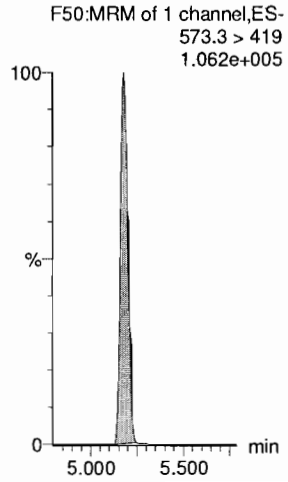


d3-N-MeFOSAA



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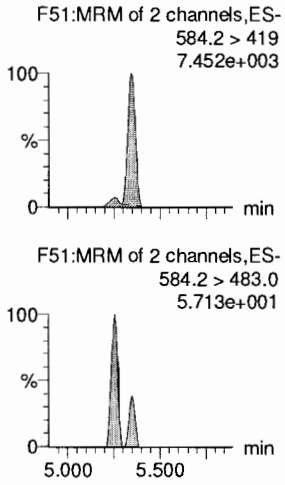
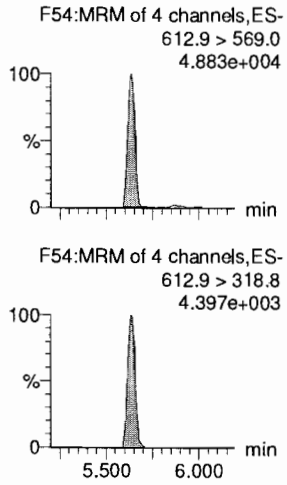
Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

L-EtFOSAA



PFDoA



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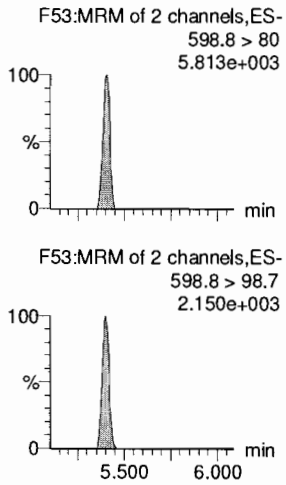

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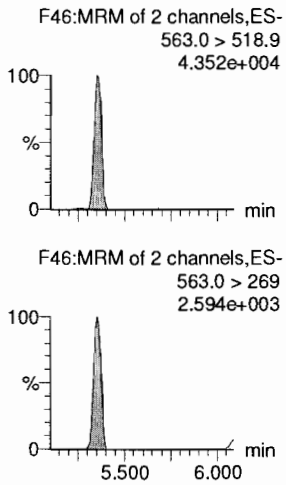

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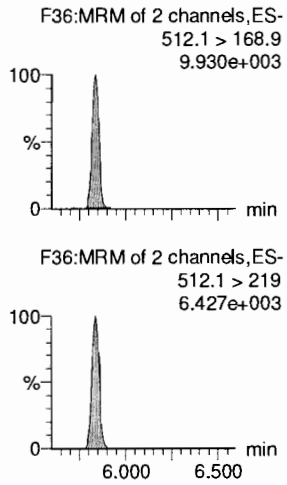
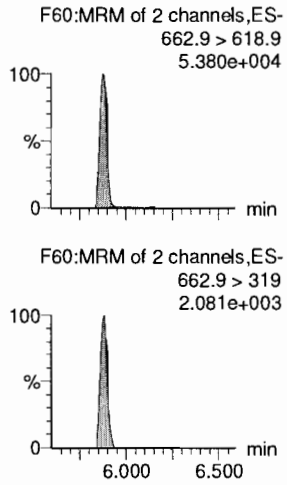
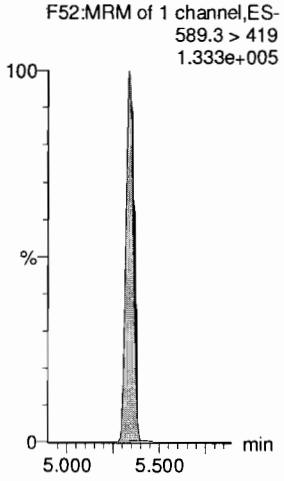


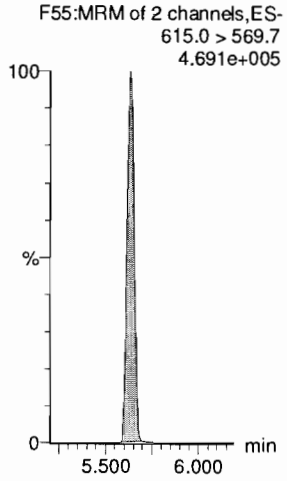
PFTrDA



d5-N-EtFOSAA



13C2-PFDoA



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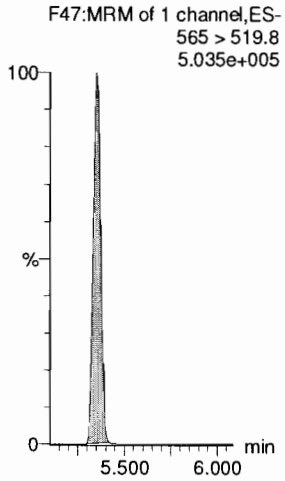

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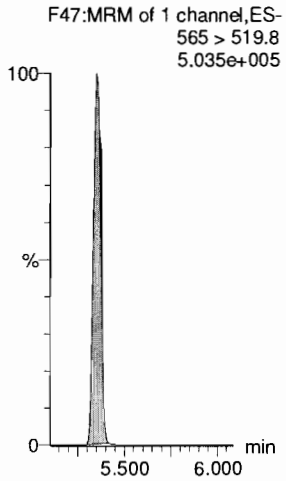

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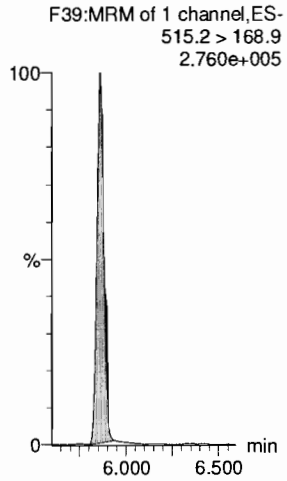

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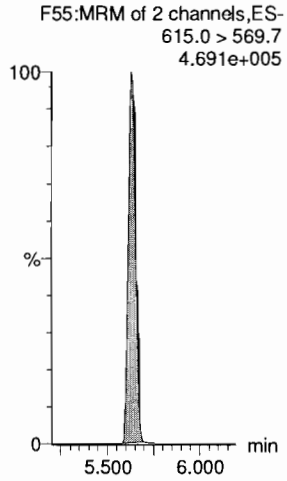

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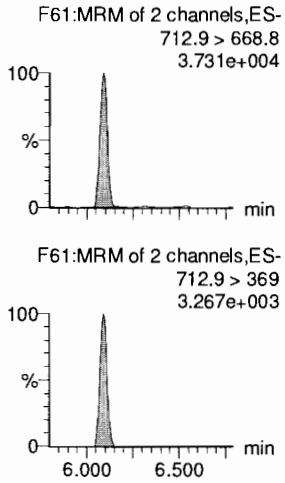
Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

PFTeDA



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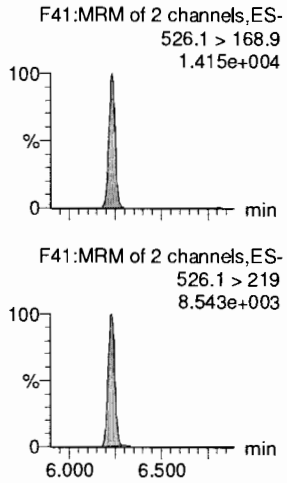
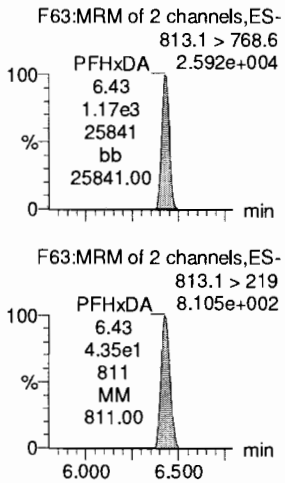


PFHxDA



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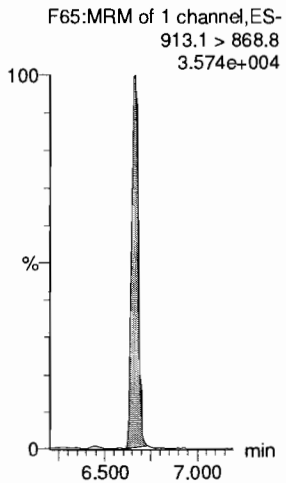

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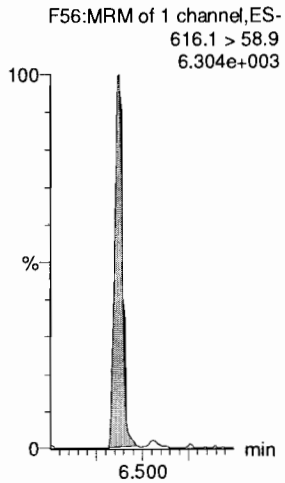

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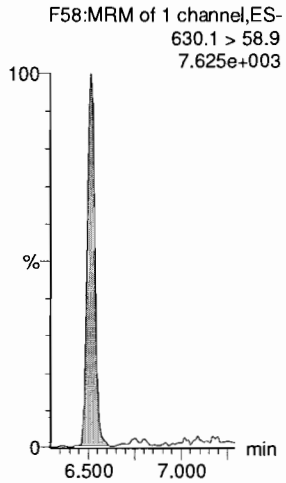

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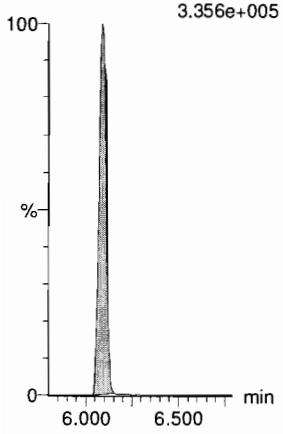

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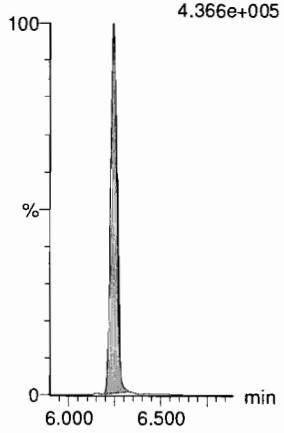
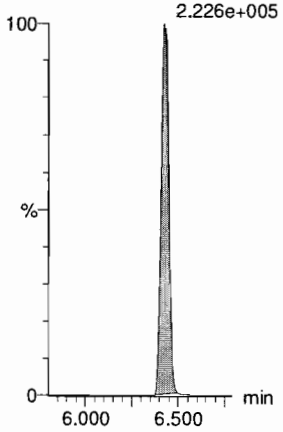
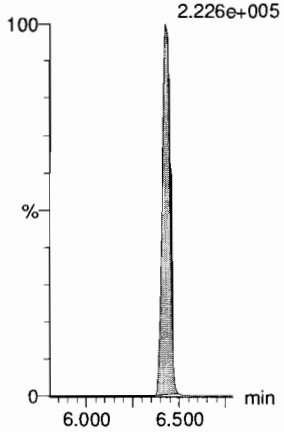


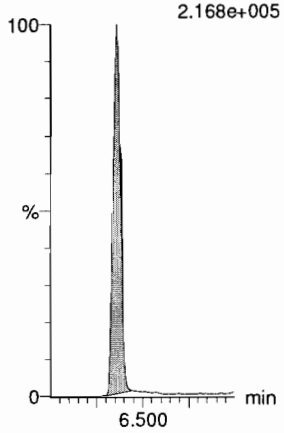
13C2-PFHxDA



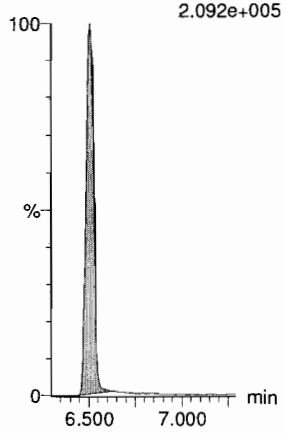
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

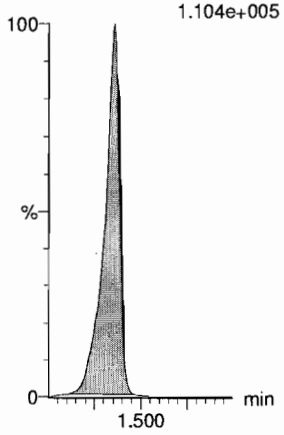


Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-4.qld

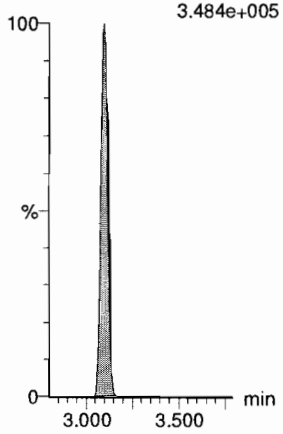
Last Altered: Wednesday, June 06, 2018 17:17:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:17:36 Pacific Daylight Time

Name: 180605M2_4, Date: 05-Jun-2018, Time: 16:59:39, ID: ST180605M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

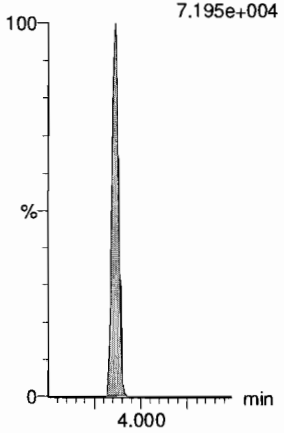
13C4-PFBA



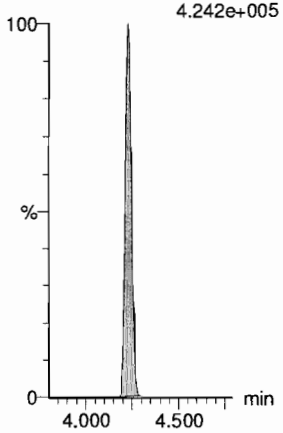
13C5-PFHxA



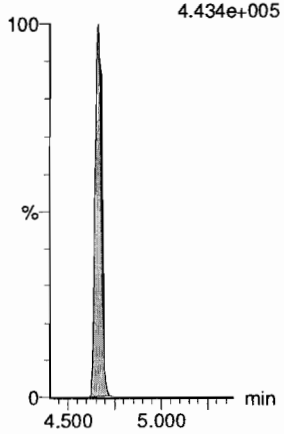
13C3-PFHxS



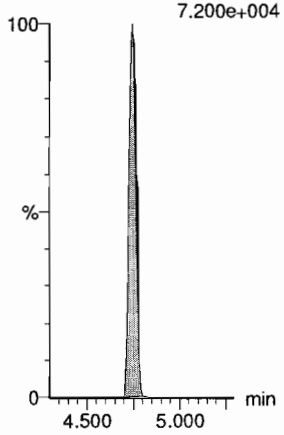
13C8-PFOA



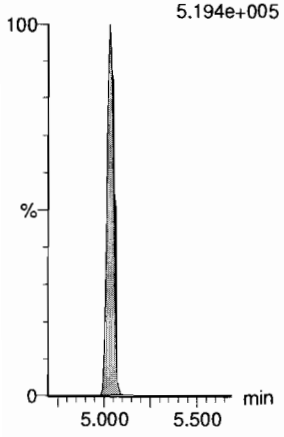
13C9-PFNA



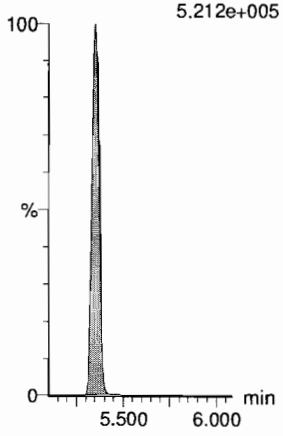
13C4-PFOS



13C6-PFDA



13C7-PFUdA



Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:22 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	1	PFBA	213.0 > 16...	7.45e3	8.01e3		1.31	1.31	11.6	10.5	104.7	NO		
2	2	PFPeA	263.1 > 21...	1.10e4	1.32e4		2.28	2.28	10.4	10.1	101.0	NO		
3	3	PFBS	299.0 > 79.7	2.71e3	1.59e3		2.57	2.57	21.3	10.7	106.9	NO	2.833	NO
4	4	4:2 FTS	327.2>307.2	3.66e3	3.55e3		2.98	2.98	12.9	12.1	120.6	NO	1.945	NO
5	5	PFHxA	313.2 > 26...	1.60e4	4.34e3		3.06	3.06	18.5	11.6	115.8	NO	215.779	NO
6	6	PFPeS	349.1>80.1	2.51e3	1.59e3		3.26	3.26	19.8	10.9	109.4	NO	1.820	NO
7	7	PFHpA	363.0 > 31...	1.21e4	1.20e4		3.67	3.68	12.6	10.8	107.6	NO	12.607	NO
8	8	L-PFHxS	398.9 > 79.6	2.02e3	1.43e3		3.83	3.83	17.7	9.20	92.0	NO	1.700	NO
9	10	6:2 FTS	427.1 > 407	4.00e3	3.52e3		4.17	4.15	14.2	11.5	115.1	NO	3.103	NO
10	11	L-PFOA	413 > 368.7	1.64e4	2.08e4		4.25	4.20	9.86	10.9	109.3	NO	4.101	NO
11	13	PFHpS	449 > 80.0	2.45e3	2.08e4		4.33	4.32	1.47	9.35	93.5	NO	1.816	NO
12	14	PFNA	463.0 > 41...	1.62e4	1.79e4		4.66	4.64	11.3	8.79	87.9	NO	4.289	NO
13	15	PFOSA	498.2 > 77.9	2.62e3	3.50e3		4.73	4.71	9.34	9.84	98.4	NO	33.170	NO
14	16	L-PFOS	499.1 > 79.9	2.58e3	3.53e3		4.74	4.72	9.14	9.84	98.4	NO	1.934	NO
15	18	PFDA	513 > 468.8	2.25e4	2.42e4		5.03	5.01	11.6	11.3	112.5	NO	6.594	NO
16	19	8:2 FTS	527 > 506.9	3.47e3	3.49e3		5.00	4.99	12.4	8.62	86.2	NO	2.686	NO
17	20	PFNS	549.1>80.1	2.35e3	3.53e3		5.09	5.08	8.33	9.97	99.7	NO	1.787	NO
18	21	L-MeFOSAA	570.1 > 419	6.22e3	4.89e3		5.18	5.17	15.9	8.42	84.2	NO	23.046	NO
19	23	L-EtFOSAA	584.2 > 419	4.98e3	6.39e3		5.37	5.33	9.73	8.53	85.3	NO	27.517	NO

√ KBF 6/6/18

GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	25	PFUdA	563.0 > 51...	2.04e4	2.36e4		5.35	5.34	10.8	11.2	111.8	NO	10.558	NO
2	26	PFDS	598.8 > 80	2.66e3	2.36e4		5.40	5.39	1.41	9.78	97.8	NO	2.371	NO
3	27	PFDoA	612.9 > 56...	1.85e4	2.48e4		5.63	5.63	9.34	8.36	83.6	NO	7.041	YES
4	28	N-MeFOSA	512.1 > 16...	5.08e3	1.45e4		5.82	5.79	52.5	50.0	100.0	NO	1.430	NO
5	29	PFTrDA	662.9 > 61...	2.23e4	2.48e4		5.88	5.87	11.3	10.4	103.6	NO	23.759	NO
6	30	PFTeDA	712.9 > 66...	1.87e4	1.99e4		6.10	6.08	11.7	9.03	90.3	NO	13.102	NO
7	31	N-EtFOSA	526.1 > 16...	6.18e3	2.04e4		6.23	6.20	45.4	49.1	98.1	NO	1.561	NO
8	32	PFHxDA	813.1 > 76...	1.34e4	1.02e4		6.43	6.43	6.56	10.8	108.2	NO	27.305	NO
9	33	PFODA	913.1 > 86...	1.54e4	1.02e4		6.67	6.66	7.56	8.51	85.1	NO		
10	34	N-MeFOSE	616.1 > 58.9	3.99e3	1.19e4		6.37	6.37	50.1	50.4	100.8	NO		
11	35	N-EtFOSE	630.1 > 58.9	4.49e3	1.19e4		6.52	6.52	56.7	47.5	95.0	NO		
12	36	13C3-PFBA	216.1 > 17...	8.01e3	9.00e3	0.885	1.34	1.31	11.1	12.6	100.6	NO		
13	37	13C3-PFPeA	266. > 221.8	1.32e4	1.48e4	0.849	2.31	2.28	11.1	13.1	104.6	NO		
14	38	13C3-PFBS	302. > 98.8	1.59e3	1.48e4	0.104	2.60	2.57	1.34	12.9	103.2	NO		
15	39	13C2-4:2 FTS	329.2>308.9	3.55e3	1.48e4	0.248	3.01	2.98	2.99	12.1	96.5	NO		
16	40	13C2-PFHxA	315 > 269.8	4.34e3	1.48e4	0.729	3.09	3.06	3.66	5.02	100.3	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.20e4	1.48e4	0.836	3.71	3.67	10.1	12.1	96.8	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.43e3	3.26e3	0.443	3.86	3.83	5.48	12.4	99.0	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	3.52e3	1.71e4	0.249	4.17	4.15	2.58	10.4	83.0	NO		
20	44	13C2-PFOA	414.9 > 36...	2.08e4	1.71e4	1.332	4.23	4.20	15.2	11.4	91.4	NO		
21	45	13C5-PFNA	468.2 > 42...	1.79e4	1.96e4	0.951	4.66	4.64	11.4	12.0	96.3	NO		
22	46	13C8-PFOSA	506.1 > 77.7	3.50e3	2.67e4	0.140	4.73	4.71	1.64	11.7	93.9	NO		
23	47	13C8-PFOS	507.0 > 79.9	3.53e3	3.25e3	1.060	4.74	4.72	13.6	12.8	102.4	NO		
24	48	13C2-PFDA	515.1 > 46...	2.42e4	2.49e4	1.130	5.03	5.01	12.2	10.8	86.2	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.49e3	1.48e4	0.217	5.00	4.98	2.94	13.5	108.1	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	4.89e3	2.67e4	0.184	5.18	5.17	2.29	12.5	99.7	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	6.39e3	2.67e4	0.223	5.34	5.32	2.99	13.4	107.1	NO		
28	52	13C2-PFUdA	565 > 519.8	2.36e4	2.67e4	0.936	5.35	5.34	11.0	11.8	94.2	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.48e4	2.49e4	1.168	5.63	5.62	12.5	10.7	85.3	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.45e4	2.67e4	0.051	5.85	5.82	6.78	132	88.3	NO		
31	55	13C2-PFTeDA	714.8 > 66...	1.99e4	2.67e4	0.706	6.09	6.09	9.31	13.2	105.5	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	2.04e4	2.67e4	0.071	6.24	6.22	9.54	134	89.3	NO		

GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
33	57	13C2-PFHxDA	815 > 769.7	1.02e4	2.67e4	1.079	6.43	6.43	4.77	4.42	88.4	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.19e4	2.67e4	0.041	6.37	6.36	5.58	135	90.2	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	1.19e4	2.67e4	0.038	6.51	6.50	5.55	145	96.6	NO		
36	60	13C4-PFBA	217. > 171.8	9.00e3	9.00e3	1.000	1.35	1.30	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.48e4	1.48e4	1.000	3.09	3.06	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	3.26e3	3.26e3	1.000	3.86	3.83	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	1.71e4	1.71e4	1.000	4.23	4.20	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	1.96e4	1.96e4	1.000	4.66	4.64	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	3.25e3	3.25e3	1.000	4.74	4.72	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.49e4	2.49e4	1.000	5.03	5.01	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.67e4	2.67e4	1.000	5.35	5.34	12.5	12.5	100.0	NO		

GM 6/6/2018

Quantify Compound Summary Report **MassLynx MassLynx V4.1 SCN945 SCN960**
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180605M2_1	IPA	05-Jun-18	16:28:10
2	2	180605M2_2	ST180605M2-1 PFC CS-2 18E2902	05-Jun-18	16:38:43
3	3	180605M2_3	ST180605M2-2 PFC CS-1 18E2903	05-Jun-18	16:49:08
4	4	180605M2_4	ST180605M2-3 PFC CS0 18E2904 *	05-Jun-18	16:59:39
5	5	180605M2_5	ST180605M2-4 PFC CS1 18E2905	05-Jun-18	17:10:04
6	6	180605M2_6	ST180605M2-5 PFC CS2 18E2906	05-Jun-18	17:20:34
7	7	180605M2_7	ST180605M2-6 PFC CS3 18E2907	05-Jun-18	17:30:59
8	8	180605M2_8	ST180605M2-7 PFC CS4 18E2908	05-Jun-18	17:41:30
9	9	180605M2_9	ST180605M2-8 PFC CS5 18E2909	05-Jun-18	17:52:00
10	10	180605M2_10	ST180605M2-9 PFC CS6 18E2910	05-Jun-18	18:02:25
11	11	180605M2_11	ST180605M2-10 PFC CS7 18E2911	05-Jun-18	18:12:47
12	12	180605M2_12	IPA	05-Jun-18	18:23:17
13	13	180605M2_13	ICV180605M2-1 PFC 537 ICV 18E2901	05-Jun-18	18:33:43
14	14	180605M2_14	IPA	05-Jun-18	18:44:13
15	15	180605M2_15	B8E0097-BS1 OPR 0.25	05-Jun-18	18:54:40
16	16	180605M2_16	B8E0097-BSD1 LCSD 0.25	05-Jun-18	19:05:08
17	17	180605M2_17	B8E0097-BLK1 Method Blank 0.25	05-Jun-18	19:15:33
18	18	180605M2_18	1800863-01 Bemidji Pilot APR2 lead 0.2...	05-Jun-18	19:26:03
19	19	180605M2_19	1800863-02 Bemidji Pilot PSR2 + 0.26433	05-Jun-18	19:36:27
20	20	180605M2_20	1800863-03 Bemidji Pilot INF 0.26399	05-Jun-18	19:46:57
21	21	180605M2_21	1800901-01 ACT Sample -16 0.23838	05-Jun-18	19:57:21
22	22	180605M2_22	1800901-02 ACT Sample -19 0.23487	05-Jun-18	20:07:52
23	23	180605M2_23	1801071-02 A1-MW-55-SA1 0.11428	05-Jun-18	20:18:16
24	24	180605M2_24	1801071-03 A1-MW-23-SA1 0.11436	05-Jun-18	20:28:47
25	25	180605M2_25	1801071-04 A1-MW-07-SA1 0.11908	05-Jun-18	20:39:12
26	26	180605M2_26	1801039-01 A1-MW-13-SA1 0.10967	05-Jun-18	20:49:42
27	27	180605M2_27	1801039-02 A1-MW-11-SA1 0.11624	05-Jun-18	21:00:07
28	28	180605M2_28	1801039-03 A1-MW-14-SA1 0.11194	05-Jun-18	21:10:37
29	29	180605M2_29	1801039-04 A1-MW-15-SA1 0.11248	05-Jun-18	21:21:07
30	30	180605M2_30	IPA	05-Jun-18	21:31:32
31	31	180605M2_31	ST180605M2-11 PFC CS3 18E2907	05-Jun-18	21:42:02
32	32	180605M2_32	IPA	05-Jun-18	21:52:27

(R) over 10 samples. Can calculate

*CS0 fell in with previous calibration; curve not used KBF 6/8/18

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
33	33	180605M2_33	1801039-07 A1-MW-25-SA1 0.11252	05-Jun-18	22:02:57
34	34	180605M2_34	1801024-01 A1-MW-51-SA1 0.11961	05-Jun-18	22:13:21
35	35	180605M2_35	1801024-02 A1-MW-50-SA1 0.12082	05-Jun-18	22:23:52
36	36	180605M2_36	1801024-05 A1-MW-04-SA1 0.12315	05-Jun-18	22:34:22
37	37	180605M2_37	B8E0078-BS1 OPR 0.125	05-Jun-18	22:44:46
38	38	180605M2_38	B8E0078-BSD1 LCSD 0.125	05-Jun-18	22:55:16
39	39	180605M2_39	B8E0078-BLK1 Method Blank 0.125	05-Jun-18	23:05:40
40	40	180605M2_40	1800862-01 REEPDW451FRB 0.11732	05-Jun-18	23:16:11
41	41	180605M2_41	1800862-02 REEPDW452FRB 0.11393	05-Jun-18	23:26:35
42	42	180605M2_42	1800862-03 REEPDW453FRB 0.11381	05-Jun-18	23:37:05
43	43	180605M2_43	1800862-04 REEPDW454FRB 0.11483	05-Jun-18	23:47:29
44	44	180605M2_44	1800862-05 REEPDW456FRB 0.1202	05-Jun-18	23:58:00
45	45	180605M2_45	1800862-06 REEPDW446FRB 0.11919	06-Jun-18	00:08:25
46	46	180605M2_46	1800862-07 REEPDW455FRB 0.12259	06-Jun-18	00:18:55
47	47	180605M2_47	1800862-08 REEPDW447FRB 0.11683	06-Jun-18	00:29:20
48	48	180605M2_48	1800862-09 REEPDW448FRB 0.12114	06-Jun-18	00:39:51
49	49	180605M2_49	1800862-10 REEPDW449FRB 0.11798	06-Jun-18	00:50:16
50	50	180605M2_50	1800862-11 REEPDW450FRB 0.12118	06-Jun-18	01:00:38
51	51	180605M2_51	1800862-12 REEPDW457FRB 0.12446	06-Jun-18	01:11:08
52	52	180605M2_52	1800862-13 REEPDW459FRB 0.12147	06-Jun-18	01:21:33
53	53	180605M2_53	1800862-14 REEPDW458FRB 0.11703	06-Jun-18	01:32:03
54	54	180605M2_54	1800862-15 REEPDW460FRB 0.11944	06-Jun-18	01:42:28
55	55	180605M2_55	B8E0244-BS1 OPR 0.125	06-Jun-18	01:52:59
56	56	180605M2_56	B8E0244-BLK1 Method Blank 0.125	06-Jun-18	02:03:23
57	57	180605M2_57	B8E0244-MS1 Matrix Spike 0.11028	06-Jun-18	02:13:53
58	58	180605M2_58	B8E0244-MSD1 Matrix Spike Dup 0.113...	06-Jun-18	02:24:17
59	59	180605M2_59	B8E0244-MS2 Matrix Spike 0.11122	06-Jun-18	02:34:48
60	60	180605M2_60	B8E0244-MSD2 Matrix Spike Dup 0.115...	06-Jun-18	02:45:18
61	61	180605M2_61	1801037-01 A1-MW-18-SA1 0.11265	06-Jun-18	02:55:42
62	62	180605M2_62	1801037-02 16-MW-08-SA1 0.11493	06-Jun-18	03:06:13
63	63	180605M2_63	1801037-03 A1-MW-19-SA1 0.11827	06-Jun-18	03:16:38
64	64	180605M2_64	1801037-04 A1-MW-37-SA1 0.11915	06-Jun-18	03:27:09
65	65	180605M2_65	1801037-05 A1-MW-37-SA1D 0.11595	06-Jun-18	03:37:33
66	66	180605M2_66	1801037-06 16-H5-03-SA1 0.12456	06-Jun-18	03:48:03
67	67	180605M2_67	IPA	06-Jun-18	03:58:29
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Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Compound name: PFBA

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72	72	180605M2_72	1801037-08 16-MW-06-5A1 0.11143	06-Jun-18	04:50:50
73	73	180605M2_73	1801037-09 FRB-20180523 0.11719	06-Jun-18	05:01:15
74	74	180605M2_74	1801054-01 A1-MW-42-SA1 0.11279	06-Jun-18	05:11:45
75	75	180605M2_75	1801054-02 A1-MW-54-SA1 0.11211	06-Jun-18	05:22:09
76	76	180605M2_76	1801054-03 A1-MW-53-SA1 0.1139	06-Jun-18	05:32:40
77	77	180605M2_77	1801054-04 A1-P2-19-SA1 0.11736	06-Jun-18	05:43:10
78	78	180605M2_78	1801054-05 A1-MW-52-SA1 0.11509	06-Jun-18	05:53:35
79	79	180605M2_79	1801054-06 A1-MW-01-SA1 0.1102	06-Jun-18	06:04:05
80	80	180605M2_80	1801054-07 A1-MW-01-SA1D 0.11715	06-Jun-18	06:14:31
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82	82	180605M2_82	ST180605M2-14 PFC CS3 18E2907	06-Jun-18	06:35:26
83	83	180605M2_83	IPA	06-Jun-18	06:45:57
84	84	180605M2_84	1801054-08 A1-MW-31-SA1 0.11276	06-Jun-18	06:56:27
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86	86	180605M2_86	B8E0161-BS1 OPR 0.25	06-Jun-18	07:17:22
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92	92	180605M2_92	1800989-05 KE-FBA-MW01 0.11631	06-Jun-18	08:20:06
93	93	180605M2_93	1800989-06 KE-FBA-MW01D 0.11705	06-Jun-18	08:30:37
94	94	180605M2_94	1800989-07 KE-NNTA-MW01 0.11356	06-Jun-18	08:41:02
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97	97	180605M2_97	IPA	06-Jun-18	09:12:28
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99	99	180605M2_99	IPA	06-Jun-18	09:33:23
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102	1...	180605M2_102	1800986-01 FR Fld Blk 0.25955	06-Jun-18	10:04:48
103	1...	180605M2_103	IS SUP TESTER	06-Jun-18	10:27:41
104	1...	180605M2_104	1800986-02 Forest Ridge 0.27675	06-Jun-18	10:38:06

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Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
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Compound name: PFBA

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107	1...	180605M2_107	1800990-01 WIRR1805171315JLB 0.2...	06-Jun-18	11:09:32
108	1...	180605M2_108	1800990-02 FB1805171320JLB 0.25861	06-Jun-18	11:19:56
109	1...	180605M2_109	IPA	06-Jun-18	11:30:26
110	1...	180605M2_110	ST180605M2-16 PFC CS3 18E2907	06-Jun-18	11:40:57
111	1...	180605M2_111	IPA	06-Jun-18	11:51:21

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

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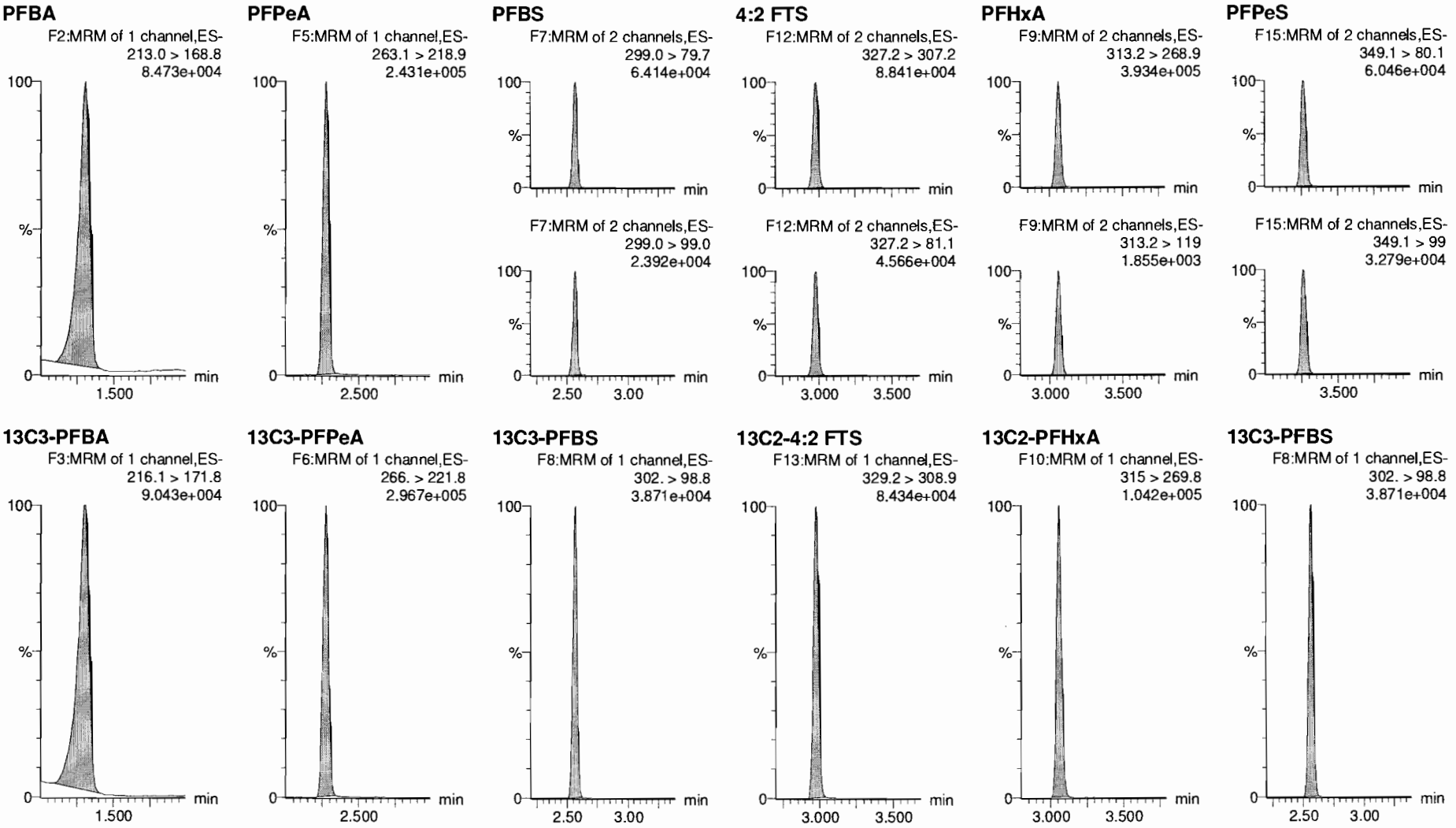

GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

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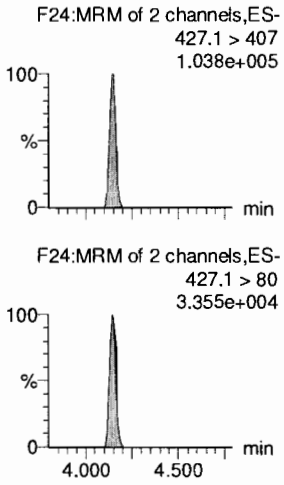
6:2 FTS



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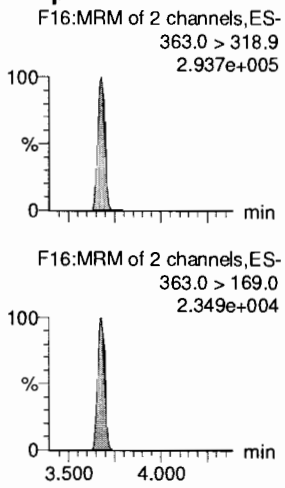

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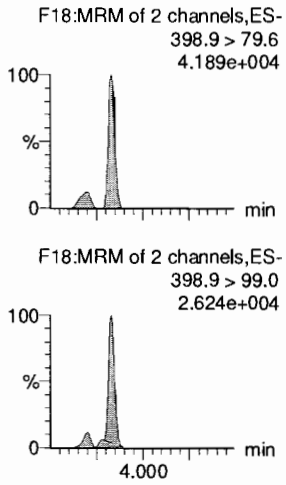

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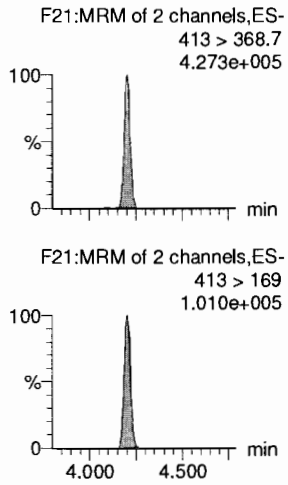

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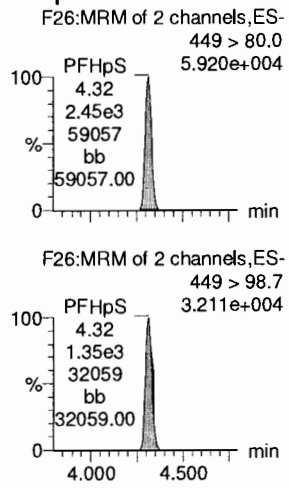

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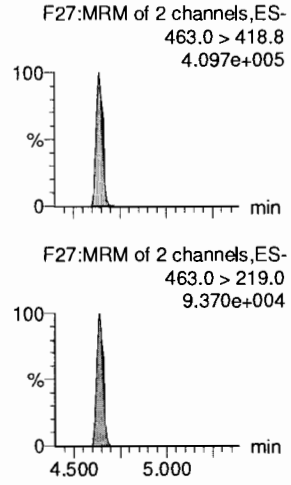

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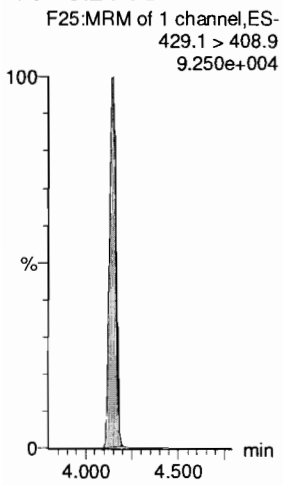

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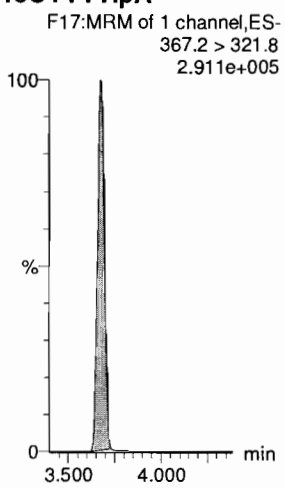

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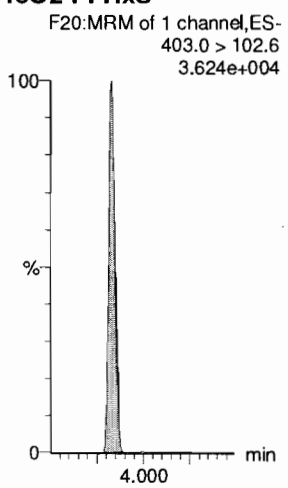

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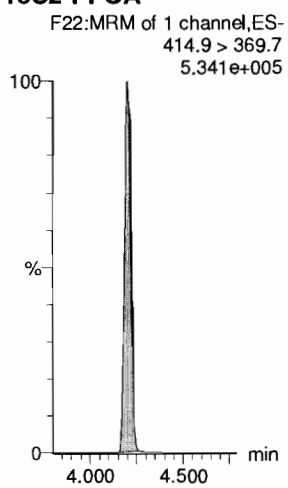

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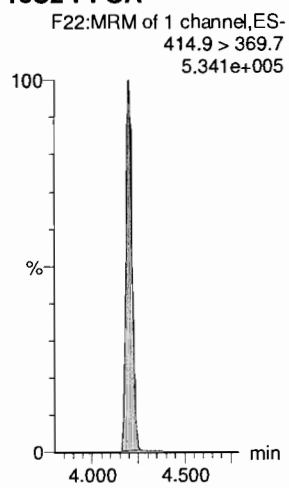

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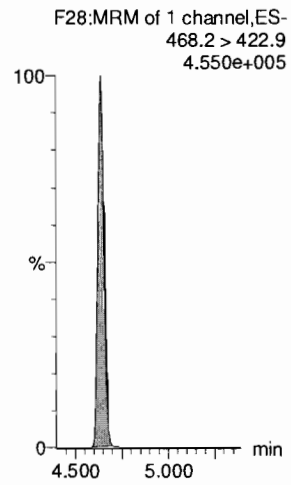

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Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

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Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

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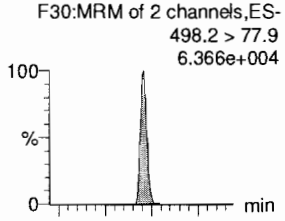

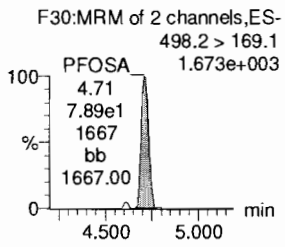

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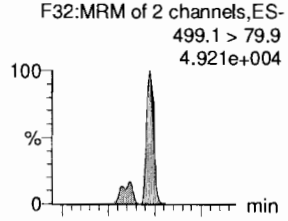

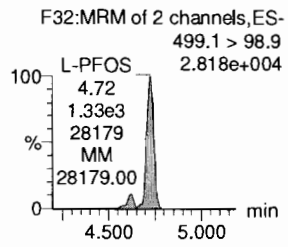

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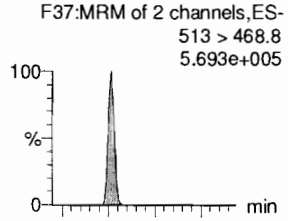

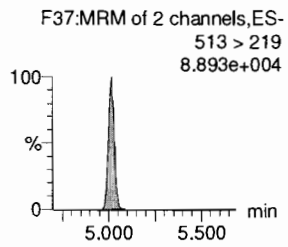

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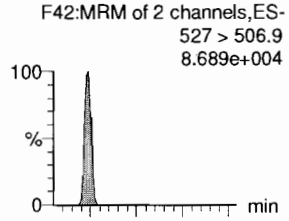

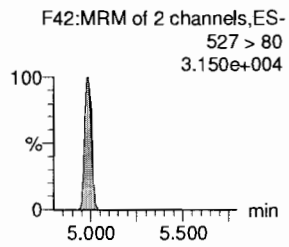

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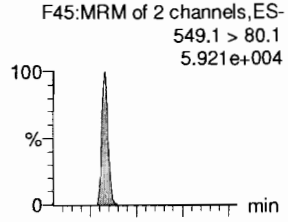

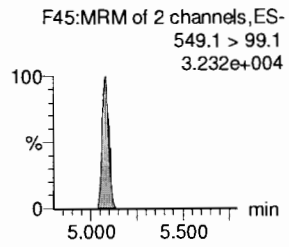

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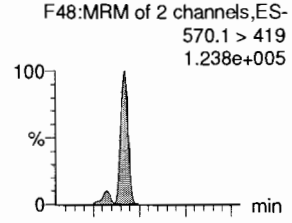

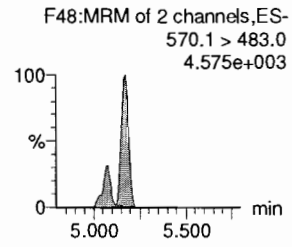

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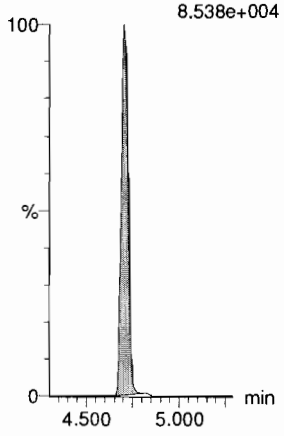

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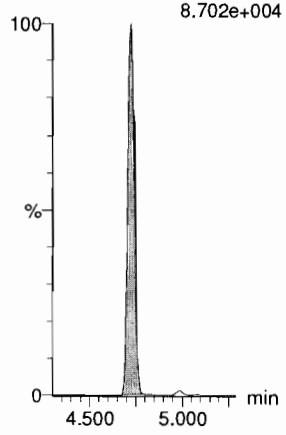

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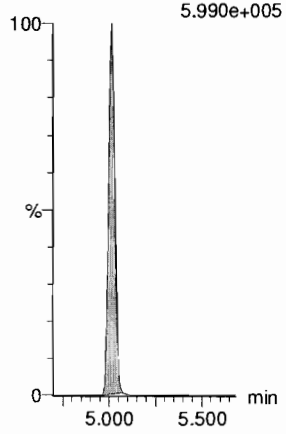

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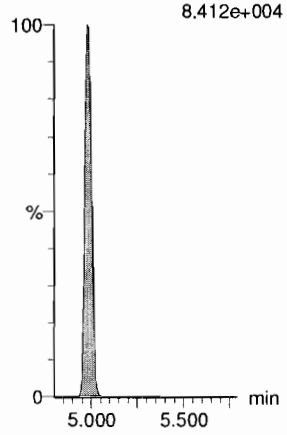

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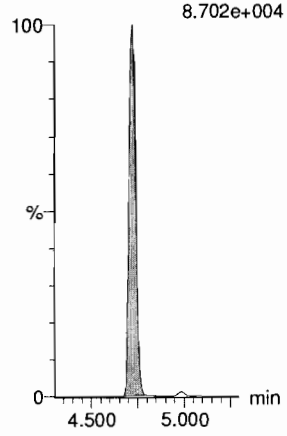

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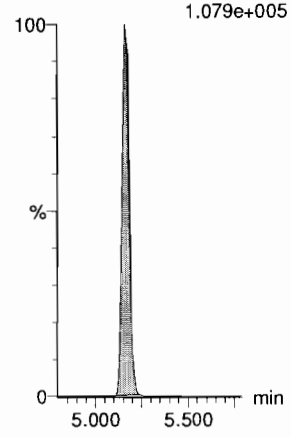

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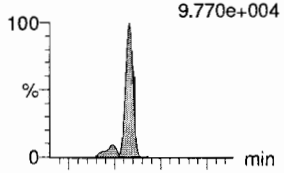
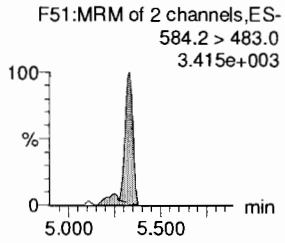
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

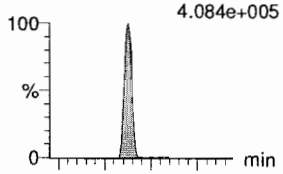
Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

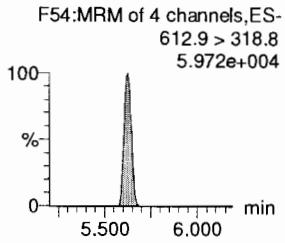
L-EtFOSAA



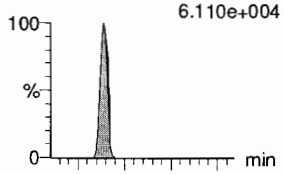


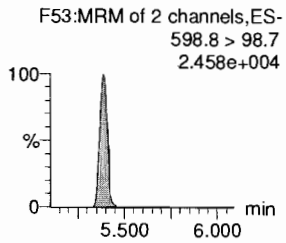
PFDoA



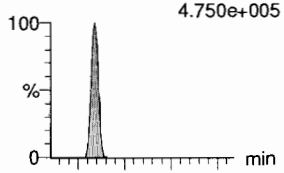


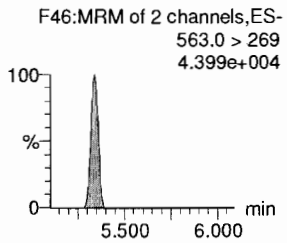
PFDS



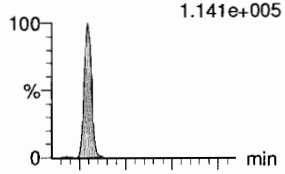


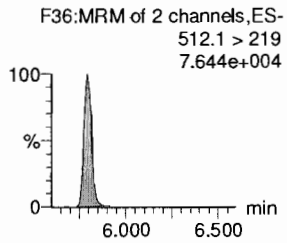
PFUdA



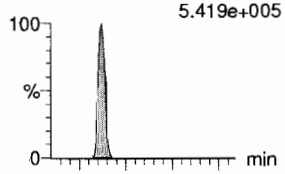


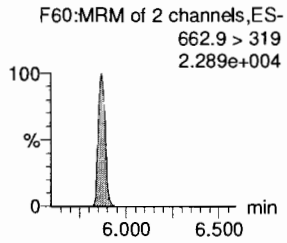
N-MeFOSA



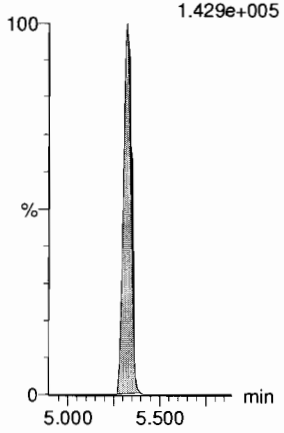


PFTrDA

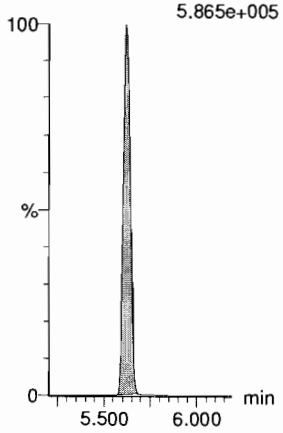




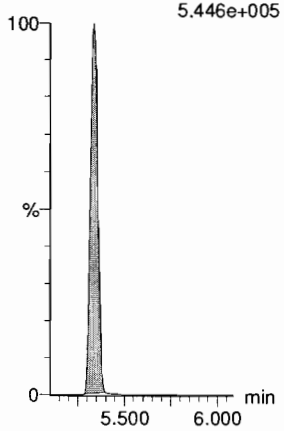
d5-N-EtFOSAA



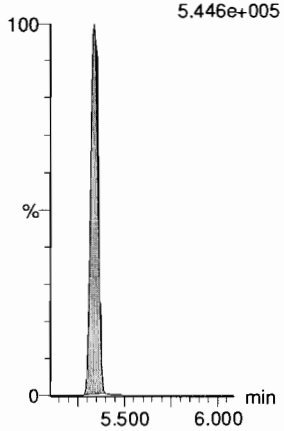
13C2-PFDoA



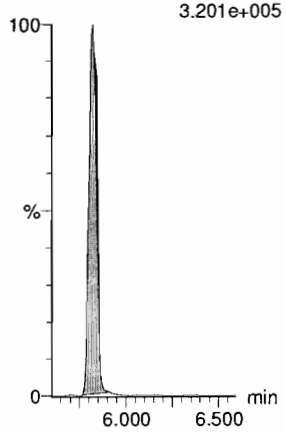
13C2-PFUdA



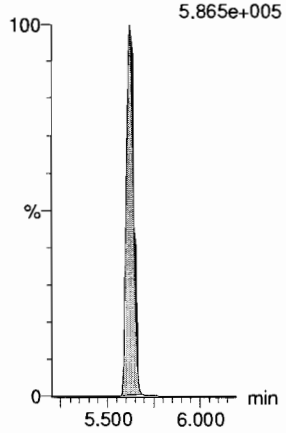
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



GM 6/6/2018

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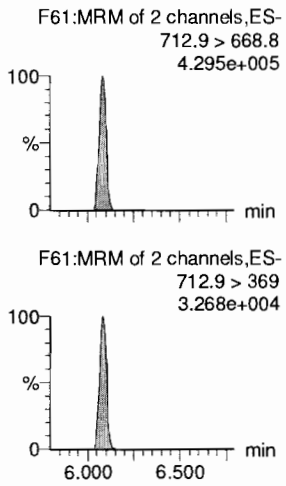
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

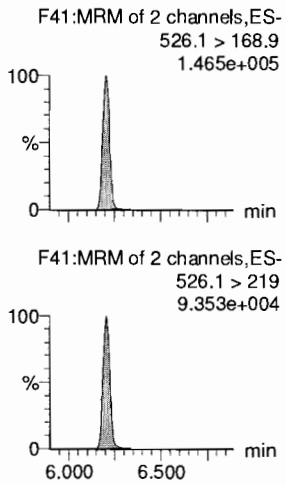
Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

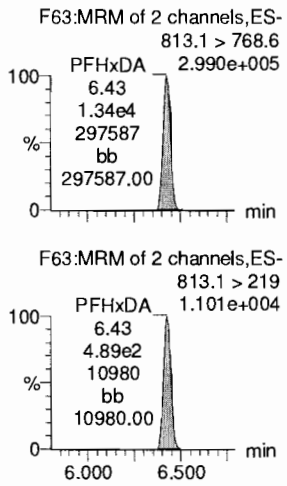
PFTeDA



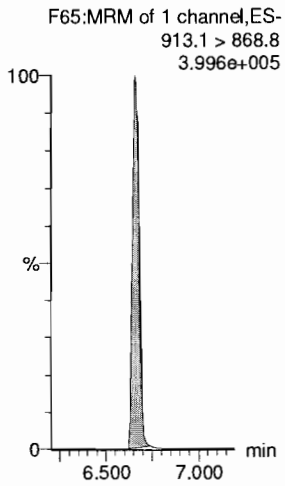
N-EtFOSA



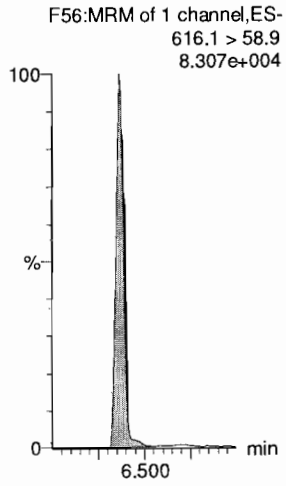
PFHxDA



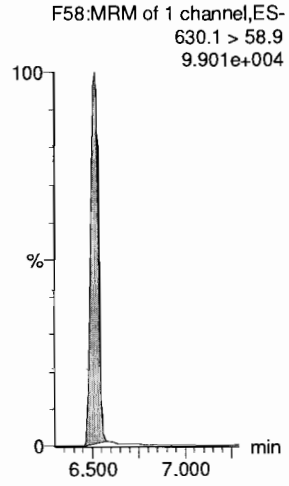
PFODA



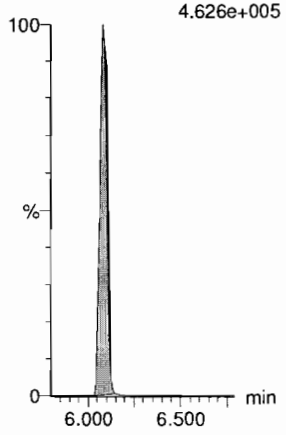
N-MeFOSE



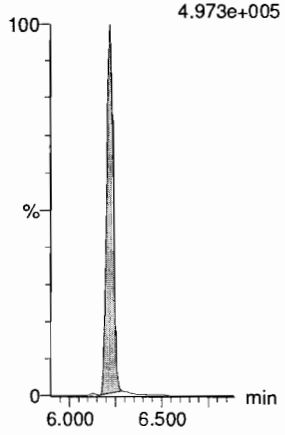
N-EtFOSE



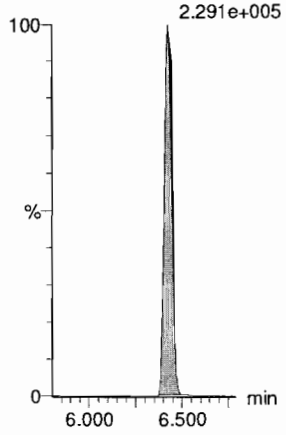
13C2-PFTeDA



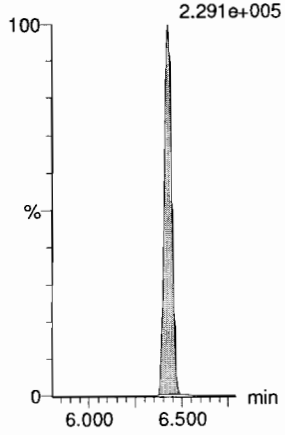
d5-N-ETFOSA



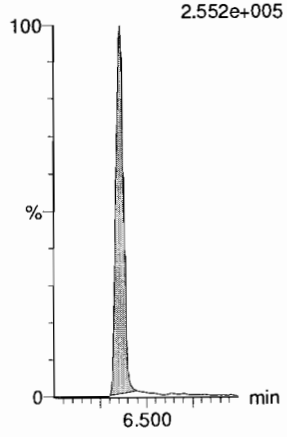
13C2-PFHxDA



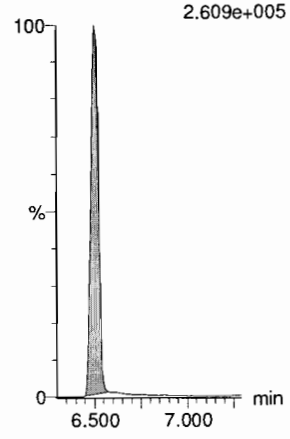
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



GM 6/6/2018

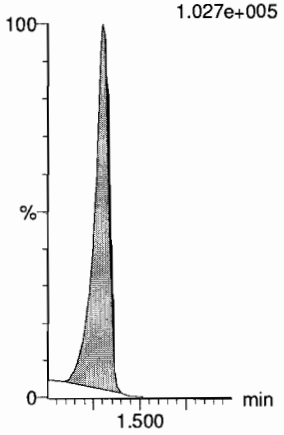
Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-31.qld

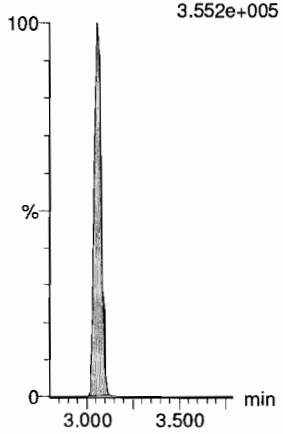
Last Altered: Wednesday, June 06, 2018 16:43:59 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:44:30 Pacific Daylight Time

Name: 180605M2_31, Date: 05-Jun-2018, Time: 21:42:02, ID: ST180605M2-11 PFC CS3 18E2907, Description: PFC CS3 18E2907

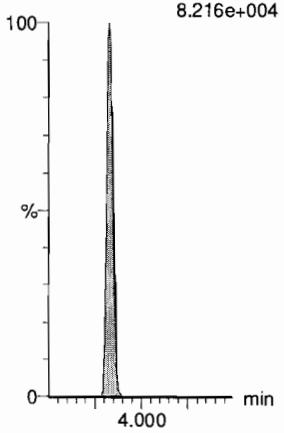
13C4-PFBA



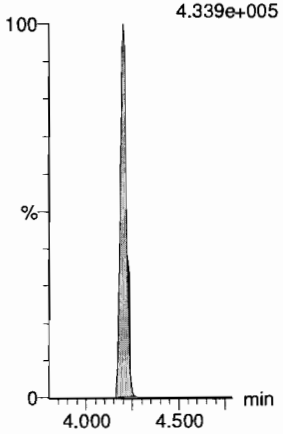
13C5-PFHxA



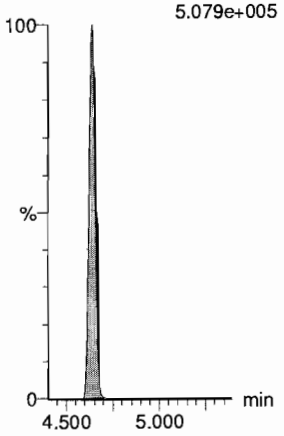
13C3-PFHxS



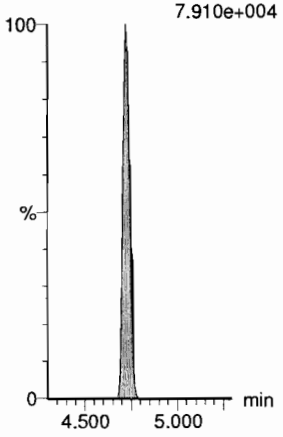
13C8-PFOA



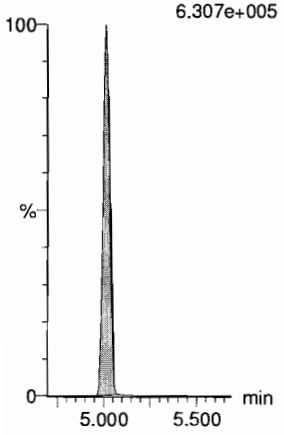
13C9-PFNA



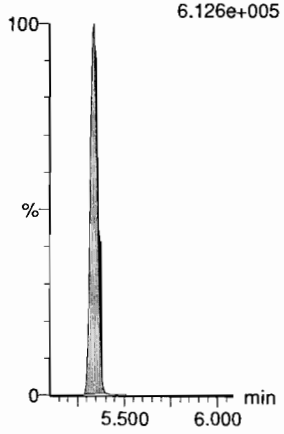
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:03 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	1	PFBA	213.0 > 16...	8.57e3	9.06e3		1.31	1.31	11.8	10.6	106.5	NO		
2	2	PFPeA	263.1 > 21...	1.17e4	1.42e4		2.28	2.28	10.3	9.99	99.9	NO		
3	3	PFBS	299.0 > 79.7	2.85e3	1.78e3		2.57	2.57	20.0	10.1	100.6	NO	2.840	NO
4	4	4:2 FTS	327.2>307.2	3.51e3	3.68e3		2.98	2.98	11.9	11.1	110.9	NO	1.836	NO
5	5	PFHxA	313.2 > 26...	1.54e4	4.69e3		3.07	3.07	16.5	10.3	103.1	NO	173.865	NO
6	6	PFPeS	349.1>80.1	2.65e3	1.78e3		3.26	3.27	18.6	10.3	103.2	NO	1.734	NO
7	7	PFHpA	363.0 > 31...	1.25e4	1.33e4		3.68	3.68	11.7	10.0	100.4	NO	15.128	NO
8	8	L-PFHxS	398.9 > 79.6	2.27e3	1.59e3		3.83	3.84	17.8	9.28	92.8	NO	1.806	NO
9	10	6:2 FTS	427.1 > 407	3.59e3	3.39e3		4.17	4.15	13.2	10.7	107.2	NO	2.858	NO
10	11	L-PFOA	413 > 368.7	1.67e4	2.15e4		4.25	4.20	9.68	10.7	107.3	NO	3.495	NO
11	13	PFHpS	449 > 80.0	2.69e3	2.15e4		4.33	4.32	1.57	9.94	99.4	NO	1.907	NO
12	14	PFNA	463.0 > 41...	1.85e4	1.80e4		4.66	4.64	12.8	10.0	100.2	NO	4.400	NO
13	15	PFOSA	498.2 > 77.9	2.76e3	3.67e3		4.73	4.71	9.40	9.90	99.0	NO	42.942	YES
14	16	L-PFOS	499.1 > 79.9	2.86e3	3.32e3		4.74	4.72	10.8	11.6	115.7	NO	1.978	NO
15	18	PFDA	513 > 468.8	1.96e4	2.16e4		5.03	5.01	11.3	11.0	110.0	NO	5.212	NO
16	19	8:2 FTS	527 > 506.9	3.43e3	3.16e3		5.00	4.99	13.6	9.45	94.5	NO	2.549	NO
17	20	PFNS	549.1>80.1	2.45e3	3.32e3		5.09	5.08	9.22	11.0	110.3	NO	1.774	NO
18	21	L-MeFOSAA	570.1 > 419	6.54e3	5.40e3		5.18	5.17	15.1	8.01	80.1	NO	16.746	NO
19	23	L-EtFOSAA	584.2 > 419	5.03e3	6.76e3		5.37	5.33	9.29	8.15	81.5	NO	19.854	NO

GM 6/6/2018

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

(K) Above limit criteria.

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	25	PFUdA	563.0 > 51...	2.06e4	2.42e4		5.35	5.34	10.6	11.0	109.6	NO	10.990	NO
2	26	PFDS	598.8 > 80	2.81e3	2.42e4		5.40	5.39	1.45	10.1	100.7	NO	1.985	NO
3	27	PFDoA	612.9 > 56...	2.05e4	2.08e4		5.63	5.63	12.3	11.1	110.5	NO	8.524	NO
4	28	N-MeFOSA	512.1 > 16...	5.34e3	1.50e4		5.82	5.79	53.3	50.7	101.4	NO	1.498	NO
5	29	PFTrDA	662.9 > 61...	2.45e4	2.08e4		5.88	5.87	14.7	13.6	135.7	YES (K)	24.194	NO
6	30	PFTeDA	712.9 > 66...	1.77e4	1.72e4		6.10	6.08	12.9	9.92	99.2	NO	11.690	NO
7	31	N-EtFOSA	526.1 > 16...	6.60e3	2.18e4		6.23	6.20	45.4	49.0	98.0	NO	1.550	NO
8	32	PFHxDA	813.1 > 76...	1.26e4	9.85e3		6.43	6.43	6.41	10.6	105.8	NO	26.053	NO
9	33	PFODA	913.1 > 86...	1.61e4	9.85e3		6.67	6.67	8.17	9.20	92.0	NO		
10	34	N-MeFOSE	616.1 > 58.9	3.98e3	1.25e4		6.37	6.37	47.6	47.9	95.7	NO		
11	35	N-EtFOSE	630.1 > 58.9	4.72e3	1.27e4		6.52	6.52	55.6	46.5	93.1	NO		
12	36	13C3-PFBA	216.1 > 17...	9.06e3	1.03e4	0.885	1.34	1.31	11.0	12.4	99.3	NO		
13	37	13C3-PFPeA	266. > 221.8	1.42e4	1.62e4	0.849	2.31	2.28	11.0	12.9	103.6	NO		
14	38	13C3-PFBS	302. > 98.8	1.78e3	1.62e4	0.104	2.60	2.57	1.37	13.2	105.8	NO		
15	39	13C2-4:2 FTS	329.2>308.9	3.68e3	1.62e4	0.248	3.01	2.98	2.84	11.5	91.8	NO		
16	40	13C2-PFHxA	315 > 269.8	4.69e3	1.62e4	0.729	3.09	3.07	3.62	4.97	99.4	NO		
17	41	13C4-PFHpA	367.2 > 32...	1.33e4	1.62e4	0.836	3.71	3.68	10.3	12.3	98.1	NO		
18	42	18O2-PFHxS	403.0 > 10...	1.59e3	3.57e3	0.443	3.86	3.83	5.58	12.6	100.9	NO		
19	43	13C2-6:2 FTS	429.1 > 40...	3.39e3	1.93e4	0.249	4.17	4.15	2.20	8.83	70.6	NO		
20	44	13C2-PFOA	414.9 > 36...	2.15e4	1.93e4	1.332	4.23	4.20	13.9	10.5	83.8	NO		
21	45	13C5-PFNA	468.2 > 42...	1.80e4	2.00e4	0.951	4.66	4.64	11.3	11.9	94.8	NO		
22	46	13C8-PFOSA	506.1 > 77.7	3.67e3	2.80e4	0.140	4.73	4.71	1.64	11.7	94.0	NO		
23	47	13C8-PFOS	507.0 > 79.9	3.32e3	3.42e3	1.060	4.74	4.72	12.1	11.5	91.7	NO		
24	48	13C2-PFDA	515.1 > 46...	2.16e4	2.26e4	1.130	5.03	5.01	11.9	10.6	84.5	NO		
25	49	13C2-8:2 FTS	529.1 > 50...	3.16e3	1.62e4	0.217	5.00	4.99	2.44	11.2	89.6	NO		
26	50	d3-N-MeFOSAA	573.3 > 419	5.40e3	2.80e4	0.184	5.18	5.17	2.41	13.1	105.2	NO		
27	51	d5-N-EtFOSAA	589.3 > 419	6.76e3	2.80e4	0.223	5.34	5.32	3.02	13.5	108.3	NO		
28	52	13C2-PFUdA	565 > 519.8	2.42e4	2.80e4	0.936	5.35	5.34	10.8	11.5	92.3	NO		
29	53	13C2-PFDoA	615.0 > 56...	2.08e4	2.26e4	1.168	5.63	5.62	11.5	9.83	78.7	NO		
30	54	d3-N-MeFOSA	515.2 > 16...	1.50e4	2.80e4	0.051	5.85	5.82	6.72	131	87.4	NO		
31	55	13C2-PFTeDA	714.8 > 66...	1.72e4	2.80e4	0.706	6.09	6.08	7.67	10.9	86.9	NO		
32	56	d5-N-ETFOSA	531.1 > 16...	2.18e4	2.80e4	0.071	6.24	6.22	9.76	137	91.3	NO		

GM 6/6/2018

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
33	57	13C2-PFHxDA	815 > 769.7	9.85e3	2.80e4	1.079	6.43	6.43	4.40	4.08	81.6	NO		
34	58	d7-N-MeFOSE	623.1 > 58.9	1.25e4	2.80e4	0.041	6.37	6.36	5.60	136	90.5	NO		
35	59	d9-N-EtFOSE	639.2 > 58.8	1.27e4	2.80e4	0.038	6.51	6.50	5.69	149	99.0	NO		
36	60	13C4-PFBA	217. > 171.8	1.03e4	1.03e4	1.000	1.35	1.31	12.5	12.5	100.0	NO		
37	61	13C5-PFHxA	318 > 272.9	1.62e4	1.62e4	1.000	3.09	3.07	12.5	12.5	100.0	NO		
38	62	13C3-PFHxS	401.9 > 79.9	3.57e3	3.57e3	1.000	3.86	3.84	12.5	12.5	100.0	NO		
39	63	13C8-PFOA	421.3 > 376	1.93e4	1.93e4	1.000	4.23	4.20	12.5	12.5	100.0	NO		
40	64	13C9-PFNA	472.2 > 42...	2.00e4	2.00e4	1.000	4.66	4.64	12.5	12.5	100.0	NO		
41	65	13C4-PFOS	503 > 79.9	3.42e3	3.42e3	1.000	4.74	4.72	12.5	12.5	100.0	NO		
42	66	13C6-PFDA	519.1 > 47...	2.26e4	2.26e4	1.000	5.03	5.01	12.5	12.5	100.0	NO		
43	67	13C7-PFUdA	570.1 > 52...	2.80e4	2.80e4	1.000	5.35	5.34	12.5	12.5	100.0	NO		

GM 6/6/2018

Quantify Compound Summary Report **MassLynx MassLynx V4.1 SCN945 SCN960**
Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180605M2_1	IPA	05-Jun-18	16:28:10
2	2	180605M2_2	ST180605M2-1 PFC CS-2 18E2902	05-Jun-18	16:38:43
3	3	180605M2_3	ST180605M2-2 PFC CS-1 18E2903	05-Jun-18	16:49:08
4	4	180605M2_4	ST180605M2-3 PFC CS0 18E2904 *	05-Jun-18	16:59:39
5	5	180605M2_5	ST180605M2-4 PFC CS1 18E2905	05-Jun-18	17:10:04
6	6	180605M2_6	ST180605M2-5 PFC CS2 18E2906	05-Jun-18	17:20:34
7	7	180605M2_7	ST180605M2-6 PFC CS3 18E2907	05-Jun-18	17:30:59
8	8	180605M2_8	ST180605M2-7 PFC CS4 18E2908	05-Jun-18	17:41:30
9	9	180605M2_9	ST180605M2-8 PFC CS5 18E2909	05-Jun-18	17:52:00
10	10	180605M2_10	ST180605M2-9 PFC CS6 18E2910	05-Jun-18	18:02:25
11	11	180605M2_11	ST180605M2-10 PFC CS7 18E2911	05-Jun-18	18:12:47
12	12	180605M2_12	IPA	05-Jun-18	18:23:17
13	13	180605M2_13	ICV180605M2-1 PFC 537 ICV 18E2901	05-Jun-18	18:33:43
14	14	180605M2_14	IPA	05-Jun-18	18:44:13
15	15	180605M2_15	B8E0097-BS1 OPR 0.25	05-Jun-18	18:54:40
16	16	180605M2_16	B8E0097-BSD1 LCSD 0.25	05-Jun-18	19:05:08
17	17	180605M2_17	B8E0097-BLK1 Method Blank 0.25	05-Jun-18	19:15:33
18	18	180605M2_18	1800863-01 Bemidji Pilot APR2 lead 0.2...	05-Jun-18	19:26:03
19	19	180605M2_19	1800863-02 Bemidji Pilot PSR2 + 0.26433	05-Jun-18	19:36:27
20	20	180605M2_20	1800863-03 Bemidji Pilot INF 0.26399	05-Jun-18	19:46:57
21	21	180605M2_21	1800901-01 ACT Sample -16 0.23838	05-Jun-18	19:57:21
22	22	180605M2_22	1800901-02 ACT Sample -19 0.23487	05-Jun-18	20:07:52
23	23	180605M2_23	1801071-02 A1-MW-55-SA1 0.11428	05-Jun-18	20:18:16
24	24	180605M2_24	1801071-03 A1-MW-23-SA1 0.11436	05-Jun-18	20:28:47
25	25	180605M2_25	1801071-04 A1-MW-07-SA1 0.11908	05-Jun-18	20:39:12
26	26	180605M2_26	1801039-01 A1-MW-13-SA1 0.10967	05-Jun-18	20:49:42
27	27	180605M2_27	1801039-02 A1-MW-11-SA1 0.11624	05-Jun-18	21:00:07
28	28	180605M2_28	1801039-03 A1-MW-14-SA1 0.11194	05-Jun-18	21:10:37
29	29	180605M2_29	1801039-04 A1-MW-15-SA1 0.11248	05-Jun-18	21:21:07
30	30	180605M2_30	IPA	05-Jun-18	21:31:32
31	31	180605M2_31	ST180605M2-11 PFC CS3 18E2907	05-Jun-18	21:42:02
32	32	180605M2_32	IPA	05-Jun-18	21:52:27

(*) over 10 samples. OM 6/6/18

*CS0 fell in with previous calibration; curve not used KBF 6/8/18

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
33	33	180605M2_33	1801039-07 A1-MW-25-SA1 0.11252	05-Jun-18	22:02:57
34	34	180605M2_34	1801024-01 A1-MW-51-SA1 0.11961	05-Jun-18	22:13:21
35	35	180605M2_35	1801024-02 A1-MW-50-SA1 0.12082	05-Jun-18	22:23:52
36	36	180605M2_36	1801024-05 A1-MW-04-SA1 0.12315	05-Jun-18	22:34:22
37	37	180605M2_37	B8E0078-BS1 OPR 0.125	05-Jun-18	22:44:46
38	38	180605M2_38	B8E0078-BSD1 LCSD 0.125	05-Jun-18	22:55:16
39	39	180605M2_39	B8E0078-BLK1 Method Blank 0.125	05-Jun-18	23:05:40
40	40	180605M2_40	1800862-01 REEPDW451FRB 0.11732	05-Jun-18	23:16:11
41	41	180605M2_41	1800862-02 REEPDW452FRB 0.11393	05-Jun-18	23:26:35
42	42	180605M2_42	1800862-03 REEPDW453FRB 0.11381	05-Jun-18	23:37:05
43	43	180605M2_43	1800862-04 REEPDW454FRB 0.11483	05-Jun-18	23:47:29
44	44	180605M2_44	1800862-05 REEPDW456FRB 0.1202	05-Jun-18	23:58:00
45	45	180605M2_45	1800862-06 REEPDW446FRB 0.11919	06-Jun-18	00:08:25
46	46	180605M2_46	1800862-07 REEPDW455FRB 0.12259	06-Jun-18	00:18:55
47	47	180605M2_47	1800862-08 REEPDW447FRB 0.11683	06-Jun-18	00:29:20
48	48	180605M2_48	1800862-09 REEPDW448FRB 0.12114	06-Jun-18	00:39:51
49	49	180605M2_49	1800862-10 REEPDW449FRB 0.11798	06-Jun-18	00:50:16
50	50	180605M2_50	1800862-11 REEPDW450FRB 0.12118	06-Jun-18	01:00:38
51	51	180605M2_51	1800862-12 REEPDW457FRB 0.12446	06-Jun-18	01:11:08
52	52	180605M2_52	1800862-13 REEPDW459FRB 0.12147	06-Jun-18	01:21:33
53	53	180605M2_53	1800862-14 REEPDW458FRB 0.11703	06-Jun-18	01:32:03
54	54	180605M2_54	1800862-15 REEPDW460FRB 0.11944	06-Jun-18	01:42:28
55	55	180605M2_55	B8E0244-BS1 OPR 0.125	06-Jun-18	01:52:59
56	56	180605M2_56	B8E0244-BLK1 Method Blank 0.125	06-Jun-18	02:03:23
57	57	180605M2_57	B8E0244-MS1 Matrix Spike 0.11028	06-Jun-18	02:13:53
58	58	180605M2_58	B8E0244-MSD1 Matrix Spike Dup 0.113...	06-Jun-18	02:24:17
59	59	180605M2_59	B8E0244-MS2 Matrix Spike 0.11122	06-Jun-18	02:34:48
60	60	180605M2_60	B8E0244-MSD2 Matrix Spike Dup 0.115...	06-Jun-18	02:45:18
61	61	180605M2_61	1801037-01 A1-MW-18-SA1 0.11265	06-Jun-18	02:55:42
62	62	180605M2_62	1801037-02 16-MW-08-SA1 0.11493	06-Jun-18	03:06:13
63	63	180605M2_63	1801037-03 A1-MW-19-SA1 0.11827	06-Jun-18	03:16:38
64	64	180605M2_64	1801037-04 A1-MW-37-SA1 0.11915	06-Jun-18	03:27:09
65	65	180605M2_65	1801037-05 A1-MW-37-SA1D 0.11595	06-Jun-18	03:37:33
66	66	180605M2_66	1801037-06 16-H5-03-SA1 0.12456	06-Jun-18	03:48:03
67	67	180605M2_67	IPA	06-Jun-18	03:58:29
68	68	180605M2_68	ST180605M2-12 PFC CS3 18E2907	06-Jun-18	04:08:59

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
69	69	180605M2_69	ST180605M2-13 PFC CS0 18E2904	06-Jun-18	04:19:24
70	70	180605M2_70	IPA	06-Jun-18	04:29:54
71	71	180605M2_71	1801037-07 16-MW-09-SA1 0.1148	06-Jun-18	04:40:20
72	72	180605M2_72	1801037-08 16-MW-06-5A1 0.11143	06-Jun-18	04:50:50
73	73	180605M2_73	1801037-09 FRB-20180523 0.11719	06-Jun-18	05:01:15
74	74	180605M2_74	1801054-01 A1-MW-42-SA1 0.11279	06-Jun-18	05:11:45
75	75	180605M2_75	1801054-02 A1-MW-54-SA1 0.11211	06-Jun-18	05:22:09
76	76	180605M2_76	1801054-03 A1-MW-53-SA1 0.1139	06-Jun-18	05:32:40
77	77	180605M2_77	1801054-04 A1-P2-19-SA1 0.11736	06-Jun-18	05:43:10
78	78	180605M2_78	1801054-05 A1-MW-52-SA1 0.11509	06-Jun-18	05:53:35
79	79	180605M2_79	1801054-06 A1-MW-01-SA1 0.1102	06-Jun-18	06:04:05
80	80	180605M2_80	1801054-07 A1-MW-01-SA1D 0.11715	06-Jun-18	06:14:31
81	81	180605M2_81	IPA	06-Jun-18	06:25:01
82	82	180605M2_82	ST180605M2-14 PFC CS3 18E2907	06-Jun-18	06:35:26
83	83	180605M2_83	IPA	06-Jun-18	06:45:57
84	84	180605M2_84	1801054-08 A1-MW-31-SA1 0.11276	06-Jun-18	06:56:27
85	85	180605M2_85	1801054-09 FRB-20180525 0.11663	06-Jun-18	07:06:52
86	86	180605M2_86	B8E0161-BS1 OPR 0.25	06-Jun-18	07:17:22
87	87	180605M2_87	B8E0161-BLK1 Method Blank 0.25	06-Jun-18	07:27:47
88	88	180605M2_88	1800989-01 KE-RD6954-MW01 0.11761	06-Jun-18	07:38:17
89	89	180605M2_89	1800989-02 KE-BBW-MW01 0.11717	06-Jun-18	07:48:48
90	90	180605M2_90	1800989-03 KE-6954-MW01 0.11556	06-Jun-18	07:59:12
91	91	180605M2_91	1800989-04 KE-APN-MW01 0.11557	06-Jun-18	08:09:43
92	92	180605M2_92	1800989-05 KE-FBA-MW01 0.11631	06-Jun-18	08:20:06
93	93	180605M2_93	1800989-06 KE-FBA-MW01D 0.11705	06-Jun-18	08:30:37
94	94	180605M2_94	1800989-07 KE-NNTA-MW01 0.11356	06-Jun-18	08:41:02
95	95	180605M2_95	1800989-08 KE-6918-MW01 0.11438	06-Jun-18	08:51:32
96	96	180605M2_96	1800989-09 KE-6917-MW01 0.11542	06-Jun-18	09:01:58
97	97	180605M2_97	IPA	06-Jun-18	09:12:28
98	98	180605M2_98	ST180605M2-15 PFC CS3 18E2907	06-Jun-18	09:22:52
99	99	180605M2_99	IPA	06-Jun-18	09:33:23
100	1...	180605M2_100	1800989-10 KE-EB-5-11-18 0.26165	06-Jun-18	09:43:53
101	1...	180605M2_101	1800989-11 KE-FTA-MW01 0.1098	06-Jun-18	09:54:18
102	1...	180605M2_102	1800986-01 FR Fld Blk 0.25955	06-Jun-18	10:04:48
103	1...	180605M2_103	IS SUP TESTER	06-Jun-18	10:27:41
104	1...	180605M2_104	1800986-02 Forest Ridge 0.27675	06-Jun-18	10:38:06

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Wednesday, June 06, 2018 17:00:17 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 17:00:28 Pacific Daylight Time

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
105	1...	180605M2_105	1800986-03 K_V Fld Blk 0.25454	06-Jun-18	10:48:37
106	1...	180605M2_106	1800986-04 K_V 0.27397	06-Jun-18	10:59:02
107	1...	180605M2_107	1800990-01 WIRR1805171315JLB 0.2...	06-Jun-18	11:09:32
108	1...	180605M2_108	1800990-02 FB1805171320JLB 0.25861	06-Jun-18	11:19:56
109	1...	180605M2_109	IPA	06-Jun-18	11:30:26
110	1...	180605M2_110	ST180605M2-16 PFC CS3 18E2907	06-Jun-18	11:40:57
111	1...	180605M2_111	IPA	06-Jun-18	11:51:21

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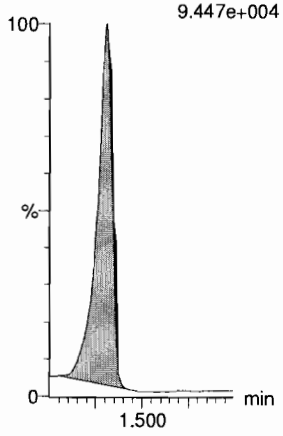
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

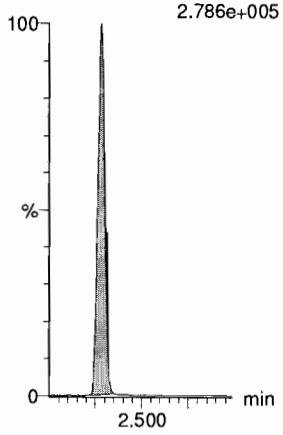
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060518.mdb 06 Jun 2018 13:40:46
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

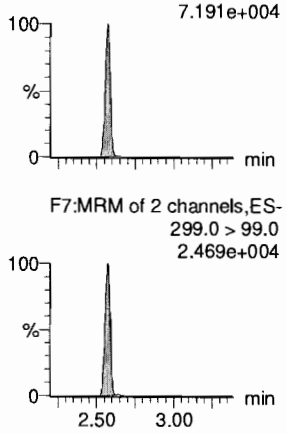
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
9.447e+004



PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
2.786e+005

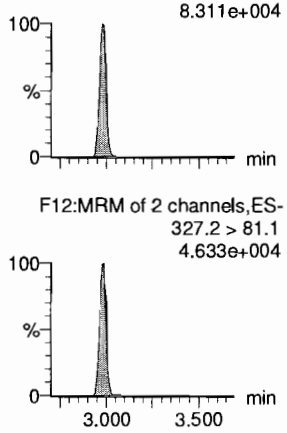


PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
7.191e+004



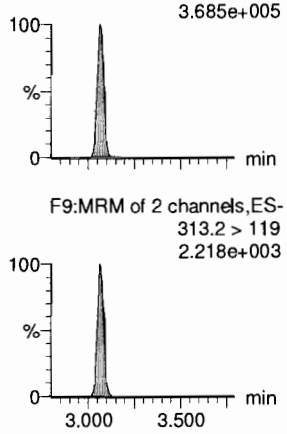
F7:MRM of 2 channels,ES-
299.0 > 99.0
2.469e+004

4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
8.311e+004



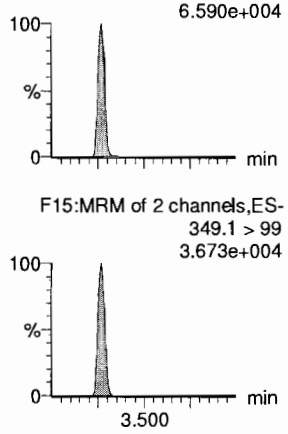
F12:MRM of 2 channels,ES-
327.2 > 81.1
4.633e+004

PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
3.685e+005



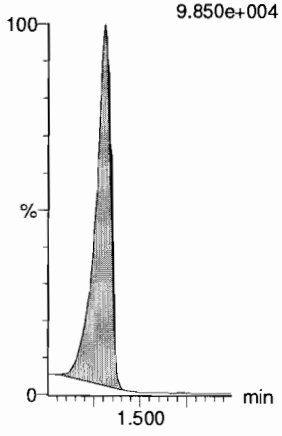
F9:MRM of 2 channels,ES-
313.2 > 119
2.218e+003

PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
6.590e+004

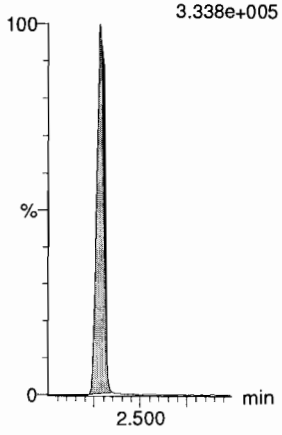


F15:MRM of 2 channels,ES-
349.1 > 99
3.673e+004

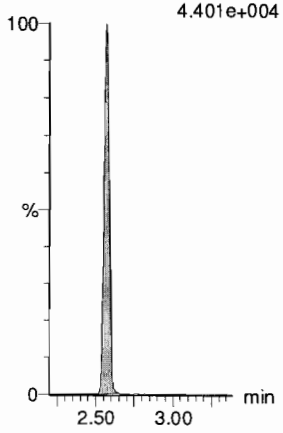
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
9.850e+004



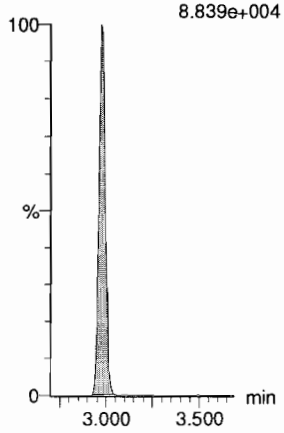
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.338e+005



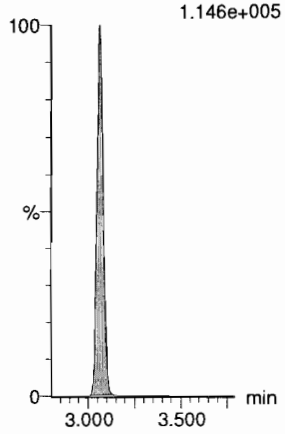
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.401e+004



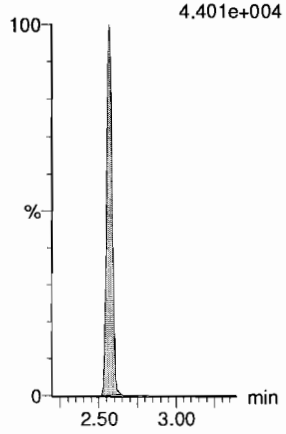
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
8.839e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.146e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.401e+004



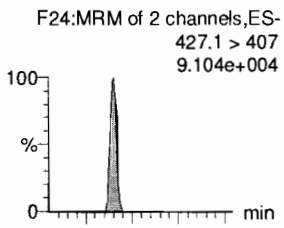
GM 6/6/2018

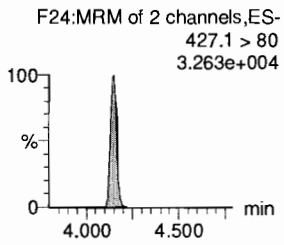
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

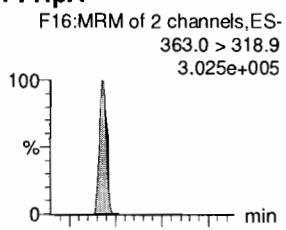
Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

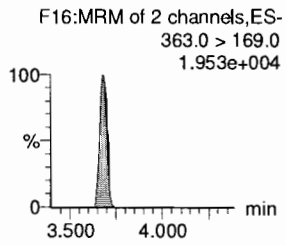
6:2 FTS



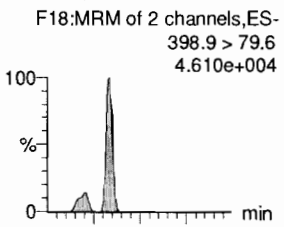


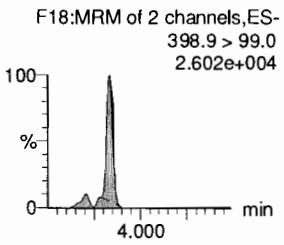
PFHpA



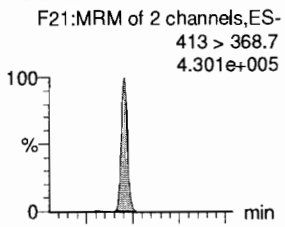


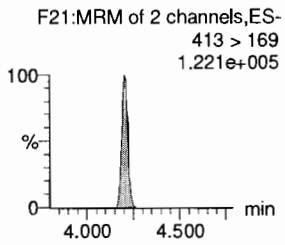
L-PFHxS





L-PFOA





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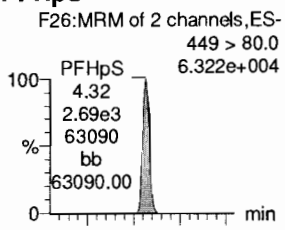

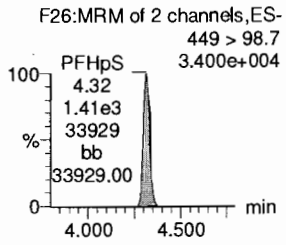

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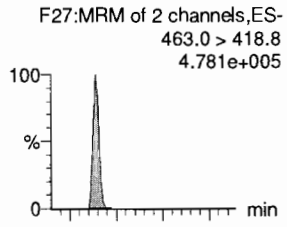
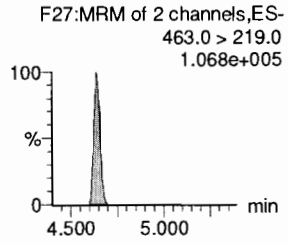
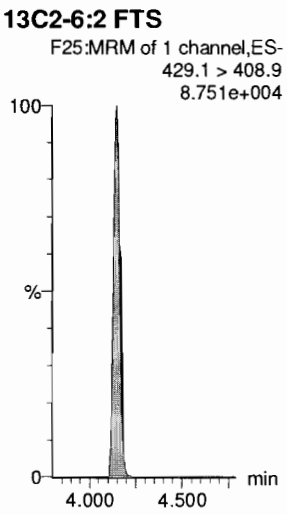
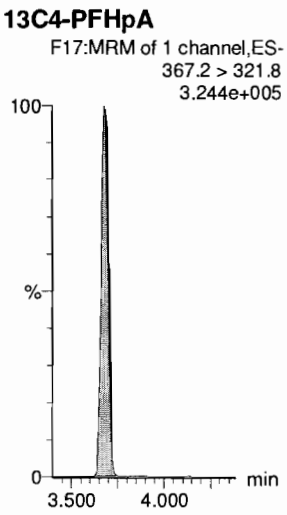




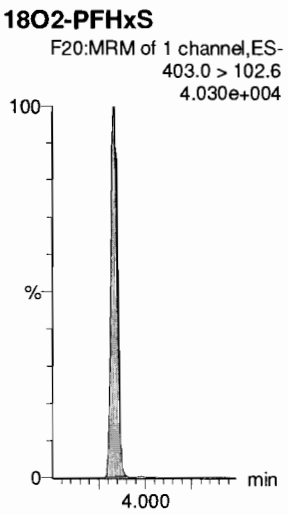
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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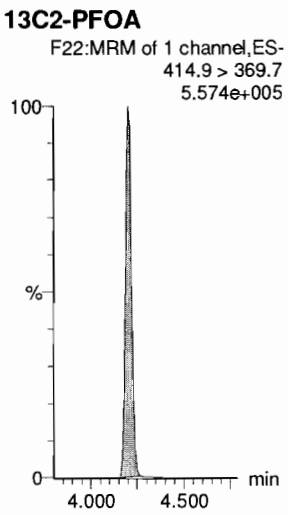

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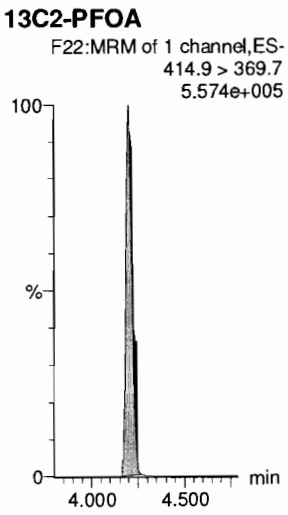
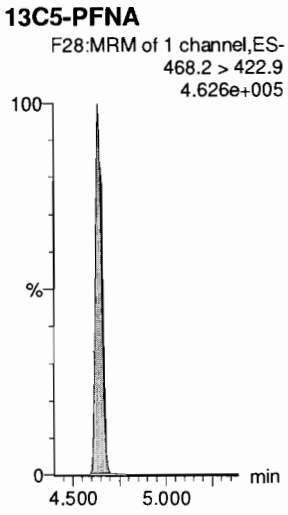


13C5-PFNA



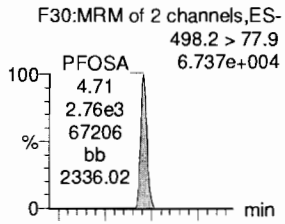
GM 6/6/2018

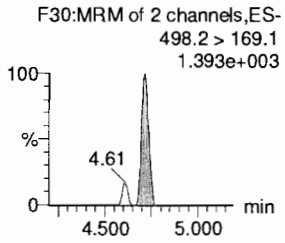
Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

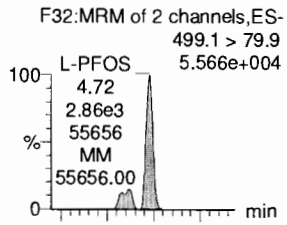
Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

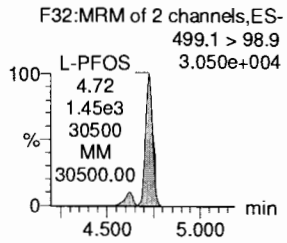
PFOSA





L-PFOS





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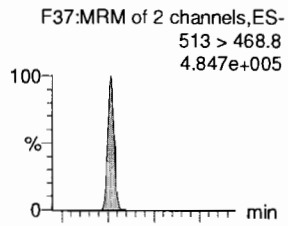
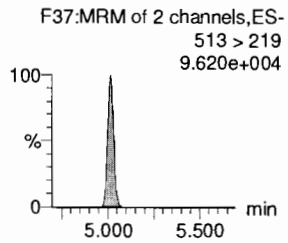
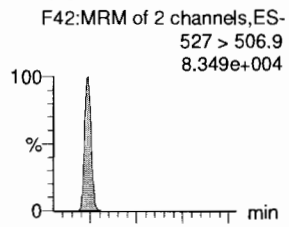
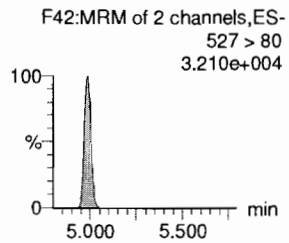




8:2 FTS





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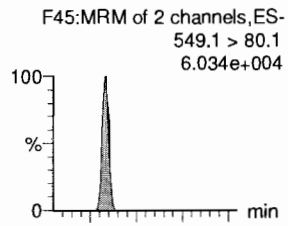

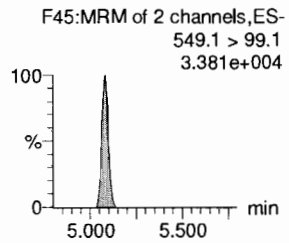

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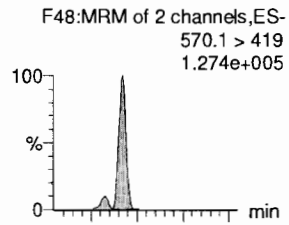
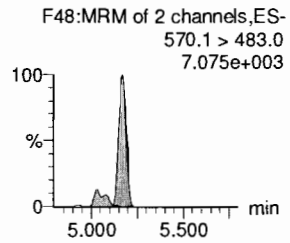
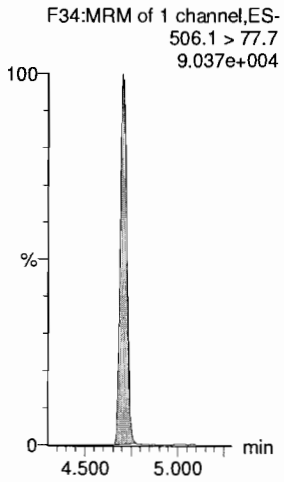
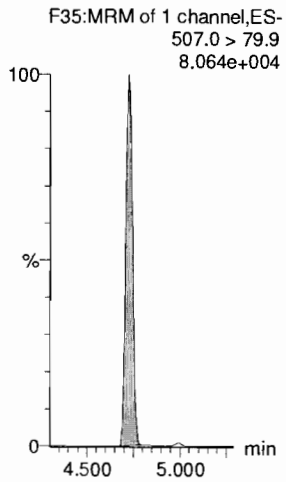




13C8-PFOSA



13C8-PFOS



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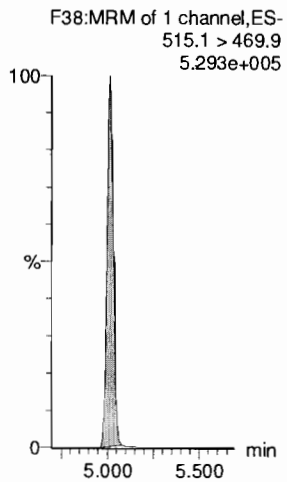
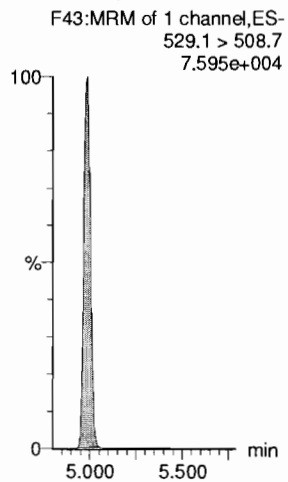
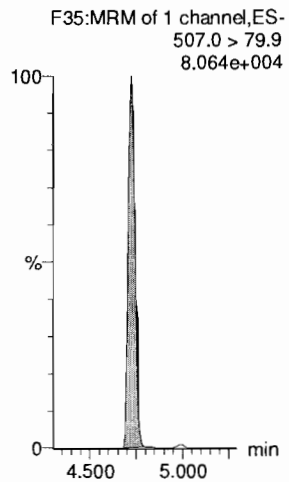


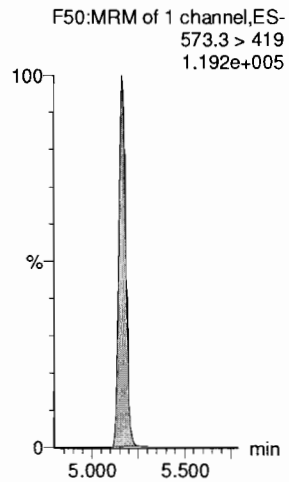
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



GM 6/6/2018

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

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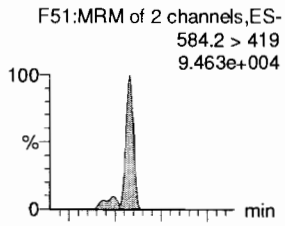
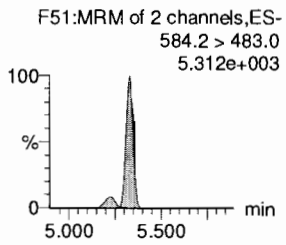
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

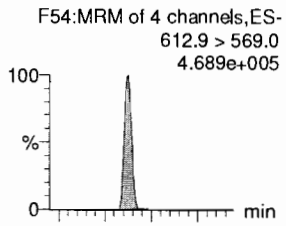
Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

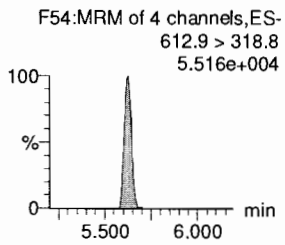
L-EtFOSAA



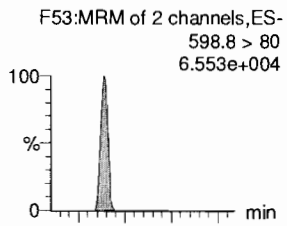


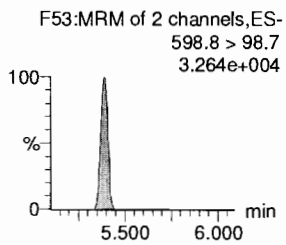
PFDoA



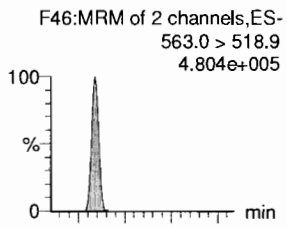


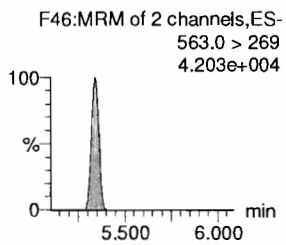
PFDS



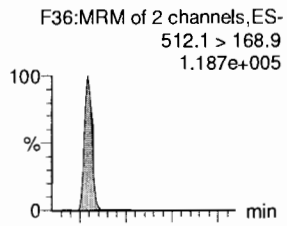


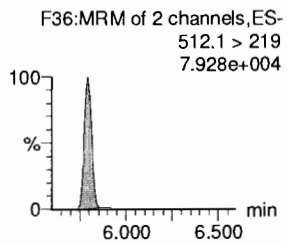
PFUdA



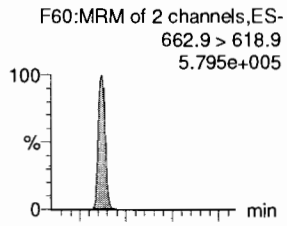


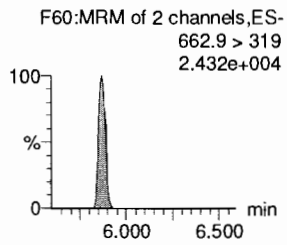
N-MeFOSA



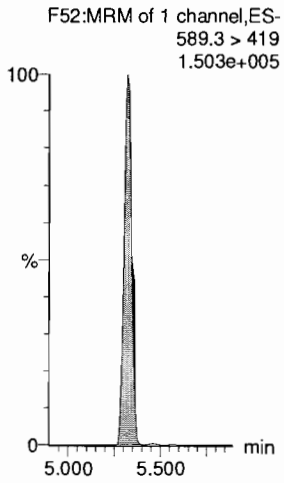


PFTrDA

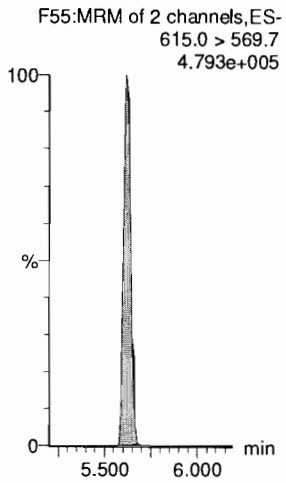




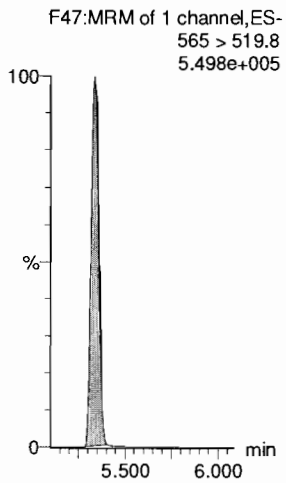
d5-N-EtFOSAA



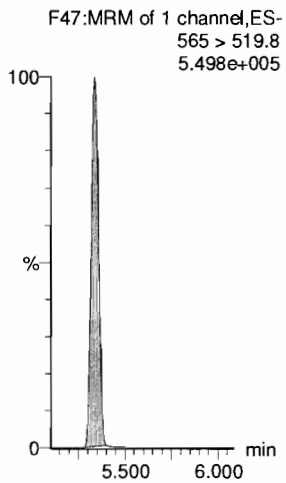
13C2-PFDoA



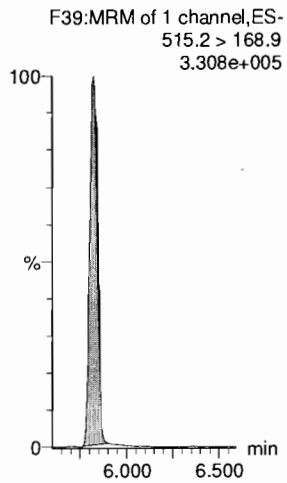
13C2-PFUdA



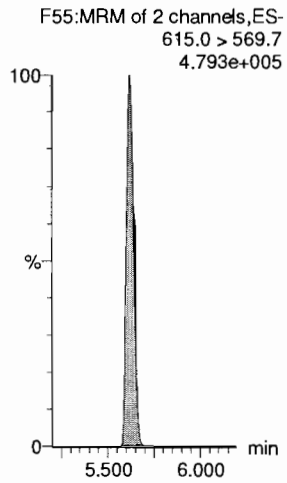
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



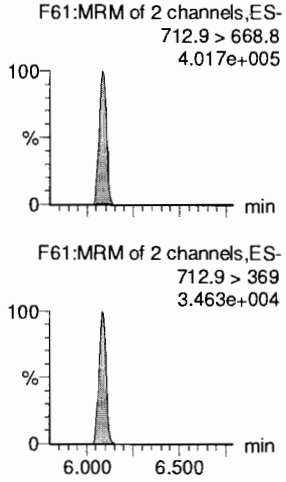
GM 6/6/2018

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

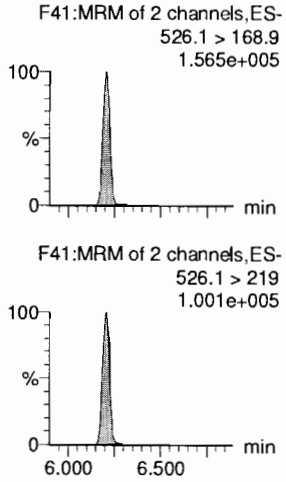
Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

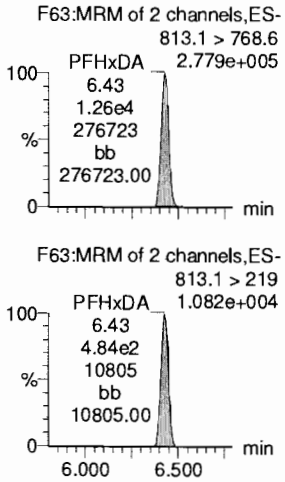
PFTeDA



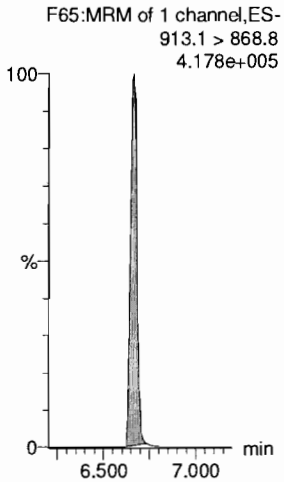
N-EtFOSA



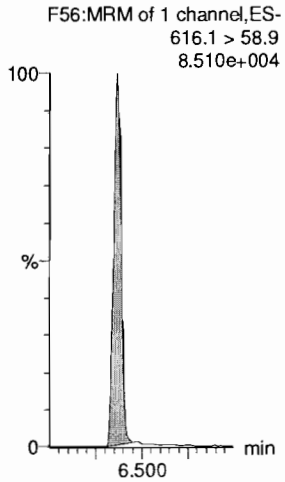
PFHxDA



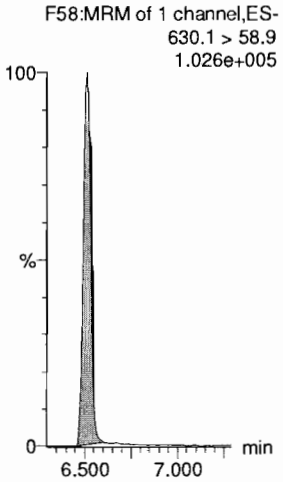
PFODA



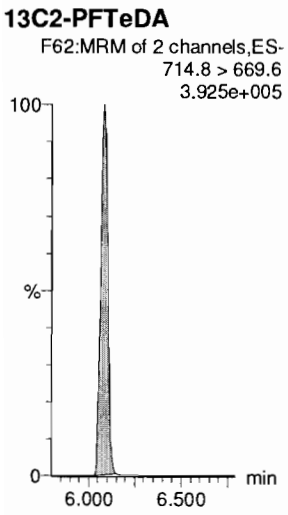
N-MeFOSE



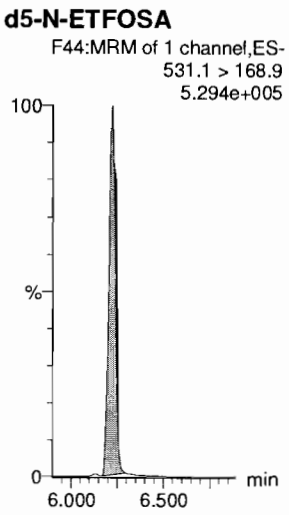
N-EtFOSE



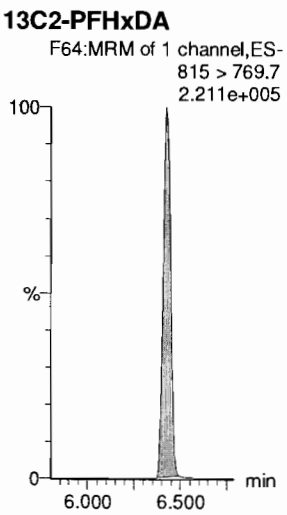
13C2-PFTeDA



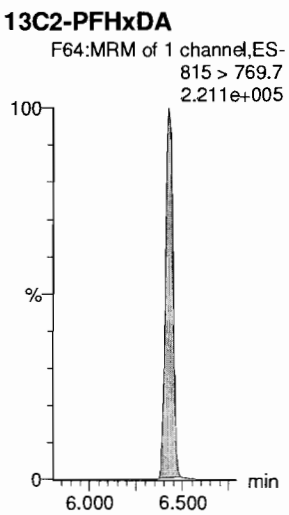
d5-N-ETFOSA



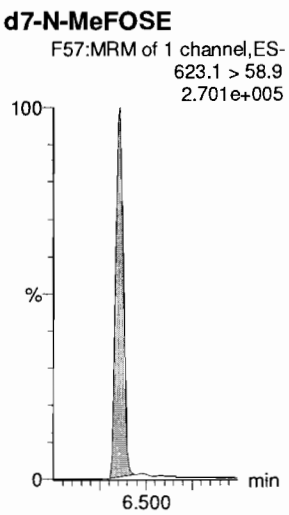
13C2-PFHxDA



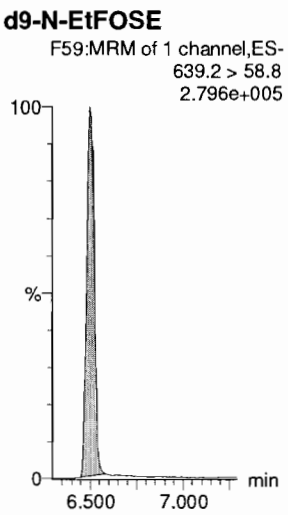
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



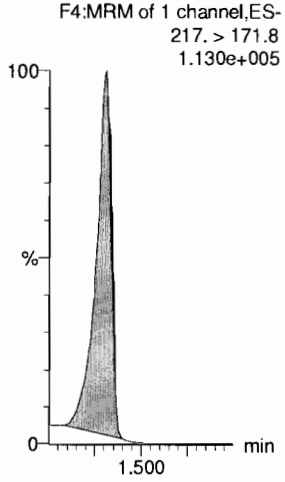
GM 6/6/2018

Dataset: F:\Projects\PFAS.PRO\Results\180605M2\180605M2-68.qld

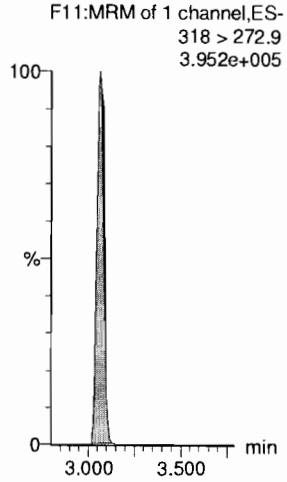
Last Altered: Wednesday, June 06, 2018 16:47:31 Pacific Daylight Time
Printed: Wednesday, June 06, 2018 16:48:11 Pacific Daylight Time

Name: 180605M2_68, Date: 06-Jun-2018, Time: 04:08:59, ID: ST180605M2-12 PFC CS3 18E2907, Description: PFC CS3 18E2907

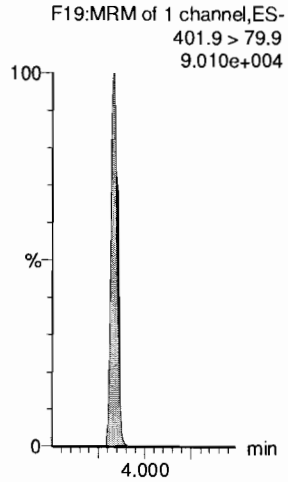
13C4-PFBA



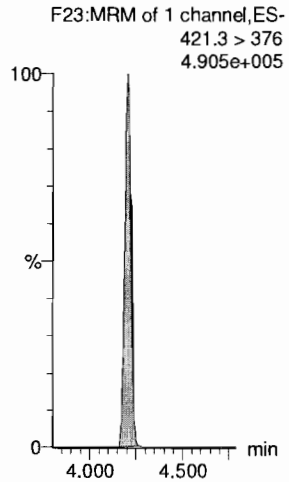
13C5-PFHxA



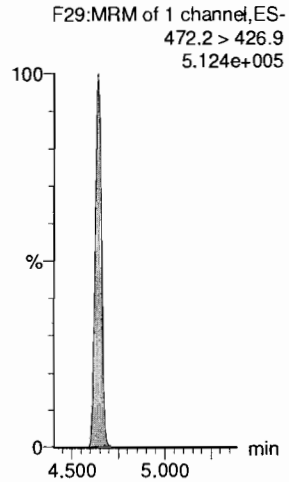
13C3-PFHxS



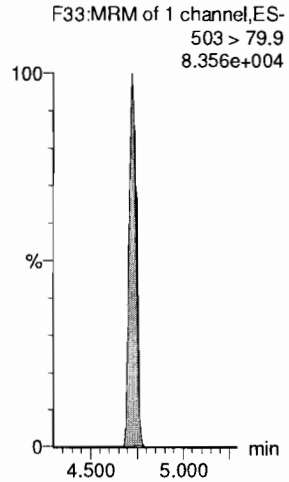
13C8-PFOA



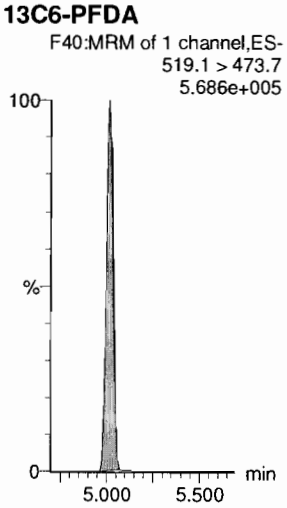
13C9-PFNA



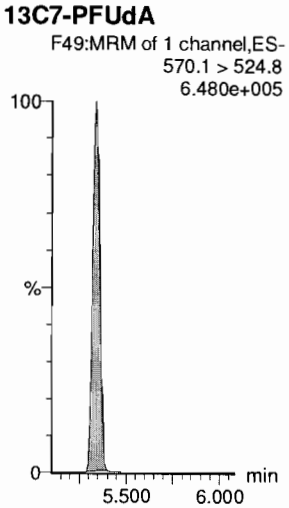
13C4-PFOS



13C6-PFDA



13C7-PFUdA



GM 6/6/2018

INITIAL CALIBRATION (ICAL)

INCLUDING ASSOCIATED

INITIAL CALIBRATION VERIFICATION (ICV) AND INSTRUMENT BLANK (IB)

Quantify Compound Summary Report **MassLynx MassLynx V4.1 SCN945 SCN960**
Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:56:32 Pacific Daylight Time

High PTs
4:2
6:2
8:2
100

Low PTs
– NO Low PTs dropped
AR 6/5/18

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

C18_VAL-PFAS_Q4_06-04-18
JM 6/5/18

Compound name: PFBA
Correlation coefficient: r = 0.999948, r^2 = 0.999896
Calibration curve: 1.11083 * x + 0.00822384
Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	1.35	200.218	9005.189	0.278	0.2	-2.9	NO	1.000	NO	MM
2	2	180604M2_3	Standard	0.500	1.34	397.783	9082.563	0.547	0.5	-2.9	NO	1.000	NO	MM
3	3	180604M2_4	Standard	1.000	1.35	904.446	9855.626	1.147	1.0	2.5	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	1.34	1563.720	8997.036	2.173	1.9	-2.6	NO	1.000	NO	bb
5	5	180604M2_6	Standard	5.000	1.35	4286.670	9430.916	5.682	5.1	2.1	NO	1.000	NO	bb
6	6	180604M2_7	Standard	10.000	1.34	9968.157	10868.822	11.464	10.3	3.1	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	1.35	43785.090	9593.588	57.050	51.4	2.7	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	1.34	86013.398	9523.508	112.896	101.6	1.6	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	1.35	205135.797	9255.525	277.045	249.4	-0.2	NO	1.000	NO	bb
10	10	180604M2_11	Standard	500.000	1.34	387010.906	8757.902	552.374	497.3	-0.5	NO	1.000	NO	bb

Compound name: PFPeA
Correlation coefficient: r = 0.999955, r^2 = 0.999909
Calibration curve: 1.02545 * x + 0.0205051
Response type: Internal Std (Ref 37), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	2.31	281.378	12347.332	0.285	0.3	3.1	NO	1.000	NO	bb
2	2	180604M2_3	Standard	0.500	2.31	541.365	12476.627	0.542	0.5	1.8	NO	1.000	NO	bb
3	3	180604M2_4	Standard	1.000	2.31	1146.746	13544.467	1.058	1.0	1.2	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	2.31	2236.822	14007.501	1.996	1.9	-3.7	NO	1.000	NO	bb
5	5	180604M2_6	Standard	5.000	2.31	5521.838	13406.085	5.149	5.0	0.0	NO	1.000	NO	bb
6	6	180604M2_7	Standard	10.000	2.31	12246.265	15122.394	10.123	9.9	-1.5	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	2.31	54015.914	13022.961	51.847	50.5	1.1	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	2.31	100253.805	12487.914	100.351	97.8	-2.2	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	2.31	241271.422	11821.135	255.127	248.8	-0.5	NO	1.000	NO	bb
10	10	180604M2_11	Standard	500.000	2.31	436875.281	10586.028	515.863	503.0	0.6	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:56:32 Pacific Daylight Time

Compound name: PFBS
Coefficient of Determination: R^2 = 0.999853
Calibration curve: 0.000168277 * x^2 + 1.98828 * x + -0.00386959
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	0.250	2.60	54.703	1498.706	0.456	0.2	-7.4	NO	1.000	NO	MM
2	2 180604M2_3	Standard	0.500	2.60	122.335	1529.458	1.000	0.5	1.0	NO	1.000	NO	MM
3	3 180604M2_4	Standard	1.000	2.60	270.237	1663.006	2.031	1.0	2.3	NO	1.000	NO	bb
4	4 180604M2_5	Standard	2.000	2.60	541.800	1756.558	3.856	1.9	-3.0	NO	1.000	NO	bb
5	5 180604M2_6	Standard	5.000	2.60	1353.673	1672.393	10.118	5.1	1.8	NO	1.000	NO	MM
6	6 180604M2_7	Standard	10.000	2.60	3063.067	1855.024	20.640	10.4	3.7	NO	1.000	NO	bb
7	7 180604M2_8	Standard	50.000	2.60	13257.850	1634.481	101.392	50.8	1.6	NO	1.000	NO	bb
8	8 180604M2_9	Standard	100.000	2.60	24840.961	1526.828	203.371	101.4	1.4	NO	1.000	NO	bb
9	9 180604M2_10	Standard	250.000	2.60	57154.797	1432.947	498.577	245.7	-1.7	NO	1.000	NO	bb
10	10 180604M2_11	Standard	500.000	2.60	100354.070	1206.225	1039.960	501.7	0.3	NO	1.000	NO	bb

Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998838
Calibration curve: -0.00374524 * x^2 + 1.11582 * x + -0.011422
Response type: Internal Std (Ref 39), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	0.250	3.01	71.012	3169.168	0.280	0.3	4.6	NO	0.999	NO	bb
2	2 180604M2_3	Standard	0.500	3.01	132.382	3422.257	0.484	0.4	-11.2	NO	0.999	NO	bb
3	3 180604M2_4	Standard	1.000	3.01	404.889	3927.586	1.289	1.2	17.0	NO	0.999	NO	bb
4	4 180604M2_5	Standard	2.000	3.01	660.839	4054.097	2.038	1.8	-7.6	NO	0.999	NO	bb
5	5 180604M2_6	Standard	5.000	3.01	1446.402	3586.589	5.041	4.6	-8.0	NO	0.999	NO	bb
6	6 180604M2_7	Standard	10.000	3.01	3845.656	4233.463	11.355	10.6	5.6	NO	0.999	NO	bb
7	7 180604M2_8	Standard	50.000	3.00	15015.386	4058.697	46.244	49.8	-0.5	NO	0.999	NO	bb
8	8 180604M2_9	Standard	100.000	3.01	26308.025	4433.810	74.169	100.1	0.1	NO	0.999	NO	bb
9	9 180604M2_10	Standard	250.000	3.01	64149.801	5370.476	149.311			NO	0.999	NO	bbXI
10	10 180604M2_11	Standard	500.000	3.01	103178.016	6656.033	193.768			NO	0.999	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:56:32 Pacific Daylight Time

Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999553
Calibration curve: -0.000313716 * x^2 + 1.59614 * x + 0.0424276
Response type: Internal Std (Ref 40), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	3.09	320.340	4246.335	0.377	0.2	-16.1	NO	1.000	NO	bb
2	2	180604M2_3	Standard	0.500	3.09	760.906	4142.994	0.918	0.5	9.8	NO	1.000	NO	bb
3	3	180604M2_4	Standard	1.000	3.09	1574.964	4630.566	1.701	1.0	3.9	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	3.09	3214.021	4710.073	3.412	2.1	5.6	NO	1.000	NO	bb
5	5	180604M2_6	Standard	5.000	3.09	7264.569	4612.718	7.874	4.9	-1.8	NO	1.000	NO	bb
6	6	180604M2_7	Standard	10.000	3.09	16854.840	4951.568	17.020	10.7	6.6	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	3.09	73282.320	4486.201	81.675	51.7	3.3	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	3.09	130754.266	4110.789	159.038	101.6	1.6	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	3.09	312826.594	4245.043	368.461	242.4	-3.1	NO	1.000	NO	bb
10	10	180604M2_11	Standard	500.000	3.09	577387.438	3985.266	724.403	503.7	0.7	NO	1.000	NO	bb

Compound name: PFPeS
Correlation coefficient: r = 0.999819, r^2 = 0.999638
Calibration curve: 1.79807 * x + 0.0789454
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	3.29	73.657	1498.706	0.614	0.3	19.1	NO	1.000	NO	bb
2	2	180604M2_3	Standard	0.500	3.29	98.936	1529.458	0.809	0.4	-18.8	NO	1.000	NO	bb
3	3	180604M2_4	Standard	1.000	3.29	267.720	1663.006	2.012	1.1	7.5	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	3.29	473.774	1756.558	3.371	1.8	-8.4	NO	1.000	NO	bb
5	5	180604M2_6	Standard	5.000	3.29	1210.386	1672.393	9.047	5.0	-0.3	NO	1.000	NO	bb
6	6	180604M2_7	Standard	10.000	3.29	2736.896	1855.024	18.442	10.2	2.1	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	3.29	11685.241	1634.481	89.365	49.7	-0.7	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	3.29	22186.217	1526.828	181.637	101.0	1.0	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	3.30	50125.336	1432.947	437.257	243.1	-2.7	NO	1.000	NO	bb
10	10	180604M2_11	Standard	500.000	3.29	87833.469	1206.225	910.210	506.2	1.2	NO	1.000	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Compound name: PFHpA
Correlation coefficient: r = 0.999421, r^2 = 0.998843
Calibration curve: 1.16069 * x + 0.0713148
Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	3.71	332.437	12501.413	0.332	0.2	-10.0	NO	0.999	NO	bb
2	2	180604M2_3	Standard	0.500	3.71	647.045	11729.507	0.690	0.5	6.5	NO	0.999	NO	bb
3	3	180604M2_4	Standard	1.000	3.70	1322.232	13016.023	1.270	1.0	3.3	NO	0.999	NO	bb
4	4	180604M2_5	Standard	2.000	3.71	2560.595	13914.408	2.300	1.9	-4.0	NO	0.999	NO	bb
5	5	180604M2_6	Standard	5.000	3.70	6473.215	13247.432	6.108	5.2	4.0	NO	0.999	NO	bb
6	6	180604M2_7	Standard	10.000	3.70	13712.969	14486.901	11.832	10.1	1.3	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	3.70	60131.785	12638.182	59.474	51.2	2.4	NO	0.999	NO	bb
8	8	180604M2_9	Standard	100.000	3.70	116906.781	12671.674	115.323	99.3	-0.7	NO	0.999	NO	bb
9	9	180604M2_10	Standard	250.000	3.71	273748.719	12444.102	274.978	236.8	-5.3	NO	0.999	NO	bb
10	10	180604M2_11	Standard	500.000	3.70	481857.938	10126.721	594.785	512.4	2.5	NO	0.999	NO	bb

Compound name: L-PFHxS
Correlation coefficient: r = 0.999443, r^2 = 0.998887
Calibration curve: 1.9216 * x + -0.00896228
Response type: Internal Std (Ref 42), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	3.86	51.876	1333.795	0.486	0.3	3.1	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	3.86	98.207	1335.589	0.919	0.5	-3.4	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	3.86	233.406	1500.467	1.944	1.0	1.7	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	3.86	421.065	1457.849	3.610	1.9	-5.8	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	3.85	1040.155	1355.524	9.592	5.0	-0.1	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	3.86	2483.240	1524.630	20.359	10.6	6.0	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	3.85	10770.157	1363.064	98.768	51.4	2.8	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	3.86	20282.564	1342.743	188.817	98.3	-1.7	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	3.86	46991.344	1285.869	456.805	237.7	-4.9	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	3.85	85220.055	1082.486	984.078	512.1	2.4	NO	0.999	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.999839
Calibration curve: -0.00346555 * x^2 + 1.27447 * x + -0.0336081
Response type: Internal Std (Ref 43), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.17	77.617	3136.696	0.309	0.3	7.7	NO	1.000	NO	MM
2	2	180604M2_3	Standard	0.500	4.17	157.005	3478.213	0.564	0.5	-6.1	NO	1.000	NO	bb
3	3	180604M2_4	Standard	1.000	4.17	364.671	3819.201	1.194	1.0	-3.5	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	4.17	803.633	3828.594	2.624	2.1	4.9	NO	1.000	NO	MM
5	5	180604M2_6	Standard	5.000	4.17	1834.352	3805.419	6.025	4.8	-3.7	NO	1.000	NO	MM
6	6	180604M2_7	Standard	10.000	4.17	3972.782	4005.856	12.397	10.0	0.3	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	4.17	17959.236	4061.438	55.274	50.3	0.5	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	4.17	33775.742	4557.357	92.641	99.8	-0.2	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	4.17	70401.641	5639.339	156.050			NO	1.000	NO	bbXl
10	10	180604M2_11	Standard	500.000	4.17	120391.594	7863.491	191.377			NO	1.000	NO	bbXl

Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999247
Calibration curve: -5.24867e-005 * x^2 + 0.895395 * x + 0.0852547
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.23	399.295	20205.967	0.247	0.2	-27.7	NO	0.999	NO	bb
2	2	180604M2_3	Standard	0.500	4.23	827.505	19150.432	0.540	0.5	1.6	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	4.23	1635.800	18664.631	1.096	1.1	12.8	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	4.23	3433.985	21305.520	2.015	2.2	7.8	NO	0.999	NO	bb
5	5	180604M2_6	Standard	5.000	4.22	7674.669	20989.240	4.571	5.0	0.2	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	4.23	17909.258	23488.016	9.531	10.6	5.6	NO	0.999	NO	bb
7	7	180604M2_8	Standard	50.000	4.22	71871.891	19220.492	46.742	52.3	4.5	NO	0.999	NO	bb
8	8	180604M2_9	Standard	100.000	4.22	132108.922	19779.754	83.487	93.7	-6.3	NO	0.999	NO	bb
9	9	180604M2_10	Standard	250.000	4.23	332175.688	18486.152	224.611	254.6	1.8	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	4.22	597850.250	17235.395	433.592	498.7	-0.3	NO	0.999	NO	bb

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Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999609
Calibration curve: -2.99805e-005 * x^2 + 0.157724 * x + 0.00259156
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.34	60.445	20205.967	0.037	0.2	-11.7	NO	1.000	NO	bb
2	2	180604M2_3	Standard	0.500	4.33	123.093	19150.432	0.080	0.5	-1.4	NO	1.000	NO	MM
3	3	180604M2_4	Standard	1.000	4.33	266.700	18664.631	0.179	1.1	11.6	NO	1.000	NO	bb
4	4	180604M2_5	Standard	2.000	4.33	523.876	21305.520	0.307	1.9	-3.4	NO	1.000	NO	MM
5	5	180604M2_6	Standard	5.000	4.33	1398.650	20989.240	0.833	5.3	5.4	NO	1.000	NO	bb
6	6	180604M2_7	Standard	10.000	4.33	2866.486	23488.016	1.526	9.7	-3.3	NO	1.000	NO	bb
7	7	180604M2_8	Standard	50.000	4.33	12718.886	19220.492	8.272	53.0	5.9	NO	1.000	NO	bb
8	8	180604M2_9	Standard	100.000	4.33	23718.021	19779.754	14.989	96.8	-3.2	NO	1.000	NO	bb
9	9	180604M2_10	Standard	250.000	4.33	55497.215	18486.152	37.526	249.8	-0.1	NO	1.000	NO	bb
10	10	180604M2_11	Standard	500.000	4.33	98501.461	17235.395	71.438	500.5	0.1	NO	1.000	NO	bb

Compound name: PFNA
Coefficient of Determination: R^2 = 0.997864
Calibration curve: 0.000147582 * x^2 + 1.2693 * x + 0.0983793
Response type: Internal Std (Ref 45), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.66	441.622	16427.822	0.336	0.2	-25.1	NO	0.998	NO	MM
2	2	180604M2_3	Standard	0.500	4.66	956.573	17421.307	0.686	0.5	-7.4	NO	0.998	NO	MM
3	3	180604M2_4	Standard	1.000	4.66	1975.412	19878.240	1.242	0.9	-9.9	NO	0.998	NO	MM
4	4	180604M2_5	Standard	2.000	4.66	4082.241	18188.109	2.806	2.1	6.6	NO	0.998	NO	MM
5	5	180604M2_6	Standard	5.000	4.66	9768.227	15834.358	7.711	6.0	19.9	NO	0.998	NO	MM
6	6	180604M2_7	Standard	10.000	4.66	17862.461	16231.207	13.756	10.7	7.5	NO	0.998	NO	MM
7	7	180604M2_8	Standard	50.000	4.66	92683.320	15917.798	72.783	56.9	13.8	NO	0.998	NO	MM
8	8	180604M2_9	Standard	100.000	4.66	165536.297	16328.868	126.721	98.6	-1.4	NO	0.998	NO	MM
9	9	180604M2_10	Standard	250.000	4.66	415747.969	16797.787	309.377	237.1	-5.2	NO	0.998	NO	MM
10	10	180604M2_11	Standard	500.000	4.66	759963.063	13975.681	679.719	505.7	1.1	NO	0.998	NO	MM

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Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999493
Calibration curve: -0.000225332 * x^2 + 0.955318 * x + -0.036378
Response type: Internal Std (Ref 46), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.73	46.728	3431.462	0.170	0.2	-13.5	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	4.72	123.414	3179.648	0.485	0.5	9.2	NO	0.999	NO	bb
3	3	180604M2_4	Standard	1.000	4.73	261.758	3595.649	0.910	1.0	-0.9	NO	0.999	NO	bb
4	4	180604M2_5	Standard	2.000	4.73	488.988	3834.985	1.594	1.7	-14.6	NO	0.999	NO	bb
5	5	180604M2_6	Standard	5.000	4.73	1424.439	3390.498	5.252	5.5	10.9	NO	0.999	NO	bb
6	6	180604M2_7	Standard	10.000	4.73	2880.019	3889.938	9.255	9.7	-2.5	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	4.72	12077.262	3418.532	44.161	46.8	-6.4	NO	0.999	NO	bb
8	8	180604M2_9	Standard	100.000	4.73	23619.221	3112.179	94.866	101.8	1.8	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	4.73	54122.398	2973.532	227.517	253.3	1.3	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	4.72	92360.813	2749.737	419.862	498.0	-0.4	NO	0.999	NO	MM

Compound name: L-PFOS
Coefficient of Determination: R^2 = 0.999458
Calibration curve: 1.42803e-007 * x^2 + 0.934629 * x + -0.0613722
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	4.75	42.566	3315.648	0.160	0.2	-5.1	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	4.74	112.495	2954.499	0.476	0.6	15.0	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	4.74	238.462	3630.876	0.821	0.9	-5.6	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	4.74	505.739	3704.720	1.706	1.9	-5.4	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	4.74	1278.387	3298.775	4.844	5.2	5.0	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	4.74	2927.725	3897.956	9.389	10.1	1.1	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	4.74	12183.854	3440.435	44.267	47.4	-5.1	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	4.74	23893.512	3274.599	91.208	97.7	-2.3	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	4.74	55947.535	2902.207	240.970	257.9	3.2	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	4.74	100952.094	2717.965	464.282	496.8	-0.6	NO	0.999	NO	MM

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Compound name: PFDA
Coefficient of Determination: R^2 = 0.999743
Calibration curve: 0.00037847 * x^2 + 1.01718 * x + 0.0671158
Response type: Internal Std (Ref 48), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	0.250	5.04	508.313	21761.287	0.292	0.2	-11.6	NO	1.000	NO	MM
2	2 180604M2_3	Standard	0.500	5.03	1152.791	20533.658	0.702	0.6	24.8	NO	1.000	NO	MM
3	3 180604M2_4	Standard	1.000	5.03	1838.713	20788.254	1.106	1.0	2.1	NO	1.000	NO	MM
4	4 180604M2_5	Standard	2.000	5.03	4669.937	26067.412	2.239	2.1	6.7	NO	1.000	NO	bb
5	5 180604M2_6	Standard	5.000	5.03	9633.189	23295.496	5.169	5.0	0.1	NO	1.000	NO	MM
6	6 180604M2_7	Standard	10.000	5.03	23717.045	26637.291	11.130	10.8	8.3	NO	1.000	NO	MM
7	7 180604M2_8	Standard	50.000	5.03	92221.961	23496.604	49.061	47.3	-5.3	NO	1.000	NO	MM
8	8 180604M2_9	Standard	100.000	5.03	139928.125	16383.868	106.758	101.1	1.1	NO	1.000	NO	MM
9	9 180604M2_10	Standard	250.000	5.03	429837.344	19258.957	278.985	250.8	0.3	NO	1.000	NO	MM
10	10 180604M2_11	Standard	500.000	5.03	817929.813	16960.596	602.816	499.7	-0.1	NO	1.000	NO	MM

Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.999723
Calibration curve: -0.0051377 * x^2 + 1.48665 * x + 0.00181394
Response type: Internal Std (Ref 49), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	0.250	5.00	91.591	2934.979	0.390	0.3	4.6	NO	1.000	NO	bb
2	2 180604M2_3	Standard	0.500	5.00	173.944	3009.166	0.723	0.5	-2.9	NO	1.000	NO	bb
3	3 180604M2_4	Standard	1.000	5.00	391.783	3267.680	1.499	1.0	1.0	NO	1.000	NO	bb
4	4 180604M2_5	Standard	2.000	5.00	779.362	3210.507	3.034	2.1	2.7	NO	1.000	NO	bb
5	5 180604M2_6	Standard	5.000	5.00	1832.006	3308.789	6.921	4.7	-5.4	NO	1.000	NO	bb
6	6 180604M2_7	Standard	10.000	5.00	4234.394	3729.984	14.190	9.9	-1.2	NO	1.000	NO	bb
7	7 180604M2_8	Standard	50.000	5.00	18019.498	3613.179	62.339	50.9	1.8	NO	1.000	NO	bb
8	8 180604M2_9	Standard	100.000	5.00	31084.084	4009.876	96.899	99.2	-0.8	NO	1.000	NO	bb
9	9 180604M2_10	Standard	250.000	5.00	68676.156	5046.779	170.099			NO	1.000	NO	bbXI
10	10 180604M2_11	Standard	500.000	4.99	114753.305	6978.822	205.538			NO	1.000	NO	bbXI

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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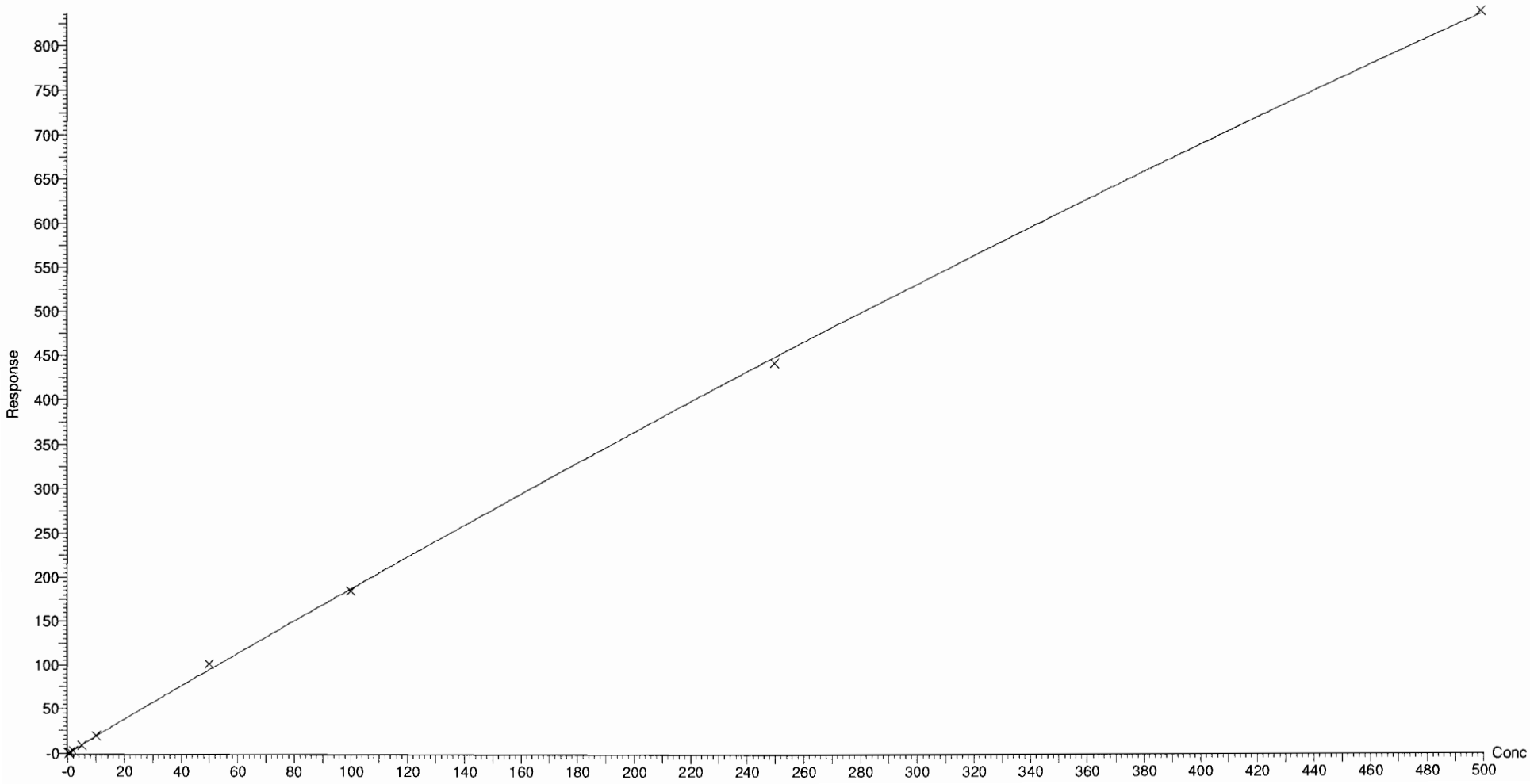
Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999432
Calibration curve: -0.000502031 * x^2 + 1.91815 * x + -0.195978
Response type: Internal Std (Ref 50), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:56:32 Pacific Daylight Time

Compound name: PFNS
Coefficient of Determination: R^2 = 0.999403
Calibration curve: -0.000141031 * x^2 + 0.84601 * x + -0.0910263
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.10	35.733	3315.648	0.135	0.3	6.7	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	5.09	94.093	2954.499	0.398	0.6	15.6	NO	0.999	NO	bb
3	3	180604M2_4	Standard	1.000	5.09	209.017	3630.876	0.720	1.0	-4.2	NO	0.999	NO	bb
4	4	180604M2_5	Standard	2.000	5.09	416.509	3704.720	1.405	1.8	-11.5	NO	0.999	NO	bb
5	5	180604M2_6	Standard	5.000	5.09	1073.949	3298.775	4.069	4.9	-1.6	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	5.09	2582.372	3897.956	8.281	9.9	-0.9	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	5.09	10938.496	3440.435	39.742	47.5	-5.1	NO	0.999	NO	bb
8	8	180604M2_9	Standard	100.000	5.09	21378.234	3274.599	81.606	98.2	-1.8	NO	0.999	NO	bb
9	9	180604M2_10	Standard	250.000	5.09	48609.973	2902.207	209.366	258.7	3.5	NO	0.999	NO	bb
10	10	180604M2_11	Standard	500.000	5.09	83666.563	2717.965	384.785	495.9	-0.8	NO	0.999	NO	bb

Compound name: L-MeFOSAA
Coefficient of Determination: R^2 = 0.999432
Calibration curve: -0.000502031 * x^2 + 1.91815 * x + -0.195978
Response type: Internal Std (Ref 50), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.19	128.578	4210.790	0.382	0.3	20.5	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	5.18	168.771	4114.854	0.513	0.4	-26.1	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	5.18	747.096	4411.583	2.117	1.2	20.6	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	5.18	1176.726	4785.307	3.074	1.7	-14.7	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	5.18	3169.990	4484.180	8.837	4.7	-5.7	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	5.18	7635.587	4988.149	19.134	10.1	1.0	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	5.18	35062.242	4352.490	100.696	53.3	6.7	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	5.18	63922.762	4328.779	184.587	98.9	-1.1	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	5.18	150590.078	4265.706	441.281	246.0	-1.6	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	5.18	261962.859	3914.602	836.493	502.2	0.4	NO	0.999	NO	MM

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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38 C10_VAL PFAS_04_06-04-18

Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999646
Calibration curve: -0.00010475 * x^2 + 1.14871 * x + -0.0588573
Response type: Internal Std (Ref 51), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.35	117.195	5523.320	0.265	0.3	12.9	NO	1.000	NO	MM
2	2	180604M2_3	Standard	0.500	5.34	214.899	5238.067	0.513	0.5	-0.5	NO	1.000	NO	MM
3	3	180604M2_4	Standard	1.000	5.34	403.874	5567.794	0.907	0.8	-15.9	NO	1.000	NO	MM
4	4	180604M2_5	Standard	2.000	5.34	873.437	5895.005	1.852	1.7	-16.8	NO	1.000	NO	MM
5	5	180604M2_6	Standard	5.000	5.34	2547.371	5760.961	5.527	4.9	-2.7	NO	1.000	NO	MM
6	6	180604M2_7	Standard	10.000	5.34	5775.263	6157.235	11.725	10.3	2.7	NO	1.000	NO	MM
7	7	180604M2_8	Standard	50.000	5.34	25802.385	5813.378	55.481	48.6	-2.9	NO	1.000	NO	MM
8	8	180604M2_9	Standard	100.000	5.34	47811.383	5069.896	117.881	103.7	3.7	NO	1.000	NO	MM
9	9	180604M2_10	Standard	250.000	5.34	104052.688	4683.729	277.697	247.4	-1.0	NO	1.000	NO	MM
10	10	180604M2_11	Standard	500.000	5.34	182901.938	4165.334	548.881	500.7	0.1	NO	1.000	NO	MM

Compound name: PFUdA
Coefficient of Determination: R^2 = 0.997692
Calibration curve: -0.00013883 * x^2 + 0.96625 * x + 0.0663674
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.36	454.345	22871.002	0.248	0.2	-24.7	NO	0.998	NO	MM
2	2	180604M2_3	Standard	0.500	5.35	926.813	18741.598	0.618	0.6	14.2	NO	0.998	NO	MM
3	3	180604M2_4	Standard	1.000	5.35	2190.952	26986.771	1.015	1.0	-1.8	NO	0.998	NO	MM
4	4	180604M2_5	Standard	2.000	5.35	3484.744	18264.871	2.385	2.4	20.0	NO	0.998	NO	MM
5	5	180604M2_6	Standard	5.000	5.35	9520.334	25583.273	4.652	4.7	-5.0	NO	0.998	NO	MM
6	6	180604M2_7	Standard	10.000	5.35	21604.178	25767.896	10.480	10.8	7.9	NO	0.998	NO	MM
7	7	180604M2_8	Standard	50.000	5.35	83864.031	24683.182	42.470	44.2	-11.7	NO	0.998	NO	bb
8	8	180604M2_9	Standard	100.000	5.35	159380.531	21720.848	91.721	96.2	-3.8	NO	0.998	NO	MM
9	9	180604M2_10	Standard	250.000	5.35	408045.594	20656.635	246.922	265.6	6.2	NO	0.998	NO	MM
10	10	180604M2_11	Standard	500.000	5.35	688705.938	19443.674	442.757	493.1	-1.4	NO	0.998	NO	MM

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Compound name: PFDS
Coefficient of Determination: R^2 = 0.998713
Calibration curve: -2.08709e-005 * x^2 + 0.145076 * x + -0.00507523
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.41	45.757	22871.002	0.025	0.2	-17.1	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	5.41	95.649	18741.598	0.064	0.5	-5.1	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	5.40	284.888	26986.771	0.132	0.9	-5.5	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	5.40	542.767	18264.871	0.371	2.6	29.8	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	5.40	1196.045	25583.273	0.584	4.1	-18.7	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	5.40	3208.356	25767.896	1.556	10.8	7.8	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	5.40	12832.533	24683.182	6.499	45.1	-9.8	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	5.40	25807.607	21720.848	14.852	104.0	4.0	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	5.40	58224.566	20656.635	35.234	252.0	0.8	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	5.39	104428.633	19443.674	67.135	498.6	-0.3	NO	0.999	NO	MM

Compound name: PFDoA
Coefficient of Determination: R^2 = 0.997401
Calibration curve: 0.000212677 * x^2 + 1.10562 * x + 0.0813564
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.64	456.527	19397.404	0.294	0.2	-23.0	NO	0.997	NO	MM
2	2	180604M2_3	Standard	0.500	5.63	1134.501	17754.355	0.799	0.6	29.8	NO	0.997	NO	bb
3	3	180604M2_4	Standard	1.000	5.63	2182.828	25882.254	1.054	0.9	-12.0	NO	0.997	NO	MM
4	4	180604M2_5	Standard	2.000	5.63	4066.530	23953.689	2.122	1.8	-7.7	NO	0.997	NO	MM
5	5	180604M2_6	Standard	5.000	5.63	12163.052	24244.600	6.271	5.6	11.8	NO	0.997	NO	MM
6	6	180604M2_7	Standard	10.000	5.63	24404.803	27755.697	10.991	9.8	-1.5	NO	0.997	NO	MM
7	7	180604M2_8	Standard	50.000	5.63	112908.602	22544.379	62.604	55.9	11.9	NO	0.997	NO	MM
8	8	180604M2_9	Standard	100.000	5.63	181720.422	22912.549	99.138	88.1	-11.9	NO	0.997	NO	MM
9	9	180604M2_10	Standard	250.000	5.63	487289.656	20375.152	298.948	257.6	3.0	NO	0.997	NO	MM
10	10	180604M2_11	Standard	500.000	5.63	813939.313	16857.902	603.530	498.1	-0.4	NO	0.997	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999647
Calibration curve: -6.00765e-005 * x^2 + 1.05382 * x + 1.43912e-005
Response type: Internal Std (Ref 54), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	1.250	5.84	99.834	14272.175	1.049	1.0	-20.3	NO	1.000	NO	bb
2	2	180604M2_3	Standard	2.500	5.82	262.255	13534.160	2.907	2.8	10.3	NO	1.000	NO	bb
3	3	180604M2_4	Standard	5.000	5.82	542.064	14890.748	5.460	5.2	3.7	NO	1.000	NO	bb
4	4	180604M2_5	Standard	10.000	5.82	1052.964	15456.740	10.218	9.7	-3.0	NO	1.000	NO	bb
5	5	180604M2_6	Standard	25.000	5.82	2661.011	14561.282	27.412	26.1	4.2	NO	1.000	NO	MM
6	6	180604M2_7	Standard	50.000	5.82	5989.729	16522.182	54.379	51.8	3.5	NO	1.000	NO	MM
7	7	180604M2_8	Standard	250.000	5.82	26163.229	14948.137	262.540	252.8	1.1	NO	1.000	NO	MM
8	8	180604M2_9	Standard	500.000	5.82	49787.059	14228.368	524.871	513.1	2.6	NO	1.000	NO	MM
9	9	180604M2_10	Standard	1250.000	5.82	114688.125	14432.672	1191.964	1215.3	-2.8	NO	1.000	NO	MM
10	10	180604M2_11	Standard	2500.000	5.82	206537.891	13636.706	2271.860	2517.0	0.7	NO	1.000	NO	MM

Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.998885
Calibration curve: 0.000371643 * x^2 + 1.06917 * x + 0.144786
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	5.88	605.594	19397.404	0.390	0.2	-8.2	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	5.88	1162.894	17754.355	0.819	0.6	26.0	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	5.88	2058.899	25882.254	0.994	0.8	-20.6	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	5.88	4096.845	23953.689	2.138	1.9	-6.9	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	5.88	10095.215	24244.600	5.205	4.7	-5.5	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	5.88	27843.785	27755.697	12.540	11.5	15.5	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	5.88	103653.180	22544.379	57.472	52.7	5.3	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	5.88	187340.047	22912.549	102.204	92.5	-7.5	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	5.88	483962.938	20375.152	296.908	255.0	2.0	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	5.88	844121.625	16857.902	625.909	498.8	-0.2	NO	0.999	NO	MM

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Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999161
Calibration curve: -0.000334653 * x^2 + 1.29716 * x + 0.0524742
Response type: Internal Std (Ref 55), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	6.10	472.059	17876.412	0.330	0.2	-14.4	NO	0.999	NO	MM
2	2	180604M2_3	Standard	0.500	6.10	841.893	16472.129	0.639	0.5	-9.6	NO	0.999	NO	MM
3	3	180604M2_4	Standard	1.000	6.09	1922.840	16315.121	1.473	1.1	9.6	NO	0.999	NO	MM
4	4	180604M2_5	Standard	2.000	6.10	3725.166	17710.369	2.629	2.0	-0.6	NO	0.999	NO	MM
5	5	180604M2_6	Standard	5.000	6.09	9742.960	17267.689	7.053	5.4	8.1	NO	0.999	NO	MM
6	6	180604M2_7	Standard	10.000	6.09	21137.033	19111.336	13.825	10.6	6.5	NO	0.999	NO	MM
7	7	180604M2_8	Standard	50.000	6.09	83730.727	16598.182	63.057	49.2	-1.6	NO	0.999	NO	MM
8	8	180604M2_9	Standard	100.000	6.09	181719.109	17128.834	132.612	105.0	5.0	NO	0.999	NO	MM
9	9	180604M2_10	Standard	250.000	6.10	378320.563	16157.284	292.686	240.5	-3.8	NO	0.999	NO	MM
10	10	180604M2_11	Standard	500.000	6.09	655769.125	14401.537	569.183	504.4	0.9	NO	0.999	NO	MM

Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999998
Calibration curve: -3.24276e-005 * x^2 + 0.927207 * x + 0.0223365
Response type: Internal Std (Ref 56), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	1.250	6.23	142.481	18564.291	1.151	1.2	-2.6	NO	1.000	NO	MM
2	2	180604M2_3	Standard	2.500	6.23	316.888	19925.244	2.386	2.5	2.0	NO	1.000	NO	MM
3	3	180604M2_4	Standard	5.000	6.22	681.625	21577.180	4.739	5.1	1.7	NO	1.000	NO	MM
4	4	180604M2_5	Standard	10.000	6.23	1385.069	22476.027	9.244	9.9	-0.5	NO	1.000	NO	MM
5	5	180604M2_6	Standard	25.000	6.22	3215.166	21033.535	22.929	24.7	-1.1	NO	1.000	NO	MM
6	6	180604M2_7	Standard	50.000	6.22	7577.270	24418.678	46.546	50.3	0.5	NO	1.000	NO	MM
7	7	180604M2_8	Standard	250.000	6.22	32583.484	21256.074	229.935	250.2	0.1	NO	1.000	NO	MM
8	8	180604M2_9	Standard	500.000	6.22	61194.531	20182.076	454.818	499.2	-0.2	NO	1.000	NO	MM
9	9	180604M2_10	Standard	1250.000	6.23	139089.672	18810.104	1109.162	1250.9	0.1	NO	1.000	NO	MM
10	10	180604M2_11	Standard	2500.000	6.22	241858.438	17152.324	2115.093	2499.6	-0.0	NO	1.000	NO	MM

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.999511
Calibration curve: -0.000267807 * x^2 + 0.605113 * x + 0.0392849
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	6.43	330.938	9317.349	0.178	0.2	-8.6	NO	1.000	NO	MM
2	2	180604M2_3	Standard	0.500	6.43	716.259	9338.518	0.383	0.6	13.8	NO	1.000	NO	MM
3	3	180604M2_4	Standard	1.000	6.43	1338.395	11752.719	0.569	0.9	-12.4	NO	1.000	NO	MM
4	4	180604M2_5	Standard	2.000	6.43	2664.839	11152.150	1.195	1.9	-4.4	NO	1.000	NO	MM
5	5	180604M2_6	Standard	5.000	6.43	6709.463	10286.672	3.261	5.3	6.7	NO	1.000	NO	MM
6	6	180604M2_7	Standard	10.000	6.43	15079.014	11743.332	6.420	10.6	5.9	NO	1.000	NO	MM
7	7	180604M2_8	Standard	50.000	6.43	61798.699	10233.453	30.194	51.0	2.0	NO	1.000	NO	MM
8	8	180604M2_9	Standard	100.000	6.43	112417.227	10143.569	55.413	95.6	-4.4	NO	1.000	NO	MM
9	9	180604M2_10	Standard	250.000	6.43	258363.797	9457.769	136.588	254.3	1.7	NO	1.000	NO	MM
10	10	180604M2_11	Standard	500.000	6.43	451723.313	9608.434	235.066	498.3	-0.3	NO	1.000	NO	MM

Compound name: PFODA
Coefficient of Determination: R^2 = 0.999491
Calibration curve: -0.000404358 * x^2 + 0.894092 * x + -0.0222858
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	0.250	6.67	421.840	9317.349	0.226	0.3	11.3	NO	0.999	NO	bb
2	2	180604M2_3	Standard	0.500	6.67	880.754	9338.518	0.472	0.6	10.5	NO	0.999	NO	bb
3	3	180604M2_4	Standard	1.000	6.67	1757.530	11752.719	0.748	0.9	-13.8	NO	0.999	NO	bb
4	4	180604M2_5	Standard	2.000	6.67	3544.492	11152.150	1.589	1.8	-9.8	NO	0.999	NO	bb
5	5	180604M2_6	Standard	5.000	6.67	8985.215	10286.672	4.367	4.9	-1.6	NO	0.999	NO	bb
6	6	180604M2_7	Standard	10.000	6.67	19850.248	11743.332	8.452	9.5	-4.8	NO	0.999	NO	bb
7	7	180604M2_8	Standard	50.000	6.67	87936.969	10233.453	42.965	49.2	-1.7	NO	0.999	NO	bb
8	8	180604M2_9	Standard	100.000	6.67	169032.750	10143.569	83.320	97.5	-2.5	NO	0.999	NO	bb
9	9	180604M2_10	Standard	250.000	6.67	386187.063	9457.769	204.164	258.6	3.4	NO	0.999	NO	bb
10	10	180604M2_11	Standard	500.000	6.67	660007.313	9608.434	343.452	495.0	-1.0	NO	0.999	NO	bb

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Compound name: N-MeFOSE
Correlation coefficient: r = 0.997461, r^2 = 0.994929
Calibration curve: 1.00285 * x + -0.37541
Response type: Internal Std (Ref 58), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	1.250	6.38	70.618	11044.131	0.959	1.3	6.5	NO	0.995	NO	MM
2	2	180604M2_3	Standard	2.500	6.37	146.761	10474.625	2.102	2.5	-1.2	NO	0.995	NO	MM
3	3	180604M2_4	Standard	5.000	6.37	418.207	12360.827	5.075	5.4	8.7	NO	0.995	NO	MM
4	4	180604M2_5	Standard	10.000	6.37	822.932	13301.675	9.280	9.6	-3.7	NO	0.995	NO	MM
5	5	180604M2_6	Standard	25.000	6.37	1900.876	11701.808	24.366	24.7	-1.3	NO	0.995	NO	MM
6	6	180604M2_7	Standard	50.000	6.37	4146.294	12515.271	49.695	49.9	-0.1	NO	0.995	NO	MM
7	7	180604M2_8	Standard	250.000	6.37	18776.223	11664.843	241.446	241.1	-3.5	NO	0.995	NO	MM
8	8	180604M2_9	Standard	500.000	6.37	38398.934	11530.785	499.518	498.5	-0.3	NO	0.995	NO	MM
9	9	180604M2_10	Standard	1250.000	6.37	88299.289	11837.472	1118.895	1116.1	-10.7	NO	0.995	NO	MM
10	10	180604M2_11	Standard	2500.000	6.37	198307.703	11217.550	2651.752	2644.6	5.8	NO	0.995	NO	MM

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999985
Calibration curve: 1.74191e-005 * x^2 + 1.19563 * x + -0.124308
Response type: Internal Std (Ref 59), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	1.250	6.53	97.683	9984.098	1.468	1.3	6.5	NO	1.000	NO	MM
2	2	180604M2_3	Standard	2.500	6.51	190.657	10038.572	2.849	2.5	-0.5	NO	1.000	NO	MM
3	3	180604M2_4	Standard	5.000	6.52	426.287	11277.418	5.670	4.8	-3.1	NO	1.000	NO	MM
4	4	180604M2_5	Standard	10.000	6.52	883.671	11254.722	11.777	10.0	-0.5	NO	1.000	NO	MM
5	5	180604M2_6	Standard	25.000	6.52	2199.000	11039.759	29.878	25.1	0.3	NO	1.000	NO	MM
6	6	180604M2_7	Standard	50.000	6.52	4909.453	12745.162	57.780	48.4	-3.2	NO	1.000	NO	MM
7	7	180604M2_8	Standard	250.000	6.52	22161.285	11078.604	300.055	250.2	0.1	NO	1.000	NO	MM
8	8	180604M2_9	Standard	500.000	6.52	43466.652	10782.540	604.681	502.2	0.4	NO	1.000	NO	MM
9	9	180604M2_10	Standard	1250.000	6.51	108494.961	10699.962	1520.963	1249.5	-0.0	NO	1.000	NO	MM
10	10	180604M2_11	Standard	2500.000	6.51	218959.797	10602.889	3097.643	2499.9	-0.0	NO	1.000	NO	MM

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Compound name: 13C3-PFBA
Response Factor: 0.885048
RRF SD: 0.0114078, Relative SD: 1.28894
Response type: Internal Std (Ref 60), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	1.34	9005.189	10271.474	10.959	12.4	-0.9	NO		NO	MM
2	2 180604M2_3	Standard	12.500	1.34	9082.563	10065.069	11.280	12.7	2.0	NO		NO	bb
3	3 180604M2_4	Standard	12.500	1.34	9855.626	11352.728	10.852	12.3	-1.9	NO		NO	bb
4	4 180604M2_5	Standard	12.500	1.34	8997.036	10214.078	11.011	12.4	-0.5	NO		NO	bb
5	5 180604M2_6	Standard	12.500	1.34	9430.916	10765.735	10.950	12.4	-1.0	NO		NO	bb
6	6 180604M2_7	Standard	12.500	1.34	10868.822	12417.303	10.941	12.4	-1.1	NO		NO	bb
7	7 180604M2_8	Standard	12.500	1.34	9593.588	10796.833	11.107	12.5	0.4	NO		NO	bb
8	8 180604M2_9	Standard	12.500	1.34	9523.508	10598.734	11.232	12.7	1.5	NO		NO	bb
9	9 180604M2_10	Standard	12.500	1.34	9255.525	10421.132	11.102	12.5	0.4	NO		NO	bb
10	10 180604M2_11	Standard	12.500	1.34	8757.902	9776.241	11.198	12.7	1.2	NO		NO	bb

Compound name: 13C3-PFPeA
Response Factor: 0.84942
RRF SD: 0.0318525, Relative SD: 3.74991
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	2.31	12347.332	15007.401	10.284	12.1	-3.1	NO		NO	bb
2	2 180604M2_3	Standard	12.500	2.31	12476.627	13827.207	11.279	13.3	6.2	NO		NO	bb
3	3 180604M2_4	Standard	12.500	2.31	13544.467	16888.469	10.025	11.8	-5.6	NO		NO	MM
4	4 180604M2_5	Standard	12.500	2.31	14007.501	15740.042	11.124	13.1	4.8	NO		NO	bb
5	5 180604M2_6	Standard	12.500	2.31	13406.085	15291.013	10.959	12.9	3.2	NO		NO	bb
6	6 180604M2_7	Standard	12.500	2.31	15122.394	17659.707	10.704	12.6	0.8	NO		NO	bb
7	7 180604M2_8	Standard	12.500	2.31	13022.961	15758.688	10.330	12.2	-2.7	NO		NO	bb
8	8 180604M2_9	Standard	12.500	2.31	12487.914	14738.479	10.591	12.5	-0.2	NO		NO	bb
9	9 180604M2_10	Standard	12.500	2.31	11821.135	14148.502	10.444	12.3	-1.6	NO		NO	bb
10	10 180604M2_11	Standard	12.500	2.31	10586.028	12678.664	10.437	12.3	-1.7	NO		NO	bb

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Compound name: 13C3-PFBS
Response Factor: 0.103869
RRF SD: 0.00542707, Relative SD: 5.22492
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	2.60	1498.706	15007.401	1.248	12.0	-3.9	NO		NO	MM
2	2	180604M2_3	Standard	12.500	2.60	1529.458	13827.207	1.383	13.3	6.5	NO		NO	bb
3	3	180604M2_4	Standard	12.500	2.60	1663.006	16888.469	1.231	11.9	-5.2	NO		NO	bb
4	4	180604M2_5	Standard	12.500	2.60	1756.558	15740.042	1.395	13.4	7.4	NO		NO	bb
5	5	180604M2_6	Standard	12.500	2.60	1672.393	15291.013	1.367	13.2	5.3	NO		NO	MM
6	6	180604M2_7	Standard	12.500	2.60	1855.024	17659.707	1.313	12.6	1.1	NO		NO	bb
7	7	180604M2_8	Standard	12.500	2.60	1634.481	15758.688	1.296	12.5	-0.1	NO		NO	bb
8	8	180604M2_9	Standard	12.500	2.60	1526.828	14738.479	1.295	12.5	-0.3	NO		NO	bb
9	9	180604M2_10	Standard	12.500	2.60	1432.947	14148.502	1.266	12.2	-2.5	NO		NO	bb
10	10	180604M2_11	Standard	12.500	2.60	1206.225	12678.664	1.189	11.4	-8.4	NO		NO	bb

Compound name: 13C2-4:2 FTS
Response Factor: 0.247683
RRF SD: 0.0262332, Relative SD: 10.5914
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	3.01	3169.168	15007.401	2.640	10.7	-14.7	NO		NO	bb
2	2	180604M2_3	Standard	12.500	3.01	3422.257	13827.207	3.094	12.5	-0.1	NO		NO	bb
3	3	180604M2_4	Standard	12.500	3.01	3927.586	16888.469	2.907	11.7	-6.1	NO		NO	bb
4	4	180604M2_5	Standard	12.500	3.01	4054.097	15740.042	3.220	13.0	4.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	3.00	3586.589	15291.013	2.932	11.8	-5.3	NO		NO	bb
6	6	180604M2_7	Standard	12.500	3.01	4233.463	17659.707	2.997	12.1	-3.2	NO		NO	bb
7	7	180604M2_8	Standard	12.500	3.00	4058.697	15758.688	3.219	13.0	4.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	3.01	4433.810	14738.479	3.760	15.2	21.5	NO		NO	bb
9	9	180604M2_10	Standard	12.500	3.01	5370.476	14148.502	4.745	19.2	53.3	NO		NO	bbX
10	10	180604M2_11	Standard	12.500	3.01	6656.033	12678.664	6.562	26.5	112.0	NO		NO	bbX

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Compound name: 13C2-PFHxA
Response Factor: 0.729003
RRF SD: 0.0325361, Relative SD: 4.4631
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	5.000	3.09	4246.335	15007.401	3.537	4.9	-3.0	NO		NO	bb
2	2	180604M2_3	Standard	5.000	3.09	4142.994	13827.207	3.745	5.1	2.8	NO		NO	bb
3	3	180604M2_4	Standard	5.000	3.09	4630.566	16888.469	3.427	4.7	-6.0	NO		NO	bb
4	4	180604M2_5	Standard	5.000	3.09	4710.073	15740.042	3.741	5.1	2.6	NO		NO	bb
5	5	180604M2_6	Standard	5.000	3.09	4612.718	15291.013	3.771	5.2	3.5	NO		NO	bb
6	6	180604M2_7	Standard	5.000	3.09	4951.568	17659.707	3.505	4.8	-3.8	NO		NO	bb
7	7	180604M2_8	Standard	5.000	3.09	4486.201	15758.688	3.559	4.9	-2.4	NO		NO	bb
8	8	180604M2_9	Standard	5.000	3.09	4110.789	14738.479	3.486	4.8	-4.4	NO		NO	bb
9	9	180604M2_10	Standard	5.000	3.09	4245.043	14148.502	3.750	5.1	2.9	NO		NO	bb
10	10	180604M2_11	Standard	5.000	3.09	3985.266	12678.664	3.929	5.4	7.8	NO		NO	bb

Compound name: 13C4-PFHpA
Response Factor: 0.836272
RRF SD: 0.0378621, Relative SD: 4.52749
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	3.71	12501.413	15007.401	10.413	12.5	-0.4	NO		NO	bb
2	2	180604M2_3	Standard	12.500	3.70	11729.507	13827.207	10.604	12.7	1.4	NO		NO	bb
3	3	180604M2_4	Standard	12.500	3.70	13016.023	16888.469	9.634	11.5	-7.8	NO		NO	bb
4	4	180604M2_5	Standard	12.500	3.71	13914.408	15740.042	11.050	13.2	5.7	NO		NO	bb
5	5	180604M2_6	Standard	12.500	3.70	13247.432	15291.013	10.829	12.9	3.6	NO		NO	bb
6	6	180604M2_7	Standard	12.500	3.70	14486.901	17659.707	10.254	12.3	-1.9	NO		NO	bb
7	7	180604M2_8	Standard	12.500	3.70	12638.182	15758.688	10.025	12.0	-4.1	NO		NO	bb
8	8	180604M2_9	Standard	12.500	3.70	12671.674	14738.479	10.747	12.9	2.8	NO		NO	bb
9	9	180604M2_10	Standard	12.500	3.71	12444.102	14148.502	10.994	13.1	5.2	NO		NO	bb
10	10	180604M2_11	Standard	12.500	3.70	10126.721	12678.664	9.984	11.9	-4.5	NO		NO	bb

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Compound name: 18O2-PFHxS
Response Factor: 0.442568
RRF SD: 0.0142283, Relative SD: 3.21493
Response type: Internal Std (Ref 62), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	3.86	1333.795	3044.086	5.477	12.4	-1.0	NO		NO	MM
2	2 180604M2_3	Standard	12.500	3.86	1335.589	2855.621	5.846	13.2	5.7	NO		NO	MM
3	3 180604M2_4	Standard	12.500	3.85	1500.467	3323.627	5.643	12.8	2.0	NO		NO	MM
4	4 180604M2_5	Standard	12.500	3.86	1457.849	3243.628	5.618	12.7	1.6	NO		NO	MM
5	5 180604M2_6	Standard	12.500	3.85	1355.524	3131.864	5.410	12.2	-2.2	NO		NO	MM
6	6 180604M2_7	Standard	12.500	3.85	1524.630	3617.574	5.268	11.9	-4.8	NO		NO	MM
7	7 180604M2_8	Standard	12.500	3.85	1363.064	3005.609	5.669	12.8	2.5	NO		NO	MM
8	8 180604M2_9	Standard	12.500	3.85	1342.743	3121.421	5.377	12.1	-2.8	NO		NO	MM
9	9 180604M2_10	Standard	12.500	3.86	1285.869	2851.130	5.638	12.7	1.9	NO		NO	MM
10	10 180604M2_11	Standard	12.500	3.85	1082.486	2517.609	5.375	12.1	-2.8	NO		NO	MM

Compound name: 13C2-6:2 FTS
Response Factor: 0.249011
RRF SD: 0.0286251, Relative SD: 11.4955
Response type: Internal Std (Ref 63), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	4.17	3136.696	15167.363	2.585	10.4	-16.9	NO		NO	MM
2	2 180604M2_3	Standard	12.500	4.17	3478.213	14724.747	2.953	11.9	-5.1	NO		NO	bb
3	3 180604M2_4	Standard	12.500	4.17	3819.201	15358.042	3.108	12.5	-0.1	NO		NO	MM
4	4 180604M2_5	Standard	12.500	4.17	3828.594	16216.819	2.951	11.9	-5.2	NO		NO	bb
5	5 180604M2_6	Standard	12.500	4.17	3805.419	16212.924	2.934	11.8	-5.7	NO		NO	bb
6	6 180604M2_7	Standard	12.500	4.17	4005.856	15974.759	3.135	12.6	0.7	NO		NO	bb
7	7 180604M2_8	Standard	12.500	4.17	4061.438	14468.508	3.509	14.1	12.7	NO		NO	bb
8	8 180604M2_9	Standard	12.500	4.17	4557.357	15287.114	3.726	15.0	19.7	NO		NO	bb
9	9 180604M2_10	Standard	12.500	4.17	5639.339	12818.621	5.499	22.1	76.7	NO		NO	bbX
10	10 180604M2_11	Standard	12.500	4.17	7863.491	12943.563	7.594	30.5	144.0	NO		NO	bbX

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Compound name: 13C2-PFOA
Response Factor: 1.33228
RRF SD: 0.0738349, Relative SD: 5.54199
Response type: Internal Std (Ref 63), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.23	20205.967	15167.363	16.653	12.5	-0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	4.23	19150.432	14724.747	16.257	12.2	-2.4	NO		NO	bb
3	3	180604M2_4	Standard	12.500	4.23	18664.631	15358.042	15.191	11.4	-8.8	NO		NO	bb
4	4	180604M2_5	Standard	12.500	4.23	21305.520	16216.819	16.422	12.3	-1.4	NO		NO	bb
5	5	180604M2_6	Standard	12.500	4.22	20989.240	16212.924	16.182	12.1	-2.8	NO		NO	bb
6	6	180604M2_7	Standard	12.500	4.23	23488.016	15974.759	18.379	13.8	10.4	NO		NO	bb
7	7	180604M2_8	Standard	12.500	4.22	19220.492	14468.508	16.605	12.5	-0.3	NO		NO	bb
8	8	180604M2_9	Standard	12.500	4.22	19779.754	15287.114	16.174	12.1	-2.9	NO		NO	bb
9	9	180604M2_10	Standard	12.500	4.23	18486.152	12818.621	18.027	13.5	8.2	NO		NO	MM
10	10	180604M2_11	Standard	12.500	4.22	17235.395	12943.563	16.645	12.5	-0.1	NO		NO	bb

Compound name: 13C5-PFNA
Response Factor: 0.95074
RRF SD: 0.0610405, Relative SD: 6.42031
Response type: Internal Std (Ref 64), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.66	16427.822	16881.150	12.164	12.8	2.4	NO		NO	MM
2	2	180604M2_3	Standard	12.500	4.66	17421.307	18334.830	11.877	12.5	-0.1	NO		NO	bb
3	3	180604M2_4	Standard	12.500	4.66	19878.240	20973.391	11.847	12.5	-0.3	NO		NO	bb
4	4	180604M2_5	Standard	12.500	4.66	18188.109	20413.705	11.137	11.7	-6.3	NO		NO	bb
5	5	180604M2_6	Standard	12.500	4.66	15834.358	15700.341	12.607	13.3	6.1	NO		NO	bb
6	6	180604M2_7	Standard	12.500	4.66	16231.207	18020.547	11.259	11.8	-5.3	NO		NO	bb
7	7	180604M2_8	Standard	12.500	4.66	15917.798	18653.123	10.667	11.2	-10.2	NO		NO	bb
8	8	180604M2_9	Standard	12.500	4.66	16328.868	17510.518	11.656	12.3	-1.9	NO		NO	MM
9	9	180604M2_10	Standard	12.500	4.66	16797.787	15816.211	13.276	14.0	11.7	NO		NO	MM
10	10	180604M2_11	Standard	12.500	4.66	13975.681	14143.361	12.352	13.0	3.9	NO		NO	MM

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Compound name: 13C8-PFOSA
Response Factor: 0.139501
RRF SD: 0.0131475, Relative SD: 9.42465
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.73	3431.462	25518.572	1.681	12.0	-3.6	NO		NO	bb
2	2	180604M2_3	Standard	12.500	4.72	3179.648	24694.490	1.609	11.5	-7.7	NO		NO	bb
3	3	180604M2_4	Standard	12.500	4.72	3595.649	25475.063	1.764	12.6	1.2	NO		NO	bb
4	4	180604M2_5	Standard	12.500	4.73	3834.985	25878.838	1.852	13.3	6.2	NO		NO	bb
5	5	180604M2_6	Standard	12.500	4.72	3390.498	27276.764	1.554	11.1	-10.9	NO		NO	bb
6	6	180604M2_7	Standard	12.500	4.72	3889.938	29220.201	1.664	11.9	-4.6	NO		NO	MM
7	7	180604M2_8	Standard	12.500	4.72	3418.532	26358.738	1.621	11.6	-7.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	4.72	3112.179	22964.137	1.694	12.1	-2.9	NO		NO	MM
9	9	180604M2_10	Standard	12.500	4.72	2973.532	19544.465	1.902	13.6	9.1	NO		NO	MM
10	10	180604M2_11	Standard	12.500	4.72	2749.737	16400.094	2.096	15.0	20.2	NO		NO	MM

Compound name: 13C8-PFOS
Response Factor: 1.06017
RRF SD: 0.0418424, Relative SD: 3.94676
Response type: Internal Std (Ref 65), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.75	3315.648	3009.181	13.773	13.0	3.9	NO		NO	MM
2	2	180604M2_3	Standard	12.500	4.74	2954.499	2803.353	13.174	12.4	-0.6	NO		NO	MM
3	3	180604M2_4	Standard	12.500	4.74	3630.876	3163.443	14.347	13.5	8.3	NO		NO	MM
4	4	180604M2_5	Standard	12.500	4.74	3704.720	3406.201	13.595	12.8	2.6	NO		NO	MM
5	5	180604M2_6	Standard	12.500	4.74	3298.775	3250.212	12.687	12.0	-4.3	NO		NO	MM
6	6	180604M2_7	Standard	12.500	4.74	3897.956	3730.943	13.060	12.3	-1.5	NO		NO	MM
7	7	180604M2_8	Standard	12.500	4.74	3440.435	3324.223	12.937	12.2	-2.4	NO		NO	MM
8	8	180604M2_9	Standard	12.500	4.74	3274.599	3196.282	12.806	12.1	-3.4	NO		NO	MM
9	9	180604M2_10	Standard	12.500	4.74	2902.207	2834.296	12.800	12.1	-3.4	NO		NO	MM
10	10	180604M2_11	Standard	12.500	4.74	2717.965	2546.279	13.343	12.6	0.7	NO		NO	MM

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Compound name: 13C2-PFDA
Response Factor: 1.13012
RRF SD: 0.0968721, Relative SD: 8.57185
Response type: Internal Std (Ref 66), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	5.04	21761.287	16320.667	16.667	14.7	18.0	NO		NO	bb
2	2 180604M2_3	Standard	12.500	5.03	20533.658	18545.604	13.840	12.2	-2.0	NO		NO	bb
3	3 180604M2_4	Standard	12.500	5.03	20788.254	20377.879	12.752	11.3	-9.7	NO		NO	MM
4	4 180604M2_5	Standard	12.500	5.03	26067.412	22186.215	14.687	13.0	4.0	NO		NO	MM
5	5 180604M2_6	Standard	12.500	5.03	23295.496	22014.791	13.227	11.7	-6.4	NO		NO	MM
6	6 180604M2_7	Standard	12.500	5.03	26637.291	23696.297	14.051	12.4	-0.5	NO		NO	MM
7	7 180604M2_8	Standard	12.500	5.03	23496.604	18802.346	15.621	13.8	10.6	NO		NO	MM
8	8 180604M2_9	Standard	12.500	5.03	16383.868	15408.911	13.291	11.8	-5.9	NO		NO	MM
9	9 180604M2_10	Standard	12.500	5.03	19258.957	17490.107	13.764	12.2	-2.6	NO		NO	MM
10	10 180604M2_11	Standard	12.500	5.03	16960.596	15862.810	13.365	11.8	-5.4	NO		NO	MM

Compound name: 13C2-8:2 FTS
Response Factor: 0.217451
RRF SD: 0.0250656, Relative SD: 11.527
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	5.00	2934.979	15007.401	2.445	11.2	-10.1	NO		NO	bb
2	2 180604M2_3	Standard	12.500	5.00	3009.166	13827.207	2.720	12.5	0.1	NO		NO	bb
3	3 180604M2_4	Standard	12.500	5.00	3267.680	16888.469	2.419	11.1	-11.0	NO		NO	bb
4	4 180604M2_5	Standard	12.500	5.00	3210.507	15740.042	2.550	11.7	-6.2	NO		NO	bb
5	5 180604M2_6	Standard	12.500	5.00	3308.789	15291.013	2.705	12.4	-0.5	NO		NO	bb
6	6 180604M2_7	Standard	12.500	5.00	3729.984	17659.707	2.640	12.1	-2.9	NO		NO	bb
7	7 180604M2_8	Standard	12.500	5.00	3613.179	15758.688	2.866	13.2	5.4	NO		NO	bb
8	8 180604M2_9	Standard	12.500	5.00	4009.876	14738.479	3.401	15.6	25.1	NO		NO	bb
9	9 180604M2_10	Standard	12.500	5.00	5046.779	14148.502	4.459	20.5	64.0	NO		NO	bbX
10	10 180604M2_11	Standard	12.500	4.99	6978.822	12678.664	6.880	31.6	153.1	NO		NO	bbX

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Compound name: d3-N-MeFOSAA
Response Factor: 0.183541
RRF SD: 0.025562, Relative SD: 13.9272
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.18	4210.790	25518.572	2.063	11.2	-10.1	NO		NO	MM
2	2	180604M2_3	Standard	12.500	5.18	4114.854	24694.490	2.083	11.3	-9.2	NO		NO	MM
3	3	180604M2_4	Standard	12.500	5.18	4411.583	25475.063	2.165	11.8	-5.6	NO		NO	MM
4	4	180604M2_5	Standard	12.500	5.18	4785.307	25878.838	2.311	12.6	0.7	NO		NO	MM
5	5	180604M2_6	Standard	12.500	5.18	4484.180	27276.764	2.055	11.2	-10.4	NO		NO	MM
6	6	180604M2_7	Standard	12.500	5.18	4988.149	29220.201	2.134	11.6	-7.0	NO		NO	MM
7	7	180604M2_8	Standard	12.500	5.18	4352.490	26358.738	2.064	11.2	-10.0	NO		NO	MM
8	8	180604M2_9	Standard	12.500	5.18	4328.779	22964.137	2.356	12.8	2.7	NO		NO	MM
9	9	180604M2_10	Standard	12.500	5.18	4265.706	19544.465	2.728	14.9	18.9	NO		NO	MM
10	10	180604M2_11	Standard	12.500	5.18	3914.602	16400.094	2.984	16.3	30.0	NO		NO	MM

Compound name: d5-N-EtFOSAA
Response Factor: 0.223178
RRF SD: 0.0139114, Relative SD: 6.23334
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.34	5523.320	25518.572	2.706	12.1	-3.0	NO		NO	MM
2	2	180604M2_3	Standard	12.500	5.34	5238.067	24694.490	2.651	11.9	-5.0	NO		NO	MM
3	3	180604M2_4	Standard	12.500	5.34	5567.794	25475.063	2.732	12.2	-2.1	NO		NO	MM
4	4	180604M2_5	Standard	12.500	5.34	5895.005	25878.838	2.847	12.8	2.1	NO		NO	MM
5	5	180604M2_6	Standard	12.500	5.34	5760.961	27276.764	2.640	11.8	-5.4	NO		NO	MM
6	6	180604M2_7	Standard	12.500	5.34	6157.235	29220.201	2.634	11.8	-5.6	NO		NO	MM
7	7	180604M2_8	Standard	12.500	5.34	5813.378	26358.738	2.757	12.4	-1.2	NO		NO	MM
8	8	180604M2_9	Standard	12.500	5.34	5069.896	22964.137	2.760	12.4	-1.1	NO		NO	MM
9	9	180604M2_10	Standard	12.500	5.34	4683.729	19544.465	2.996	13.4	7.4	NO		NO	MM
10	10	180604M2_11	Standard	12.500	5.33	4165.334	16400.094	3.175	14.2	13.8	NO		NO	MM

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Compound name: 13C2-PFUdA
Response Factor: 0.936486
RRF SD: 0.141846, Relative SD: 15.1467
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.35	22871.002	25518.572	11.203	12.0	-4.3	NO		NO	bb
2	2	180604M2_3	Standard	12.500	5.35	18741.598	24694.490	9.487	10.1	-19.0	NO		NO	MM
3	3	180604M2_4	Standard	12.500	5.35	26986.771	25475.063	13.242	14.1	13.1	NO		NO	MM
4	4	180604M2_5	Standard	12.500	5.35	18264.871	25878.838	8.822	9.4	-24.6	NO		NO	MM
5	5	180604M2_6	Standard	12.500	5.35	25583.273	27276.764	11.724	12.5	0.2	NO		NO	MM
6	6	180604M2_7	Standard	12.500	5.35	25767.896	29220.201	11.023	11.8	-5.8	NO		NO	MM
7	7	180604M2_8	Standard	12.500	5.35	24683.182	26358.738	11.705	12.5	-0.0	NO		NO	MM
8	8	180604M2_9	Standard	12.500	5.35	21720.848	22964.137	11.823	12.6	1.0	NO		NO	MM
9	9	180604M2_10	Standard	12.500	5.35	20656.635	19544.465	13.211	14.1	12.9	NO		NO	MM
10	10	180604M2_11	Standard	12.500	5.35	19443.674	16400.094	14.820	15.8	26.6	NO		NO	MM

Compound name: 13C2-PFDoA
Response Factor: 1.16819
RRF SD: 0.141926, Relative SD: 12.1492
Response type: Internal Std (Ref 66), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.64	19397.404	16320.667	14.856	12.7	1.7	NO		NO	bb
2	2	180604M2_3	Standard	12.500	5.63	17754.355	18545.604	11.967	10.2	-18.0	NO		NO	MM
3	3	180604M2_4	Standard	12.500	5.63	25882.254	20377.879	15.876	13.6	8.7	NO		NO	MM
4	4	180604M2_5	Standard	12.500	5.63	23953.689	22186.215	13.496	11.6	-7.6	NO		NO	MM
5	5	180604M2_6	Standard	12.500	5.63	24244.600	22014.791	13.766	11.8	-5.7	NO		NO	MM
6	6	180604M2_7	Standard	12.500	5.63	27755.697	23696.297	14.641	12.5	0.3	NO		NO	MM
7	7	180604M2_8	Standard	12.500	5.63	22544.379	18802.346	14.988	12.8	2.6	NO		NO	MM
8	8	180604M2_9	Standard	12.500	5.63	22912.549	15408.911	18.587	15.9	27.3	NO		NO	MM
9	9	180604M2_10	Standard	12.500	5.63	20375.152	17490.107	14.562	12.5	-0.3	NO		NO	MM
10	10	180604M2_11	Standard	12.500	5.63	16857.902	15862.810	13.284	11.4	-9.0	NO		NO	MM

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Compound name: d3-N-MeFOSA
Response Factor: 0.0512089
RRF SD: 0.0079688, Relative SD: 15.5614
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	150.000	5.86	14272.175	25518.572	6.991	136.5	-9.0	NO		NO	bb
2	2	180604M2_3	Standard	150.000	5.85	13534.160	24694.490	6.851	133.8	-10.8	NO		NO	bb
3	3	180604M2_4	Standard	150.000	5.85	14890.748	25475.063	7.307	142.7	-4.9	NO		NO	bb
4	4	180604M2_5	Standard	150.000	5.85	15456.740	25878.838	7.466	145.8	-2.8	NO		NO	bb
5	5	180604M2_6	Standard	150.000	5.85	14561.282	27276.764	6.673	130.3	-13.1	NO		NO	MM
6	6	180604M2_7	Standard	150.000	5.85	16522.182	29220.201	7.068	138.0	-8.0	NO		NO	MM
7	7	180604M2_8	Standard	150.000	5.85	14948.137	26358.738	7.089	138.4	-7.7	NO		NO	MM
8	8	180604M2_9	Standard	150.000	5.85	14228.368	22964.137	7.745	151.2	0.8	NO		NO	MM
9	9	180604M2_10	Standard	150.000	5.85	14432.672	19544.465	9.231	180.3	20.2	NO		NO	MM
10	10	180604M2_11	Standard	150.000	5.85	13636.706	16400.094	10.394	203.0	35.3	NO		NO	MM

Compound name: 13C2-PFTeDA
Response Factor: 0.705988
RRF SD: 0.0856003, Relative SD: 12.1249
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	6.10	17876.412	25518.572	8.757	12.4	-0.8	NO		NO	MM
2	2	180604M2_3	Standard	12.500	6.09	16472.129	24694.490	8.338	11.8	-5.5	NO		NO	MM
3	3	180604M2_4	Standard	12.500	6.09	16315.121	25475.063	8.005	11.3	-9.3	NO		NO	MM
4	4	180604M2_5	Standard	12.500	6.09	17710.369	25878.838	8.554	12.1	-3.1	NO		NO	MM
5	5	180604M2_6	Standard	12.500	6.09	17267.689	27276.764	7.913	11.2	-10.3	NO		NO	MM
6	6	180604M2_7	Standard	12.500	6.09	19111.336	29220.201	8.176	11.6	-7.4	NO		NO	MM
7	7	180604M2_8	Standard	12.500	6.09	16598.182	26358.738	7.871	11.1	-10.8	NO		NO	MM
8	8	180604M2_9	Standard	12.500	6.09	17128.834	22964.137	9.324	13.2	5.7	NO		NO	MM
9	9	180604M2_10	Standard	12.500	6.09	16157.284	19544.465	10.334	14.6	17.1	NO		NO	MM
10	10	180604M2_11	Standard	12.500	6.09	14401.537	16400.094	10.977	15.5	24.4	NO		NO	MM

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Compound name: d5-N-ETFOSA
Response Factor: 0.0712517
RRF SD: 0.00771474, Relative SD: 10.8274
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	150.000	6.25	18564.291	25518.572	9.094	127.6	-14.9	NO		NO	MM
2	2 180604M2_3	Standard	150.000	6.24	19925.244	24694.490	10.086	141.6	-5.6	NO		NO	MM
3	3 180604M2_4	Standard	150.000	6.24	21577.180	25475.063	10.587	148.6	-0.9	NO		NO	MM
4	4 180604M2_5	Standard	150.000	6.24	22476.027	25878.838	10.856	152.4	1.6	NO		NO	MM
5	5 180604M2_6	Standard	150.000	6.24	21033.535	27276.764	9.639	135.3	-9.8	NO		NO	bb
6	6 180604M2_7	Standard	150.000	6.24	24418.678	29220.201	10.446	146.6	-2.3	NO		NO	MM
7	7 180604M2_8	Standard	150.000	6.24	21256.074	26358.738	10.080	141.5	-5.7	NO		NO	MM
8	8 180604M2_9	Standard	150.000	6.24	20182.076	22964.137	10.986	154.2	2.8	NO		NO	MM
9	9 180604M2_10	Standard	150.000	6.24	18810.104	19544.465	12.030	168.8	12.6	NO		NO	MM
10	10 180604M2_11	Standard	150.000	6.24	17152.324	16400.094	13.073	183.5	22.3	NO		NO	MM

Compound name: 13C2-PFHxDA
Response Factor: 1.07858
RRF SD: 0.167769, Relative SD: 15.5546
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	5.000	6.43	9317.349	25518.572	4.564	4.2	-15.4	NO		NO	MM
2	2 180604M2_3	Standard	5.000	6.43	9338.518	24694.490	4.727	4.4	-12.3	NO		NO	MM
3	3 180604M2_4	Standard	5.000	6.43	11752.719	25475.063	5.767	5.3	6.9	NO		NO	MM
4	4 180604M2_5	Standard	5.000	6.43	11152.150	25878.838	5.387	5.0	-0.1	NO		NO	MM
5	5 180604M2_6	Standard	5.000	6.43	10286.672	27276.764	4.714	4.4	-12.6	NO		NO	MM
6	6 180604M2_7	Standard	5.000	6.43	11743.332	29220.201	5.024	4.7	-6.8	NO		NO	MM
7	7 180604M2_8	Standard	5.000	6.43	10233.453	26358.738	4.853	4.5	-10.0	NO		NO	MM
8	8 180604M2_9	Standard	5.000	6.43	10143.569	22964.137	5.521	5.1	2.4	NO		NO	MM
9	9 180604M2_10	Standard	5.000	6.43	9457.769	19544.465	6.049	5.6	12.2	NO		NO	MM
10	10 180604M2_11	Standard	5.000	6.43	9608.434	16400.094	7.323	6.8	35.8	NO		NO	MM

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Compound name: d7-N-MeFOSE
Response Factor: 0.0412317
RRF SD: 0.00729216, Relative SD: 17.6858
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	150.000	6.37	11044.131	25518.572	5.410	131.2	-12.5	NO		NO	MM
2	2	180604M2_3	Standard	150.000	6.36	10474.625	24694.490	5.302	128.6	-14.3	NO		NO	MM
3	3	180604M2_4	Standard	150.000	6.36	12360.827	25475.063	6.065	147.1	-1.9	NO		NO	MM
4	4	180604M2_5	Standard	150.000	6.37	13301.675	25878.838	6.425	155.8	3.9	NO		NO	MM
5	5	180604M2_6	Standard	150.000	6.36	11701.808	27276.764	5.363	130.1	-13.3	NO		NO	MM
6	6	180604M2_7	Standard	150.000	6.36	12515.271	29220.201	5.354	129.8	-13.4	NO		NO	MM
7	7	180604M2_8	Standard	150.000	6.36	11664.843	26358.738	5.532	134.2	-10.6	NO		NO	MM
8	8	180604M2_9	Standard	150.000	6.36	11530.785	22964.137	6.277	152.2	1.5	NO		NO	MM
9	9	180604M2_10	Standard	150.000	6.36	11837.472	19544.465	7.571	183.6	22.4	NO		NO	MM
10	10	180604M2_11	Standard	150.000	6.36	11217.550	16400.094	8.550	207.4	38.2	NO		NO	MM

Compound name: d9-N-EtFOSE
Response Factor: 0.0383339
RRF SD: 0.00658778, Relative SD: 17.1852
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	150.000	6.52	9984.098	25518.572	4.891	127.6	-14.9	NO		NO	MM
2	2	180604M2_3	Standard	150.000	6.51	10038.572	24694.490	5.081	132.6	-11.6	NO		NO	MM
3	3	180604M2_4	Standard	150.000	6.51	11277.418	25475.063	5.534	144.4	-3.8	NO		NO	MM
4	4	180604M2_5	Standard	150.000	6.51	11254.722	25878.838	5.436	141.8	-5.5	NO		NO	MM
5	5	180604M2_6	Standard	150.000	6.51	11039.759	27276.764	5.059	132.0	-12.0	NO		NO	MM
6	6	180604M2_7	Standard	150.000	6.51	12745.162	29220.201	5.452	142.2	-5.2	NO		NO	MM
7	7	180604M2_8	Standard	150.000	6.50	11078.604	26358.738	5.254	137.1	-8.6	NO		NO	MM
8	8	180604M2_9	Standard	150.000	6.51	10782.540	22964.137	5.869	153.1	2.1	NO		NO	MM
9	9	180604M2_10	Standard	150.000	6.51	10699.962	19544.465	6.843	178.5	19.0	NO		NO	MM
10	10	180604M2_11	Standard	150.000	6.50	10602.889	16400.094	8.081	210.8	40.5	NO		NO	MM

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Compound name: 13C4-PFBA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 60), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	1.35	10271.474	10271.474	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	1.34	10065.069	10065.069	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	1.35	11352.728	11352.728	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	1.35	10214.078	10214.078	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	1.35	10765.735	10765.735	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	1.34	12417.303	12417.303	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	1.35	10796.833	10796.833	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	1.34	10598.734	10598.734	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	1.35	10421.132	10421.132	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	1.35	9776.241	9776.241	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C5-PFHxA
Response Factor: 1
RRF SD: 1.33432e-016, Relative SD: 1.33432e-014
Response type: Internal Std (Ref 61), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	3.09	15007.401	15007.401	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	3.09	13827.207	13827.207	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	3.09	16888.469	16888.469	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	3.09	15740.042	15740.042	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	3.09	15291.013	15291.013	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	3.09	17659.707	17659.707	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	3.09	15758.688	15758.688	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	3.09	14738.479	14738.479	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	3.09	14148.502	14148.502	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	3.09	12678.664	12678.664	12.500	12.5	0.0	NO		NO	bb

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Compound name: 13C3-PFHxS
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-015
Response type: Internal Std (Ref 62), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	3.86	3044.086	3044.086	12.500	12.5	0.0	NO		NO	bb
2	2 180604M2_3	Standard	12.500	3.86	2855.621	2855.621	12.500	12.5	0.0	NO		NO	bb
3	3 180604M2_4	Standard	12.500	3.85	3323.627	3323.627	12.500	12.5	0.0	NO		NO	bb
4	4 180604M2_5	Standard	12.500	3.86	3243.628	3243.628	12.500	12.5	0.0	NO		NO	bb
5	5 180604M2_6	Standard	12.500	3.85	3131.864	3131.864	12.500	12.5	0.0	NO		NO	bb
6	6 180604M2_7	Standard	12.500	3.85	3617.574	3617.574	12.500	12.5	0.0	NO		NO	bb
7	7 180604M2_8	Standard	12.500	3.85	3005.609	3005.609	12.500	12.5	0.0	NO		NO	bb
8	8 180604M2_9	Standard	12.500	3.85	3121.421	3121.421	12.500	12.5	0.0	NO		NO	bb
9	9 180604M2_10	Standard	12.500	3.86	2851.130	2851.130	12.500	12.5	0.0	NO		NO	bb
10	10 180604M2_11	Standard	12.500	3.85	2517.609	2517.609	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C8-PFOA
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-015
Response type: Internal Std (Ref 63), Area * (IS Conc. / IS Area)
Curve type: RF

	# Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1 180604M2_2	Standard	12.500	4.23	15167.363	15167.363	12.500	12.5	0.0	NO		NO	bb
2	2 180604M2_3	Standard	12.500	4.22	14724.747	14724.747	12.500	12.5	0.0	NO		NO	bb
3	3 180604M2_4	Standard	12.500	4.22	15358.042	15358.042	12.500	12.5	0.0	NO		NO	bb
4	4 180604M2_5	Standard	12.500	4.23	16216.819	16216.819	12.500	12.5	0.0	NO		NO	bb
5	5 180604M2_6	Standard	12.500	4.22	16212.924	16212.924	12.500	12.5	0.0	NO		NO	bb
6	6 180604M2_7	Standard	12.500	4.22	15974.759	15974.759	12.500	12.5	0.0	NO		NO	bb
7	7 180604M2_8	Standard	12.500	4.22	14468.508	14468.508	12.500	12.5	0.0	NO		NO	bb
8	8 180604M2_9	Standard	12.500	4.22	15287.114	15287.114	12.500	12.5	0.0	NO		NO	bb
9	9 180604M2_10	Standard	12.500	4.23	12818.621	12818.621	12.500	12.5	0.0	NO		NO	bb
10	10 180604M2_11	Standard	12.500	4.22	12943.563	12943.563	12.500	12.5	0.0	NO		NO	bb

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Compound name: 13C9-PFNA
Response Factor: 1
RRF SD: 0, Relative SD: 0
Response type: Internal Std (Ref 64), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.66	16881.150	16881.150	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	4.66	18334.830	18334.830	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	4.66	20973.391	20973.391	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	4.66	20413.705	20413.705	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	4.66	15700.341	15700.341	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	4.66	18020.547	18020.547	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	4.66	18653.123	18653.123	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	4.66	17510.518	17510.518	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	4.66	15816.211	15816.211	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	4.66	14143.361	14143.361	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C4-PFOS
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-015
Response type: Internal Std (Ref 65), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	4.75	3009.181	3009.181	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	4.74	2803.353	2803.353	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	4.74	3163.443	3163.443	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	4.74	3406.201	3406.201	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	4.74	3250.212	3250.212	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	4.74	3730.943	3730.943	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	4.74	3324.223	3324.223	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	4.74	3196.282	3196.282	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	4.74	2834.296	2834.296	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	4.74	2546.279	2546.279	12.500	12.5	0.0	NO		NO	bb

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Compound name: 13C6-PFDA
Response Factor: 1
RRF SD: 7.40149e-017, Relative SD: 7.40149e-015
Response type: Internal Std (Ref 66), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.04	16320.667	16320.667	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	5.03	18545.604	18545.604	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	5.03	20377.879	20377.879	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	5.03	22186.215	22186.215	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	5.03	22014.791	22014.791	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	5.03	23696.297	23696.297	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	5.03	18802.346	18802.346	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	5.03	15408.911	15408.911	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	5.03	17490.107	17490.107	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	5.03	15862.810	15862.810	12.500	12.5	0.0	NO		NO	bb

Compound name: 13C7-PFUdA
Response Factor: 1
RRF SD: 8.27511e-017, Relative SD: 8.27511e-015
Response type: Internal Std (Ref 67), Area * (IS Conc. / IS Area)
Curve type: RF

	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Conc.	%Dev	Conc. Flag	CoD	CoD Flag	x=excluded
1	1	180604M2_2	Standard	12.500	5.35	25518.572	25518.572	12.500	12.5	0.0	NO		NO	bb
2	2	180604M2_3	Standard	12.500	5.35	24694.490	24694.490	12.500	12.5	0.0	NO		NO	bb
3	3	180604M2_4	Standard	12.500	5.35	25475.063	25475.063	12.500	12.5	0.0	NO		NO	bb
4	4	180604M2_5	Standard	12.500	5.35	25878.838	25878.838	12.500	12.5	0.0	NO		NO	bb
5	5	180604M2_6	Standard	12.500	5.35	27276.764	27276.764	12.500	12.5	0.0	NO		NO	bb
6	6	180604M2_7	Standard	12.500	5.35	29220.201	29220.201	12.500	12.5	0.0	NO		NO	bb
7	7	180604M2_8	Standard	12.500	5.35	26358.738	26358.738	12.500	12.5	0.0	NO		NO	bb
8	8	180604M2_9	Standard	12.500	5.35	22964.137	22964.137	12.500	12.5	0.0	NO		NO	bb
9	9	180604M2_10	Standard	12.500	5.35	19544.465	19544.465	12.500	12.5	0.0	NO		NO	bb
10	10	180604M2_11	Standard	12.500	5.35	16400.094	16400.094	12.500	12.5	0.0	NO		NO	bb

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:56:32 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
1	1	PFBA	36	0.9999	NO	
2	2	PFPeA	37	0.9999	NO	
3	3	PFBS	38	0.9999	NO	
4	4	4:2 FTS	39	0.9988	NO	
5	5	PFHxA	40	0.9996	NO	
6	6	PFPeS	38	0.9996	NO	
7	7	PFHpA	41	0.9988	NO	
8	8	L-PFHxS	42	0.9989	NO	
9	10	6:2 FTS	43	0.9998	NO	
10	11	L-PFOA	44	0.9992	NO	
11	13	PFHpS	44	0.9996	NO	
12	14	PFNA	45	0.9979	NO	
13	15	PFOSA	46	0.9995	NO	
14	16	L-PFOS	47	0.9995	NO	
15	18	PFDA	48	0.9997	NO	
16	19	8:2 FTS	49	0.9997	NO	
17	20	PFNS	47	0.9994	NO	
18	21	L-MeFOSAA	50	0.9994	NO	

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:57:00 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
1	23	L-EtFOSAA	51	0.9996	NO	
2	25	PFUdA	52	0.9977	NO	
3	26	PFDS	52	0.9987	NO	
4	27	PFDoA	53	0.9974	NO	
5	28	N-MeFOSA	54	0.9996	NO	
6	29	PFTrDA	53	0.9989	NO	
7	30	PFTeDA	55	0.9992	NO	
8	31	N-EtFOSA	56	1.0000	NO	
9	32	PFHxDA	57	0.9995	NO	
10	33	PFODA	57	0.9995	NO	
11	34	N-MeFOSE	58	0.9949	NO	
12	35	N-EtFOSE	59	1.0000	NO	
13	36	13C3-PFBA	60		NO	1.289
14	37	13C3-PFPeA	61		NO	3.750
15	38	13C3-PFBS	61		NO	5.225
16	39	13C2-4:2 FTS	61		NO	10.591
17	40	13C2-PFHxA	61		NO	4.463
18	41	13C4-PFHpA	61		NO	4.527
19	42	18O2-PFHxS	62		NO	3.215
20	43	13C2-6:2 FTS	63		NO	11.496
21	44	13C2-PFOA	63		NO	5.542
22	45	13C5-PFNA	64		NO	6.420
23	46	13C8-PFOSA	67		NO	9.425
24	47	13C8-PFOS	65		NO	3.947
25	48	13C2-PFDA	66		NO	8.572
26	49	13C2-8:2 FTS	61		NO	11.527
27	50	d3-N-MeFOSAA	67		NO	13.927
28	51	d5-N-EtFOSAA	67		NO	6.233
29	52	13C2-PFUdA	67		NO	15.147
30	53	13C2-PFDoA	66		NO	12.149
31	54	d3-N-MeFOSA	67		NO	15.561
32	55	13C2-PFTeDA	67		NO	12.125

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:57:00 Pacific Daylight Time

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

	#	Name	IS#	CoD	CoD Flag	%RSD
33	56	d5-N-ETFOSA	67		NO	10.827
34	57	13C2-PFHxDA	67		NO	15.555
35	58	d7-N-MeFOSE	67		NO	17.686
36	59	d9-N-EtFOSE	67		NO	17.185
37	60	13C4-PFBA	60		NO	0.000
38	61	13C5-PFHxA	61		NO	0.000
39	62	13C3-PFHxS	62		NO	0.000
40	63	13C8-PFOA	63		NO	0.000
41	64	13C9-PFNA	64		NO	0.000
42	65	13C4-PFOS	65		NO	0.000
43	66	13C6-PFDA	66		NO	0.000
44	67	13C7-PFUdA	67		NO	0.000

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:01:56 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	Name	Ion Ratio	Ratio out?
1	PFBA		
2	PFPeA		
3	PFBS	2.849	NO
4	4:2 FTS	2.064	NO
5	PFHxA	314.526	NO
6	PFPeS	1.664	NO
7	PFHpA	18.241	NO
8	L-PFHxS	1.800	NO
9	6:2 FTS	2.945	NO
10	L-PFOA	4.244	NO
11	PFHpS	1.815	NO
12	PFNA	4.476	NO
13	PFOSA	17.870	NO
14	L-PFOS	1.988	NO
15	PFDA	6.803	NO
16	8:2 FTS	2.528	NO
17	PFNS	1.892	NO
18	L-MeFOSAA	13.965	NO

Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:02:25 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

	Name	Ion Ratio	Ratio out?
1	L-EtFOSAA	13.776	NO
2	PFUdA	11.018	NO
3	PFDS	2.115	NO
4	PFDoA	8.300	NO
5	N-MeFOSA	1.431	NO
6	PFTrDA	32.402	NO
7	PFTeDA	13.373	NO
8	N-EtFOSA	1.479	NO
9	PFHxDA	35.333	NO
10	PFODA		
11	N-MeFOSE		
12	N-EtFOSE		

Vista Analytical Laboratory

Dataset: Untitled

Last Altered: Tuesday, June 05, 2018 11:05:15 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:05:32 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Compound name: PFBA

	#	Name	ID	Acq.Date	Acq.Time
1	1	180604M2_1	IPA	04-Jun-18	19:01:22
2	2	180604M2_2	ST180604M2-1 PFC CS-2 18E2902	04-Jun-18	19:11:49
3	3	180604M2_3	ST180604M2-2 PFC CS-1 18E2903	04-Jun-18	19:22:13
4	4	180604M2_4	ST180604M2-3 PFC CS0 18E2904	04-Jun-18	19:32:43
5	5	180604M2_5	ST180604M2-4 PFC CS1 18E2905	04-Jun-18	19:43:08
6	6	180604M2_6	ST180604M2-5 PFC CS2 18E2906	04-Jun-18	19:53:38
7	7	180604M2_7	ST180604M2-6 PFC CS3 18E2907	04-Jun-18	20:04:03
8	8	180604M2_8	ST180604M2-7 PFC CS4 18E2908	04-Jun-18	20:14:33
9	9	180604M2_9	ST180604M2-8 PFC CS5 18E2909	04-Jun-18	20:24:59
10	10	180604M2_10	ST180604M2-9 PFC CS6 18E2910	04-Jun-18	20:35:29
11	11	180604M2_11	ST180604M2-10 PFC CS7 18E2911	04-Jun-18	20:45:54
12	12	180604M2_12	IPA	04-Jun-18	20:56:24
13	13	180604M2_13	ICV180604M2-1 PFC 537 ICV 18E2901	04-Jun-18	21:06:49
14	14	180604M2_14	IPA	04-Jun-18	21:17:19

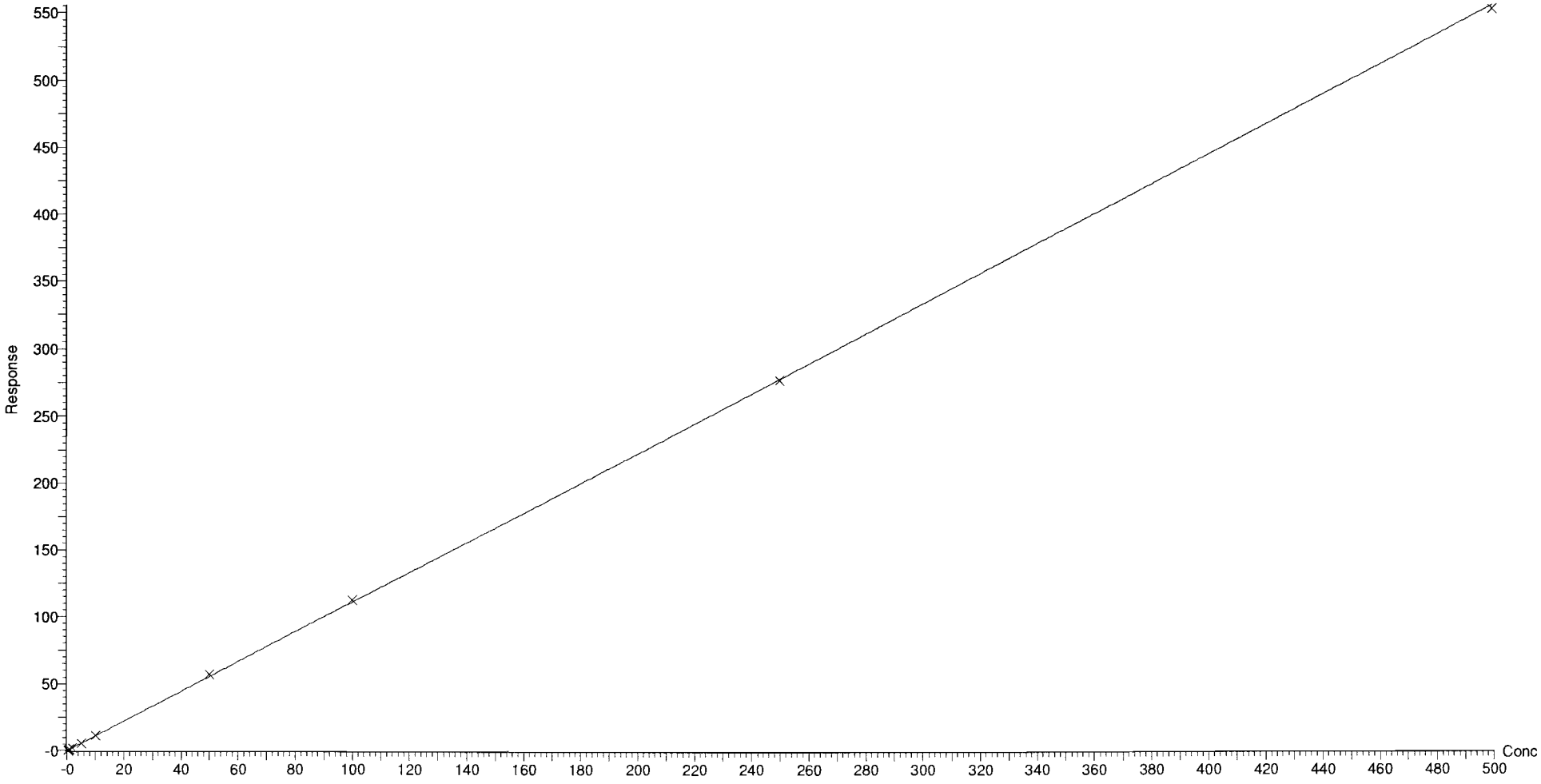
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38 C18_VAL-PFAS_Q4_060-04-18

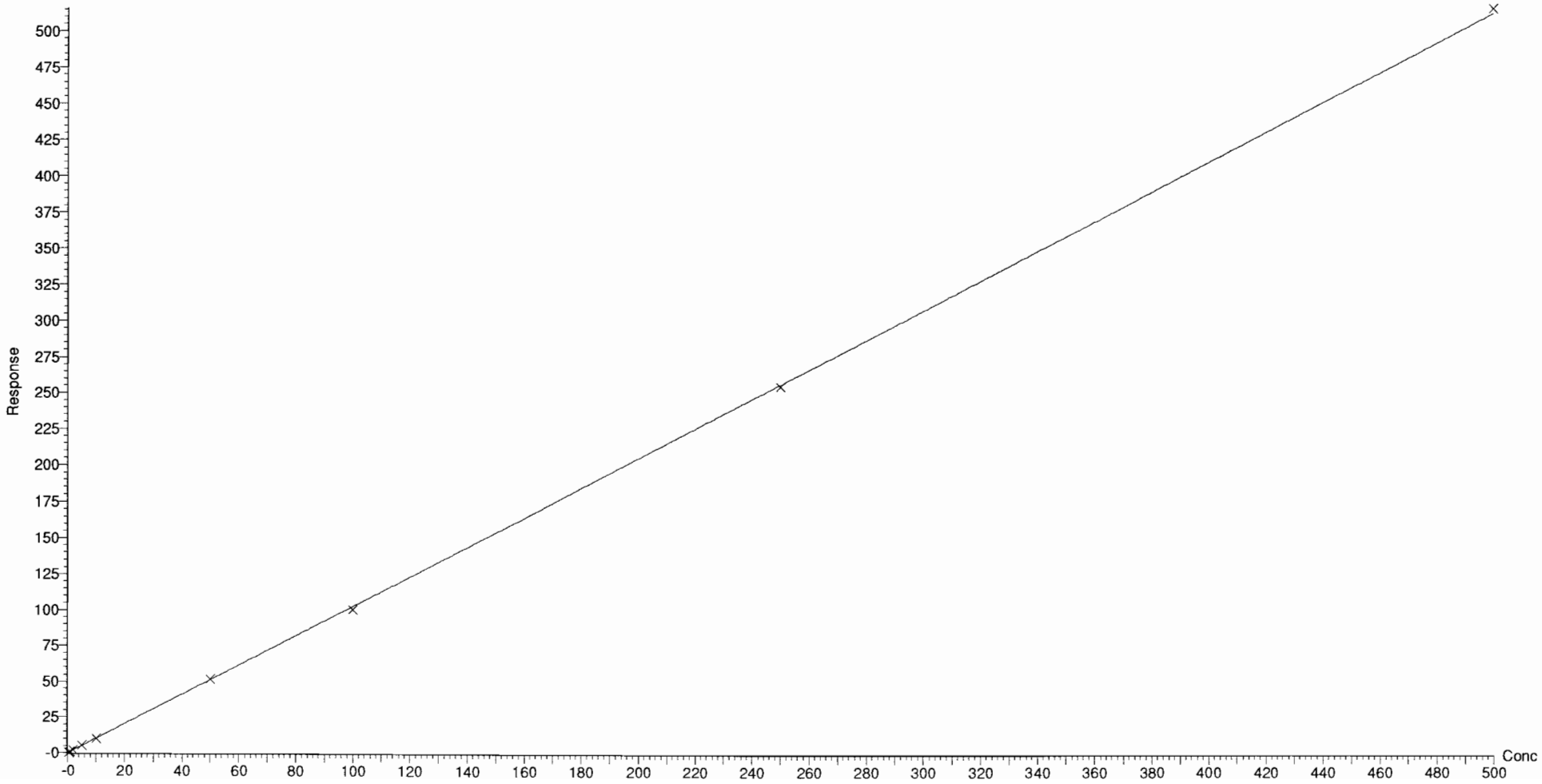
Compound name: PFBA
Correlation coefficient: r = 0.999948, r^2 = 0.999896
Calibration curve: 1.11083 * x + 0.00822384
Response type: Internal Std (Ref 36), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

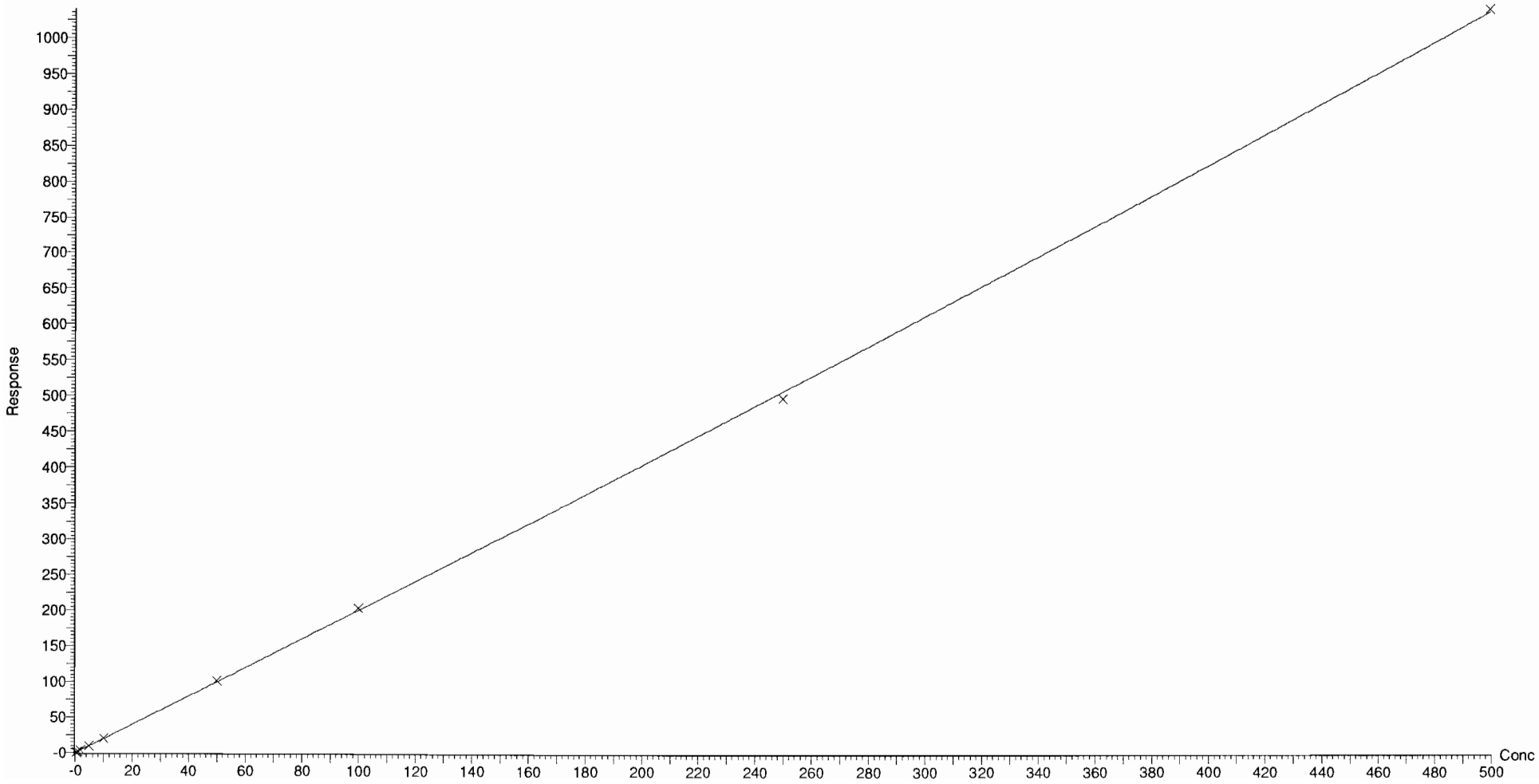
Compound name: PFPeA
Correlation coefficient: r = 0.999955, r^2 = 0.999909
Calibration curve: 1.02545 * x + 0.0205051
Response type: Internal Std (Ref 37), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

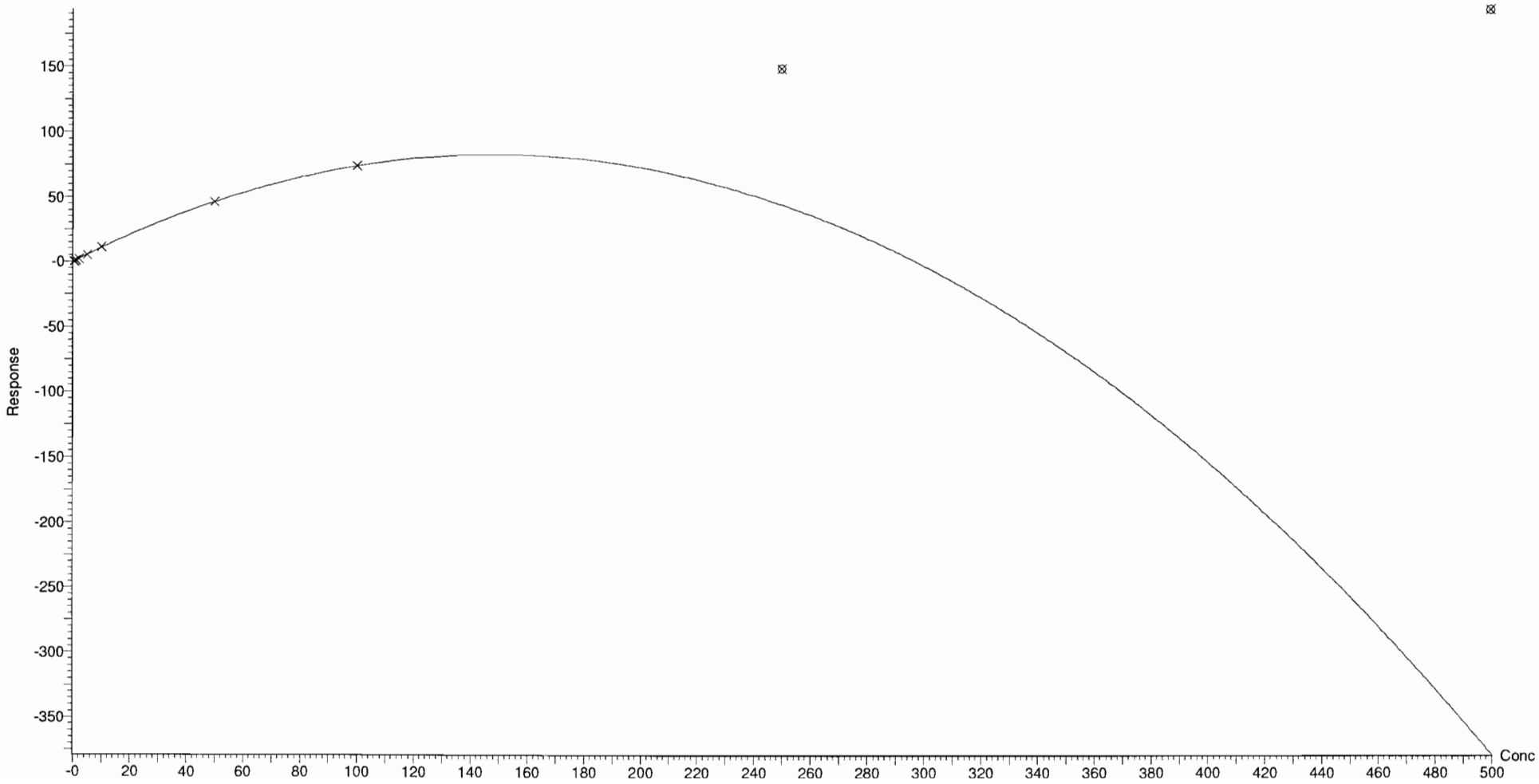
Compound name: PFBS
Coefficient of Determination: R^2 = 0.999853
Calibration curve: 0.000168277 * x^2 + 1.98828 * x + -0.00386959
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

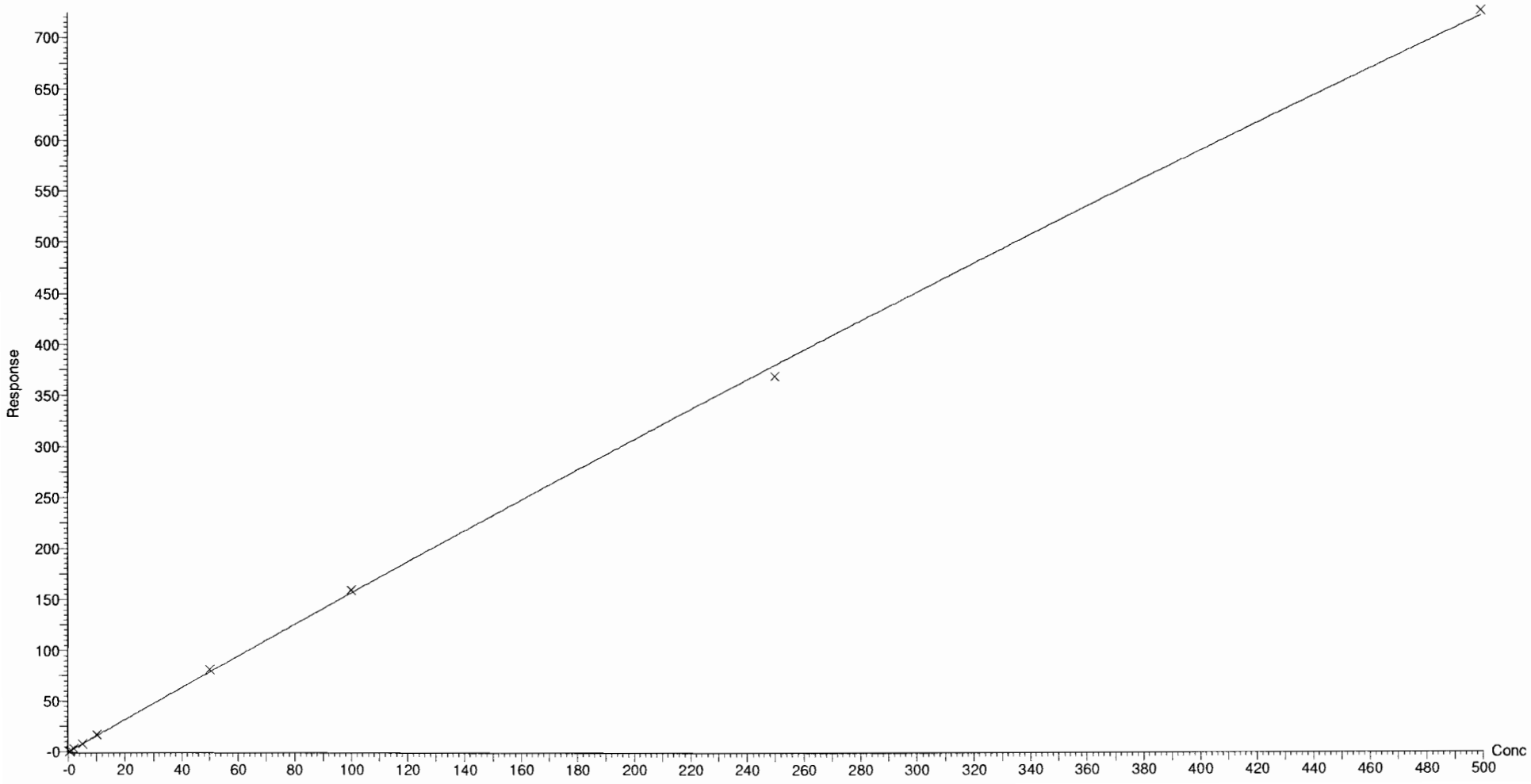
Compound name: 4:2 FTS
Coefficient of Determination: R^2 = 0.998838
Calibration curve: -0.00374524 * x^2 + 1.11582 * x + -0.011422
Response type: Internal Std (Ref 39), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

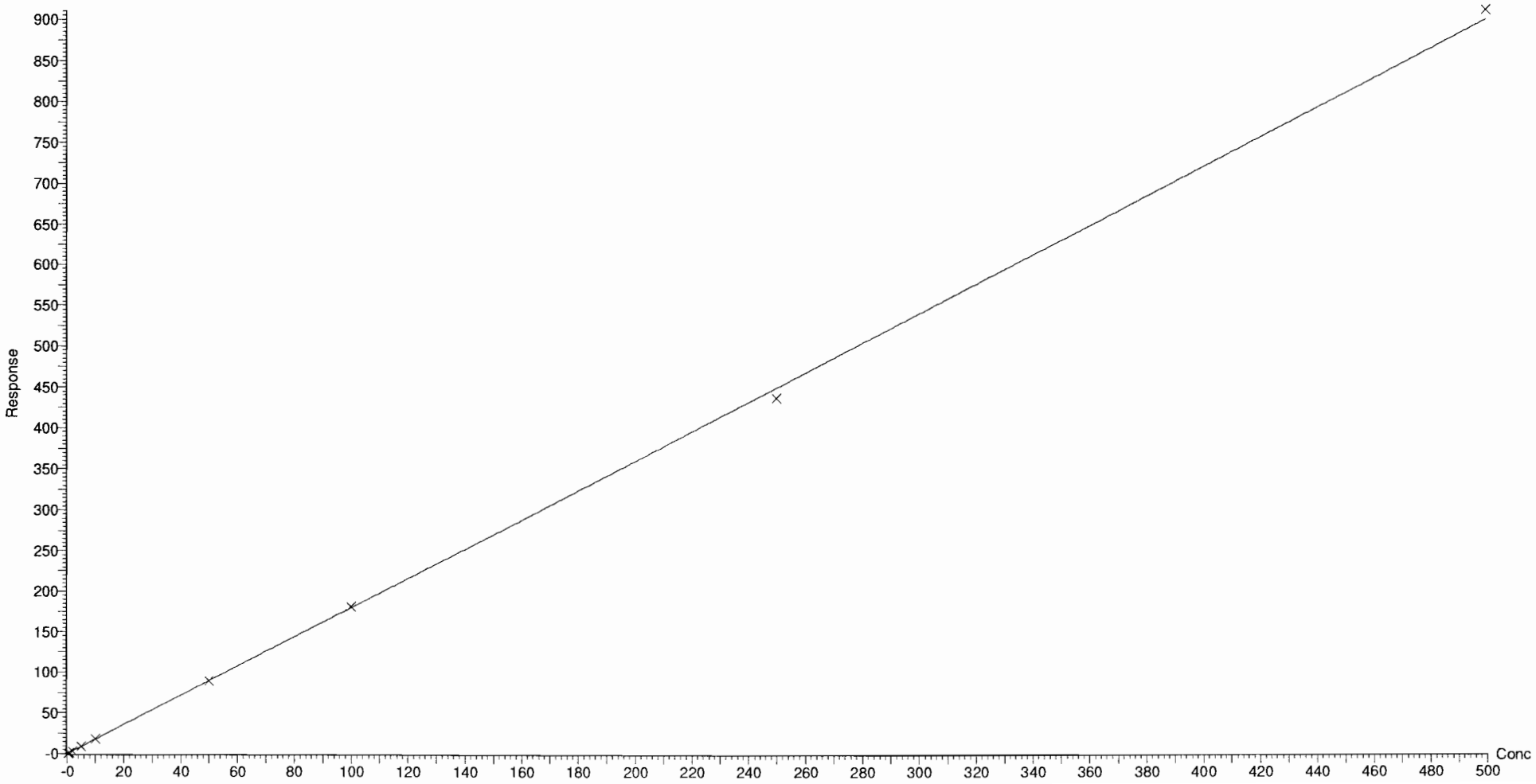
Compound name: PFHxA
Coefficient of Determination: R^2 = 0.999553
Calibration curve: -0.000313716 * x^2 + 1.59614 * x + 0.0424276
Response type: Internal Std (Ref 40), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

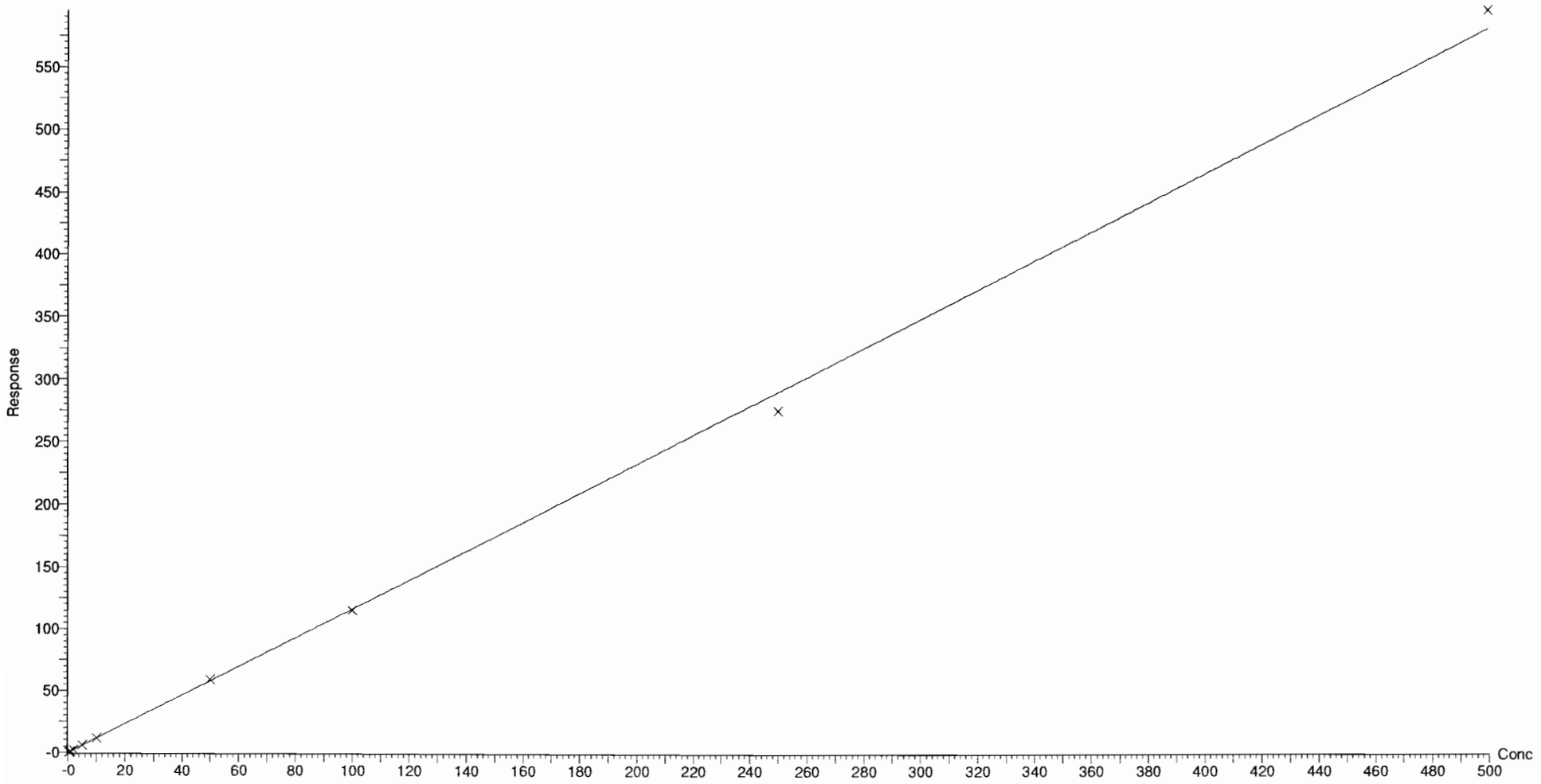
Compound name: PFPeS
Correlation coefficient: r = 0.999819, r^2 = 0.999638
Calibration curve: 1.79807 * x + 0.0789454
Response type: Internal Std (Ref 38), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

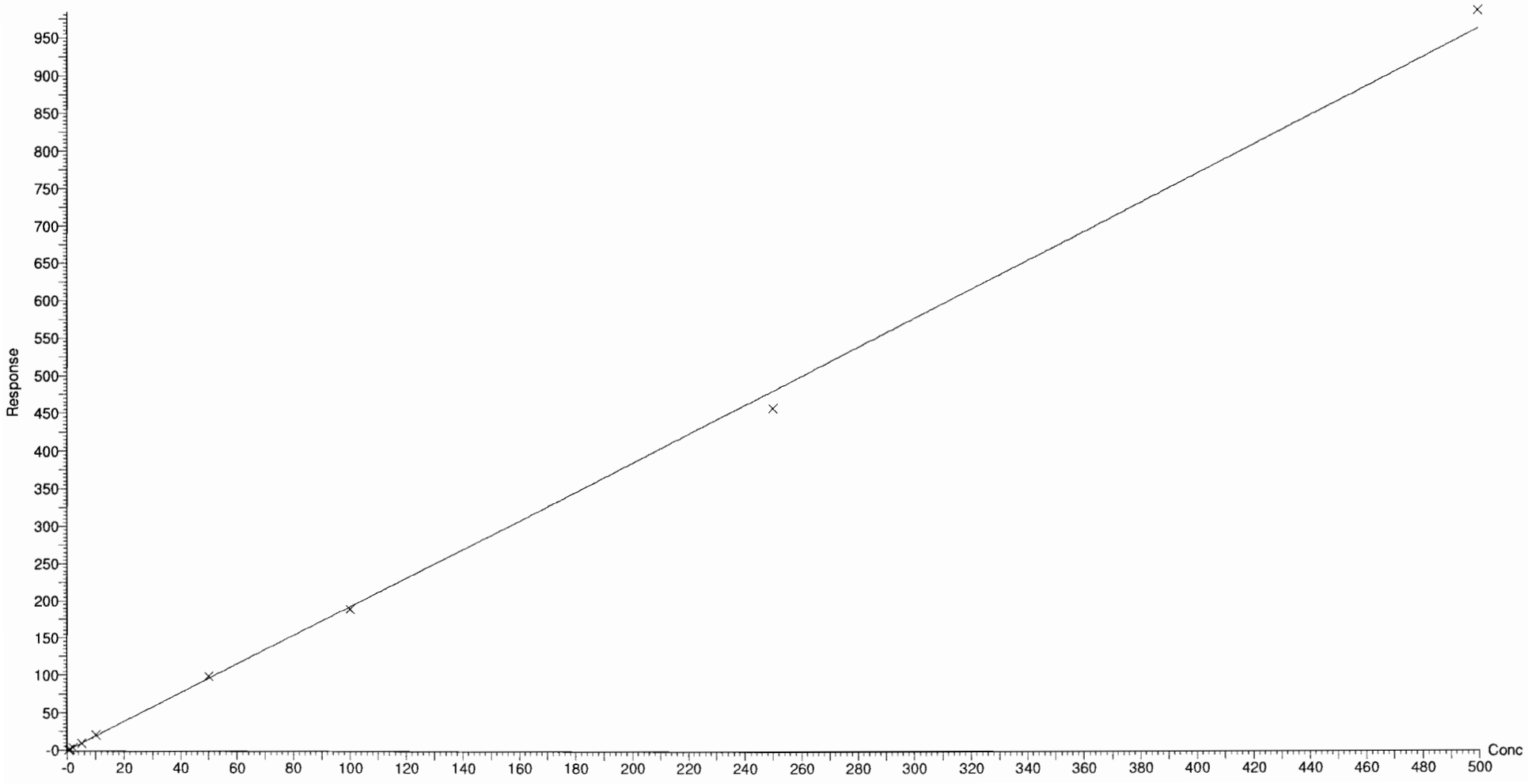
Compound name: PFHpA
Correlation coefficient: r = 0.999421, r^2 = 0.998843
Calibration curve: 1.16069 * x + 0.0713148
Response type: Internal Std (Ref 41), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

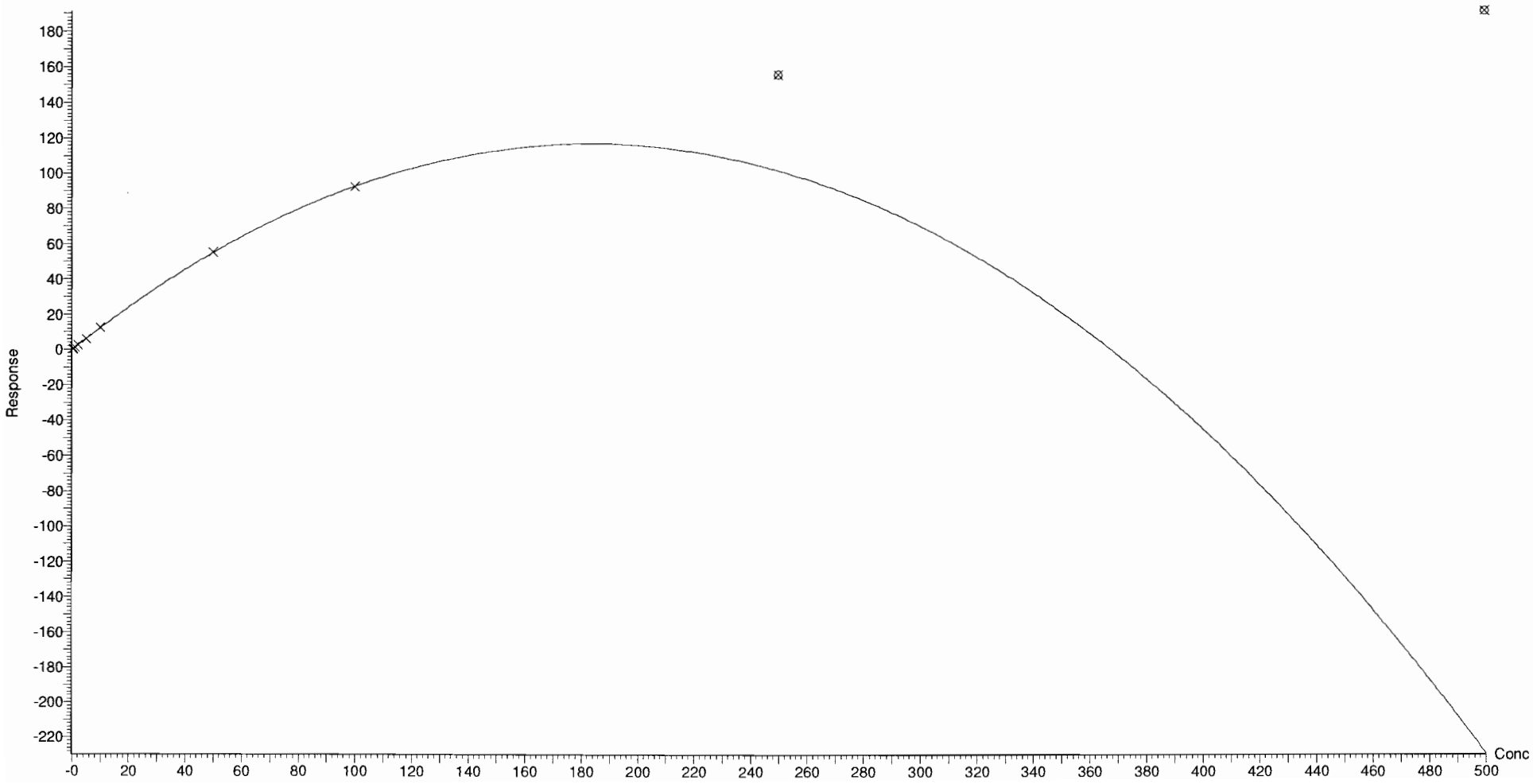
Compound name: L-PFHxS
Correlation coefficient: r = 0.999443, r^2 = 0.998887
Calibration curve: 1.9216 * x + -0.00896228
Response type: Internal Std (Ref 42), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

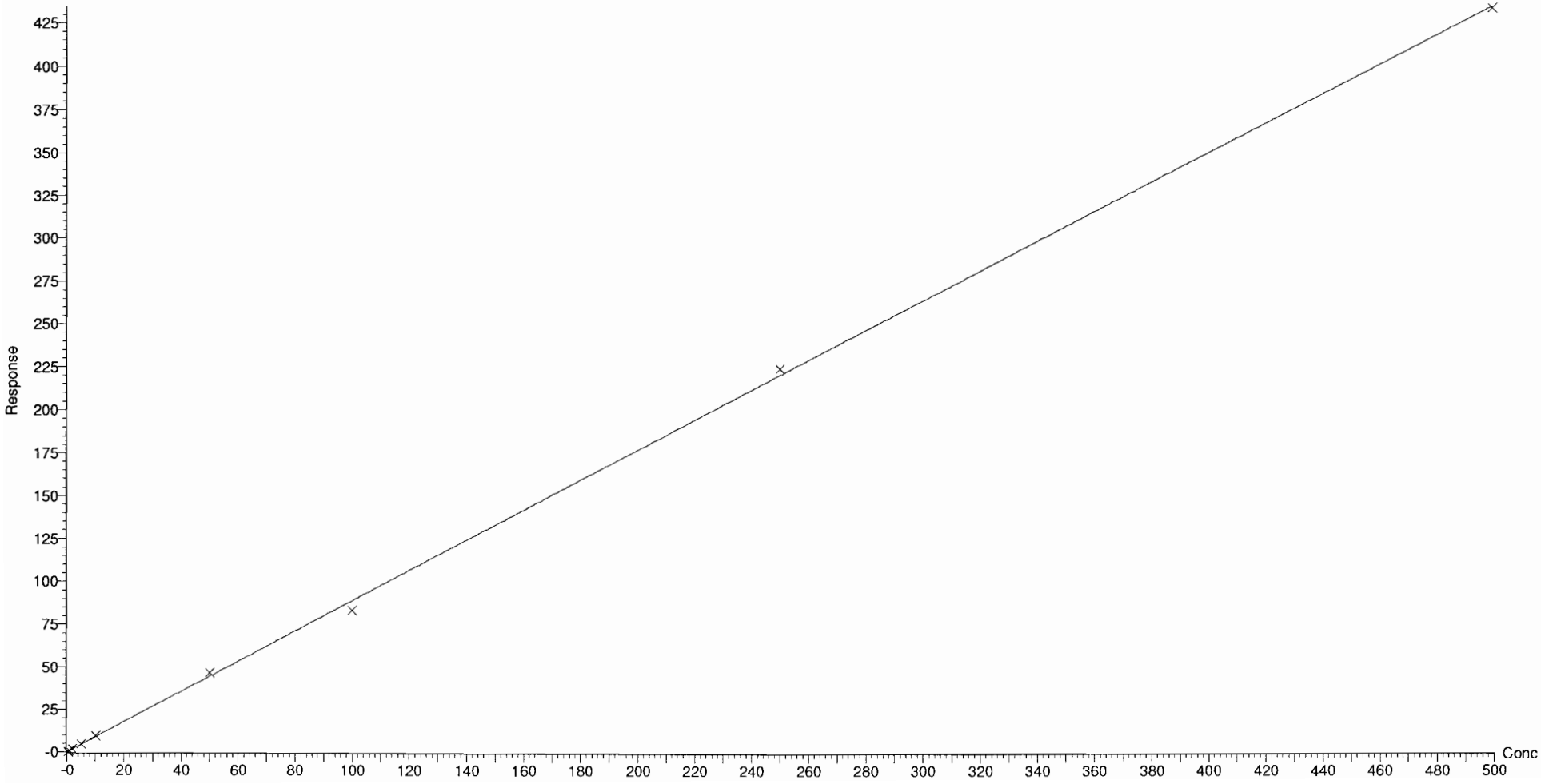
Compound name: 6:2 FTS
Coefficient of Determination: R^2 = 0.999839
Calibration curve: -0.00346555 * x^2 + 1.27447 * x + -0.0336081
Response type: Internal Std (Ref 43), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

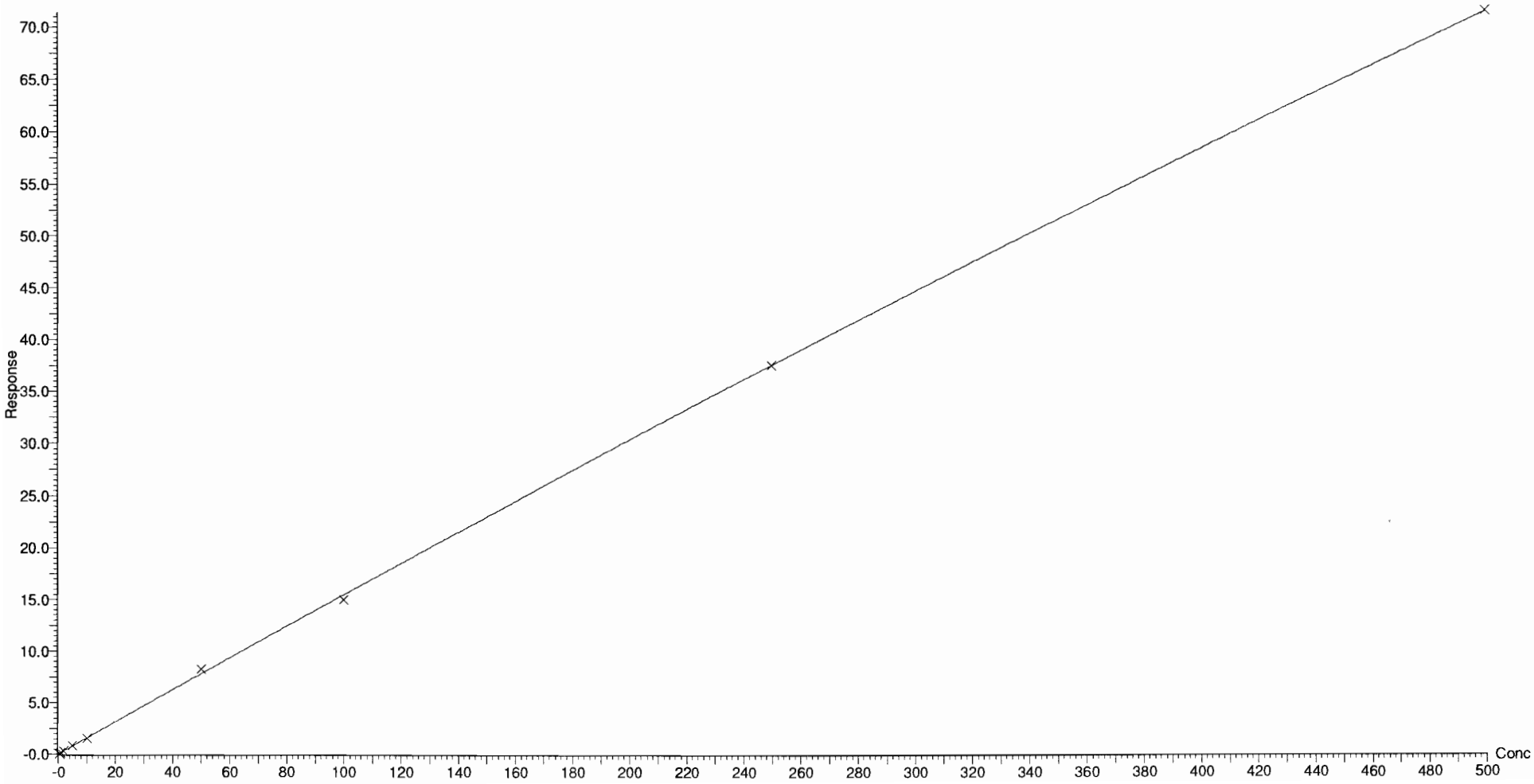
Compound name: L-PFOA
Coefficient of Determination: R^2 = 0.999247
Calibration curve: -5.24867e-005 * x^2 + 0.895395 * x + 0.0852547
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

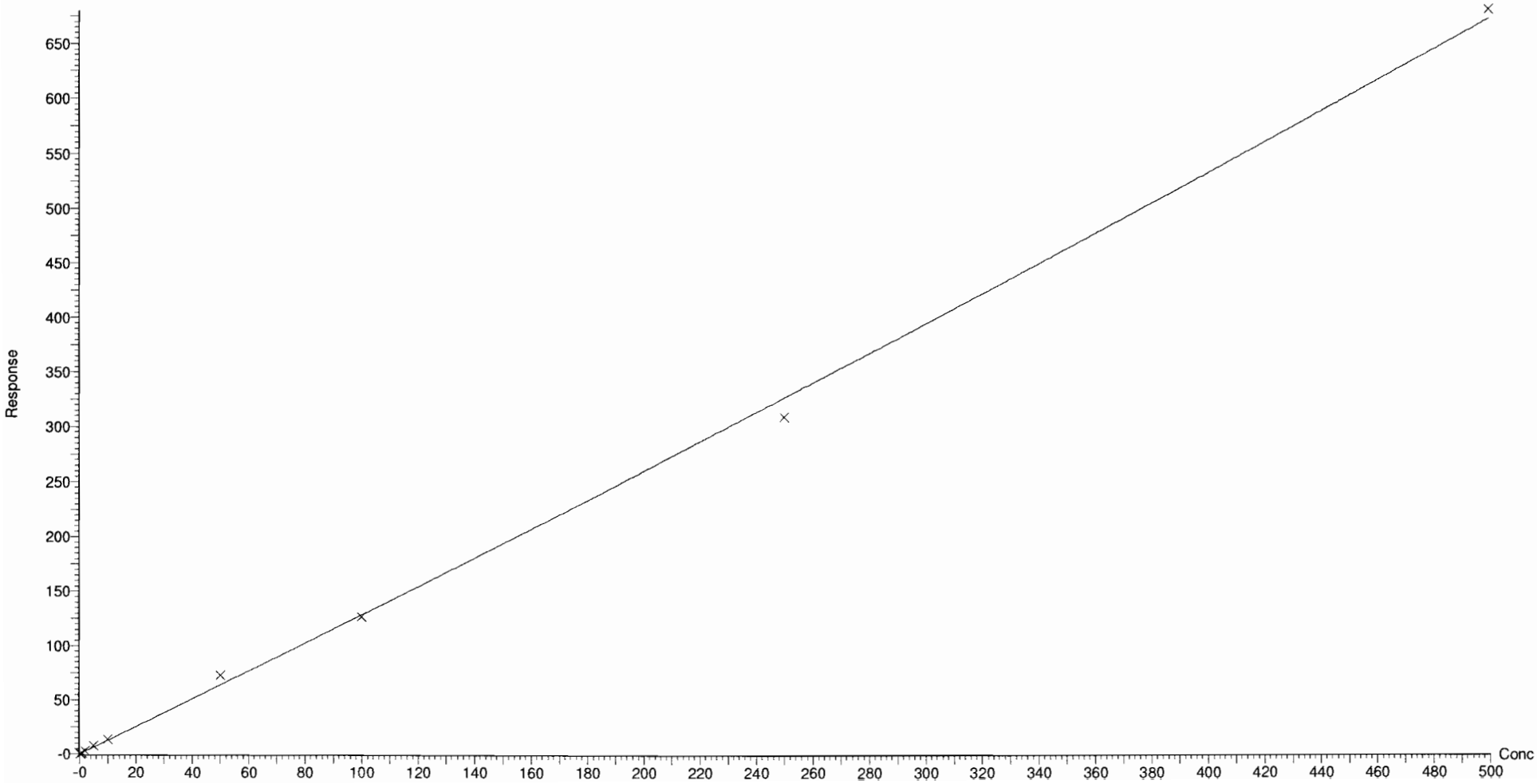
Compound name: PFHpS
Coefficient of Determination: R^2 = 0.999609
Calibration curve: -2.99805e-005 * x^2 + 0.157724 * x + 0.00259156
Response type: Internal Std (Ref 44), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

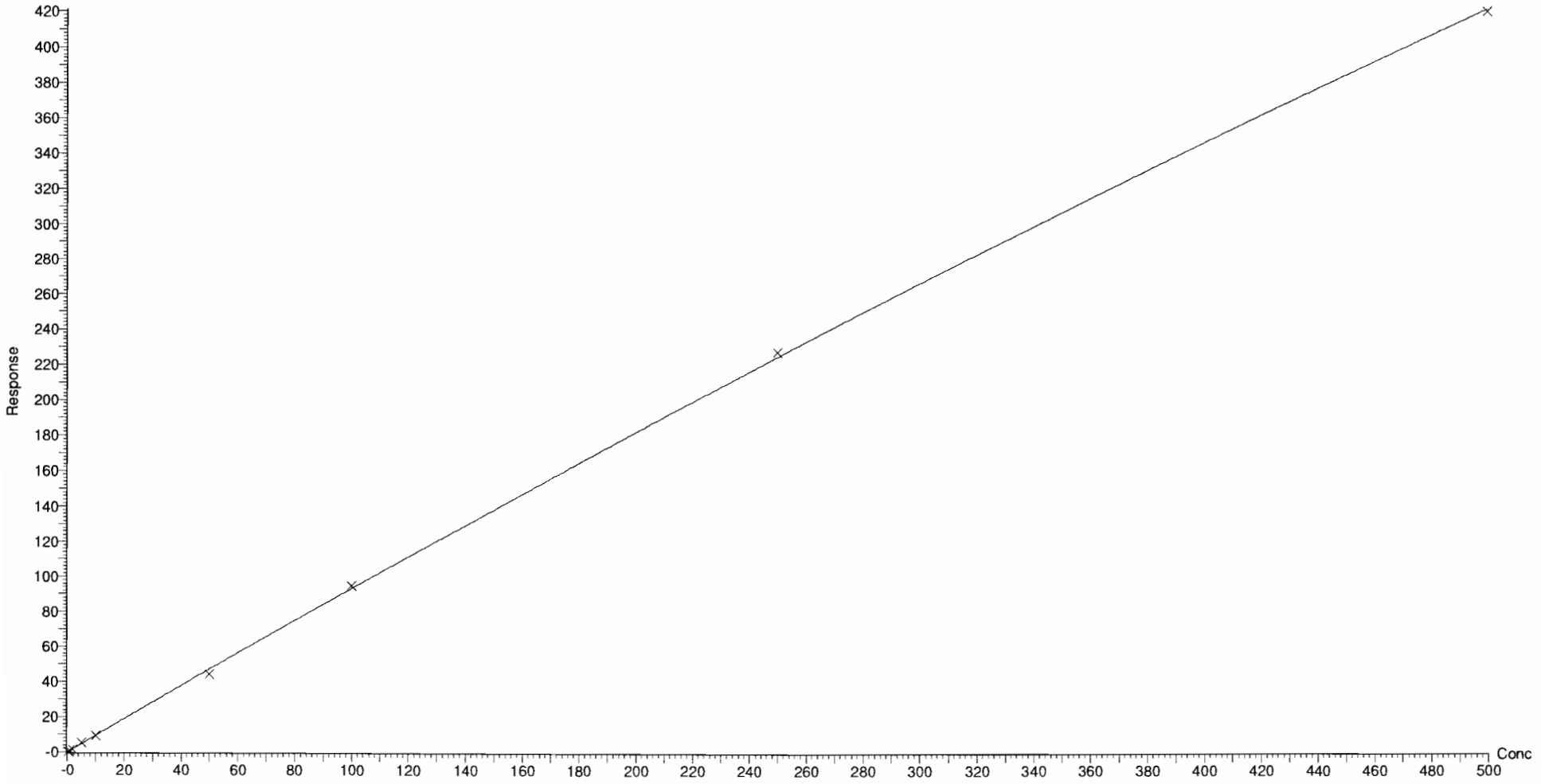
Compound name: PFNA
Coefficient of Determination: R^2 = 0.997864
Calibration curve: 0.000147582 * x^2 + 1.2693 * x + 0.0983793
Response type: Internal Std (Ref 45), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

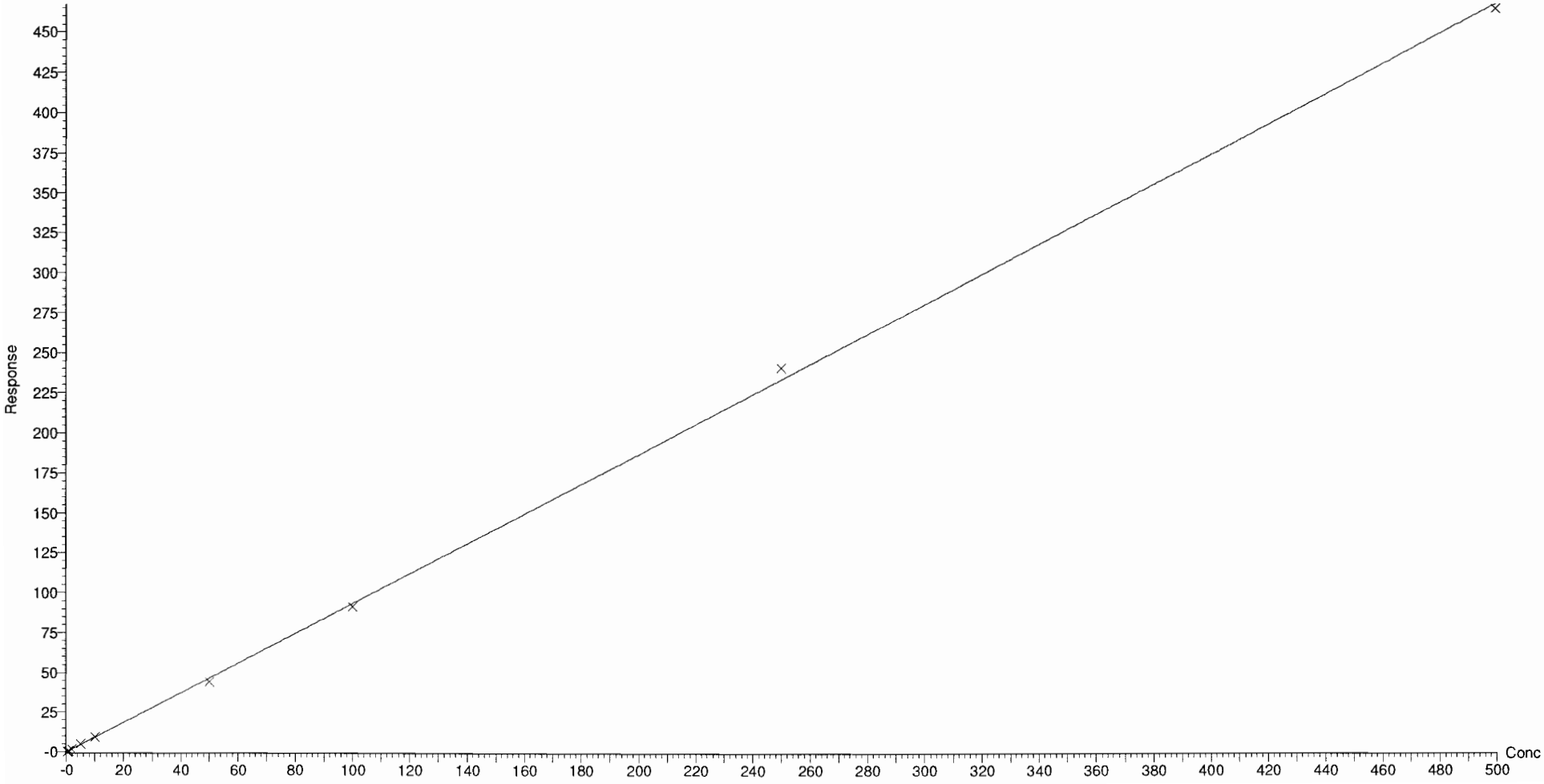
Compound name: PFOSA
Coefficient of Determination: R^2 = 0.999493
Calibration curve: -0.000225332 * x^2 + 0.955318 * x + -0.036378
Response type: Internal Std (Ref 46), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

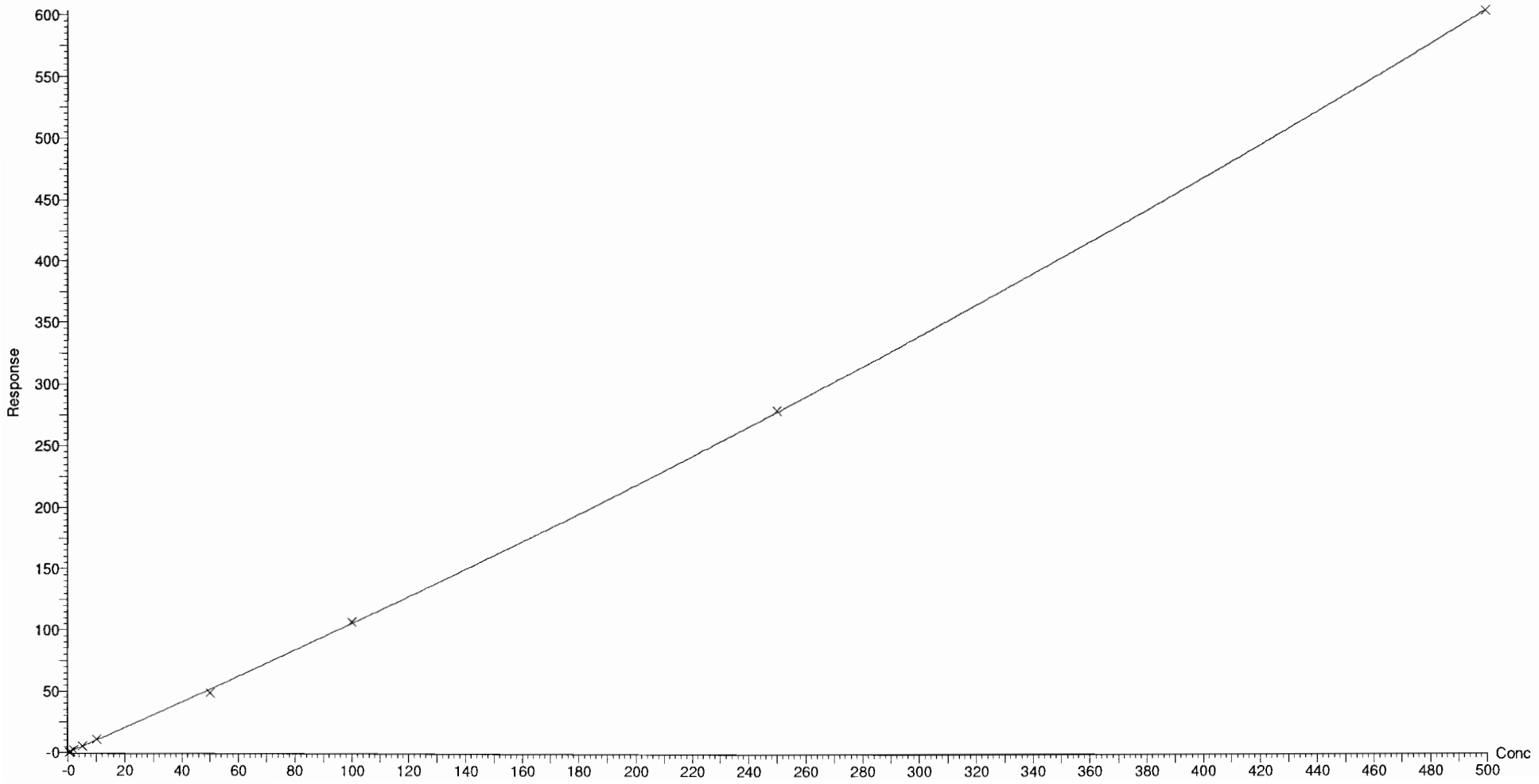
Compound name: L-PFOS
Coefficient of Determination: R^2 = 0.999458
Calibration curve: 1.42803e-007 * x^2 + 0.934629 * x + -0.0613722
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

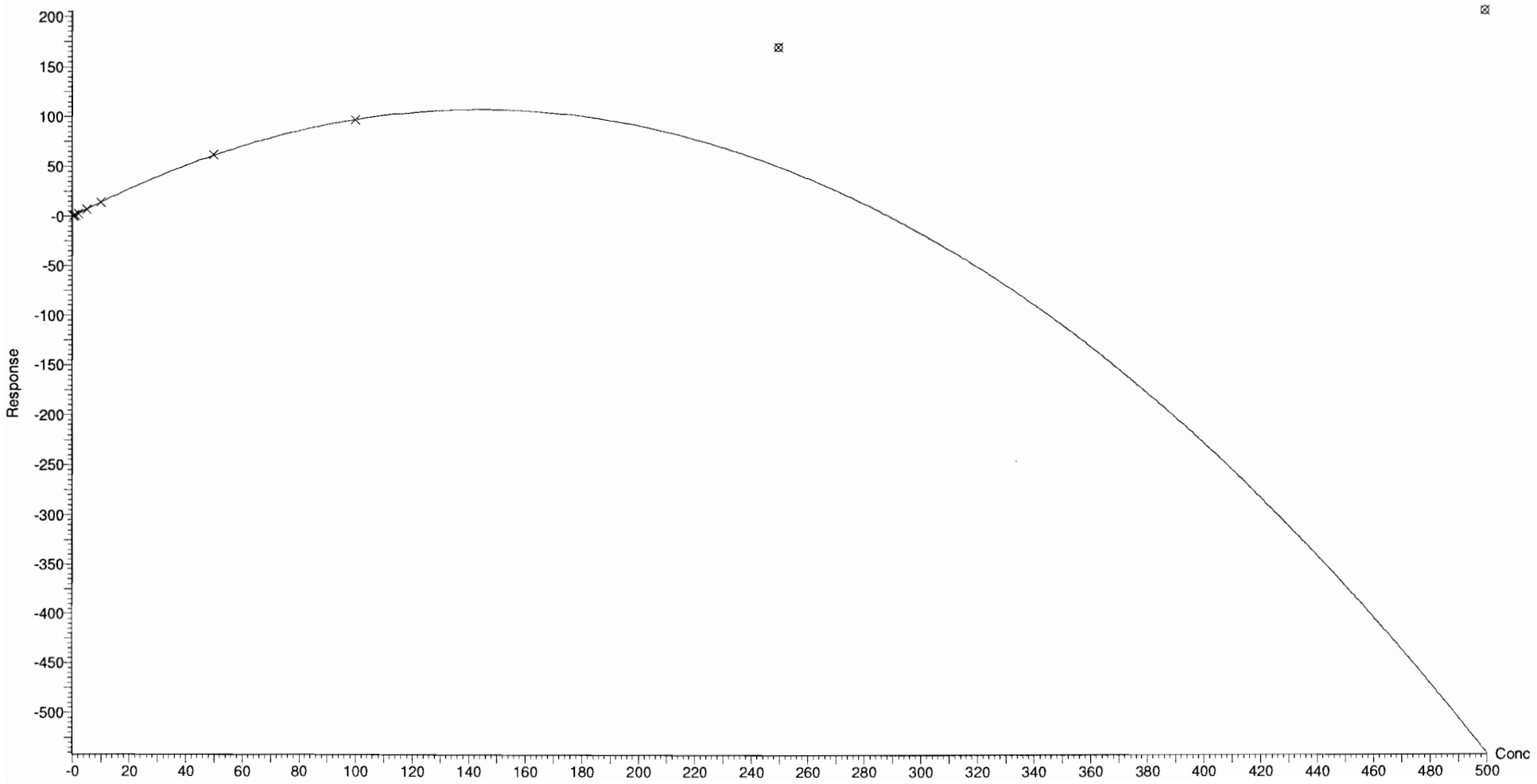
Compound name: PFDA
Coefficient of Determination: R^2 = 0.999743
Calibration curve: 0.00037847 * x^2 + 1.01718 * x + 0.0671158
Response type: Internal Std (Ref 48), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

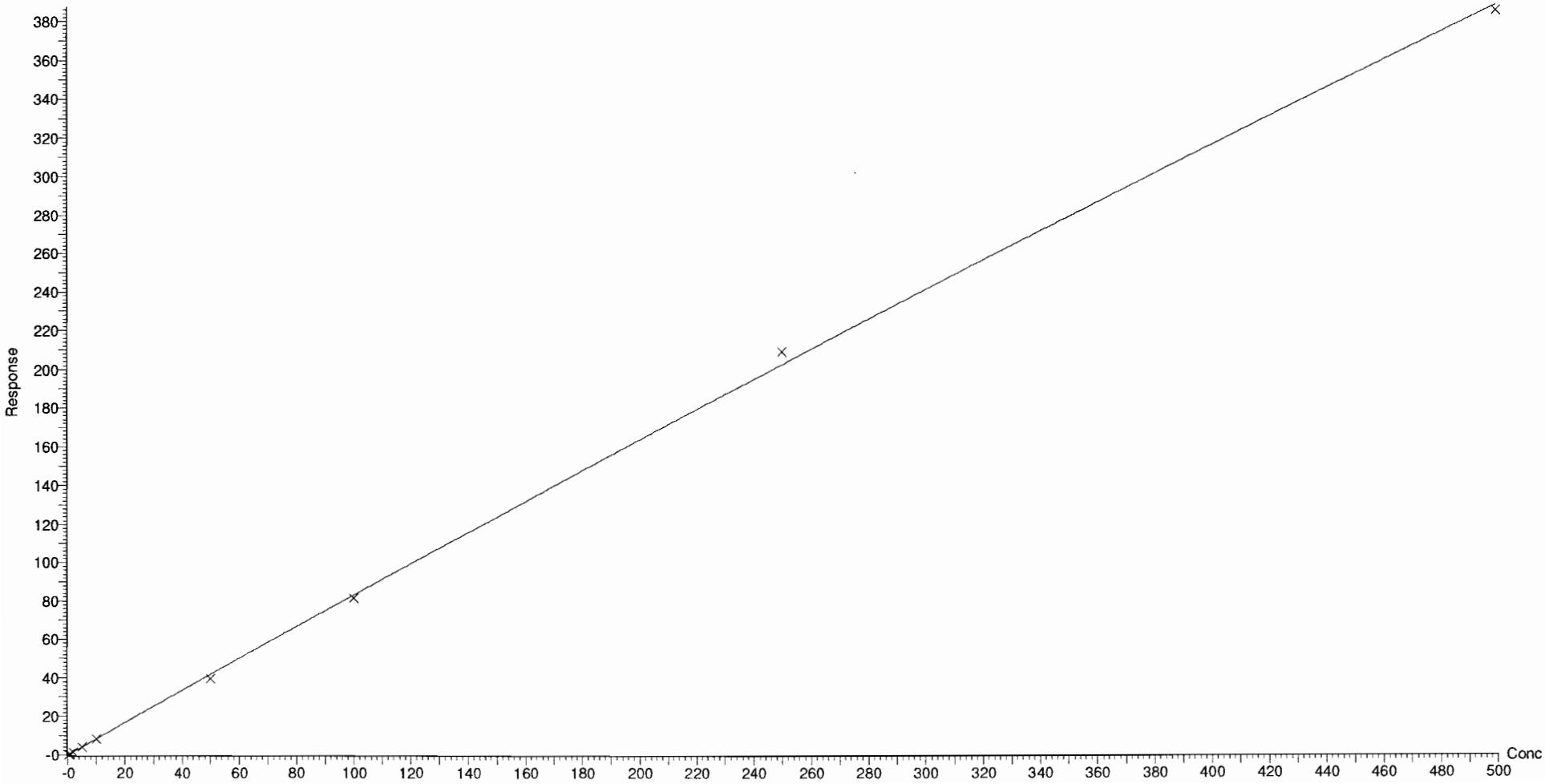
Compound name: 8:2 FTS
Coefficient of Determination: R^2 = 0.999723
Calibration curve: -0.0051377 * x^2 + 1.48665 * x + 0.00181394
Response type: Internal Std (Ref 49), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:34 Pacific Daylight Time

Compound name: PFNS
Coefficient of Determination: R^2 = 0.999403
Calibration curve: -0.000141031 * x^2 + 0.84601 * x + -0.0910263
Response type: Internal Std (Ref 47), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



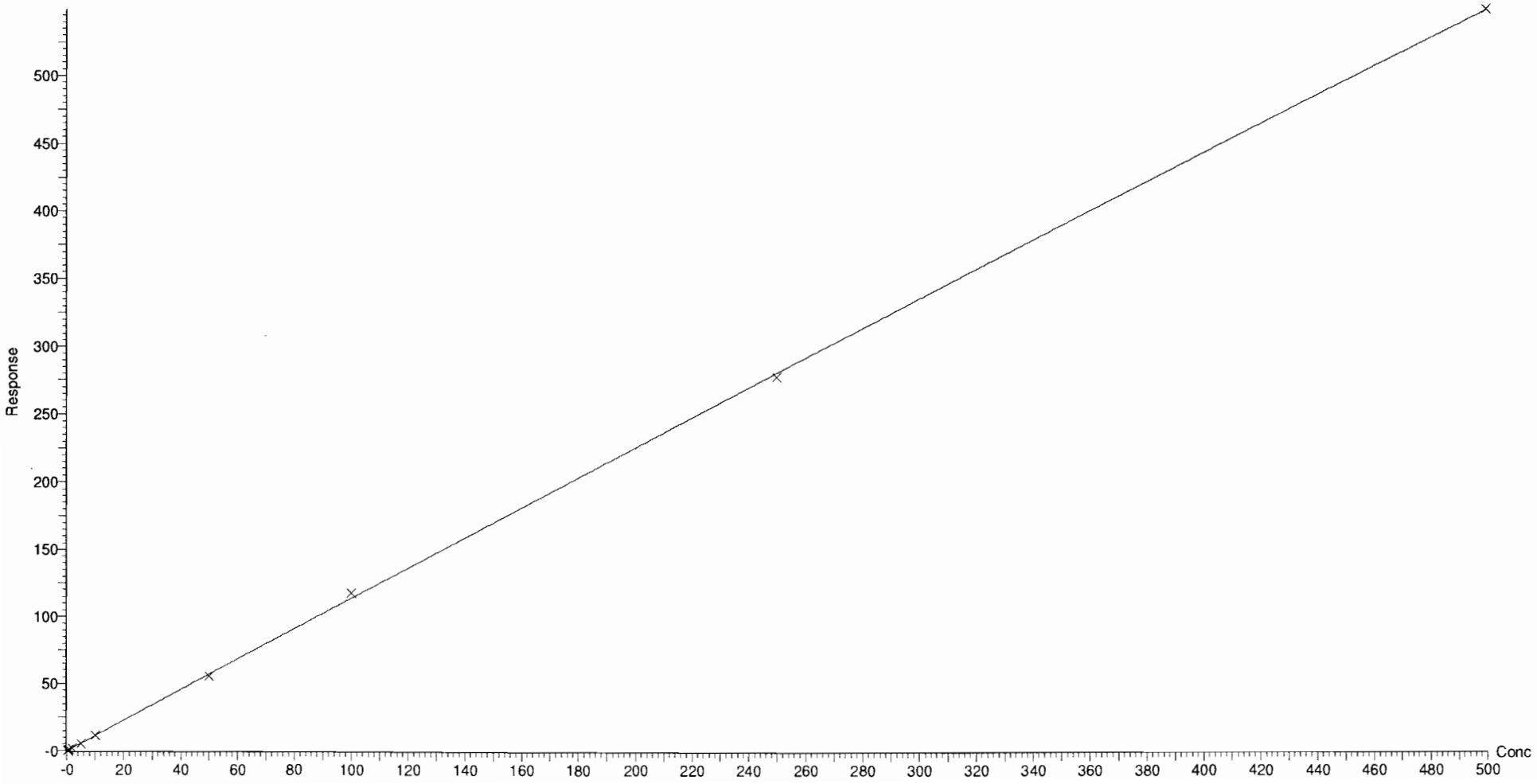
Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38 VAL_PFAS-04_00-04-18

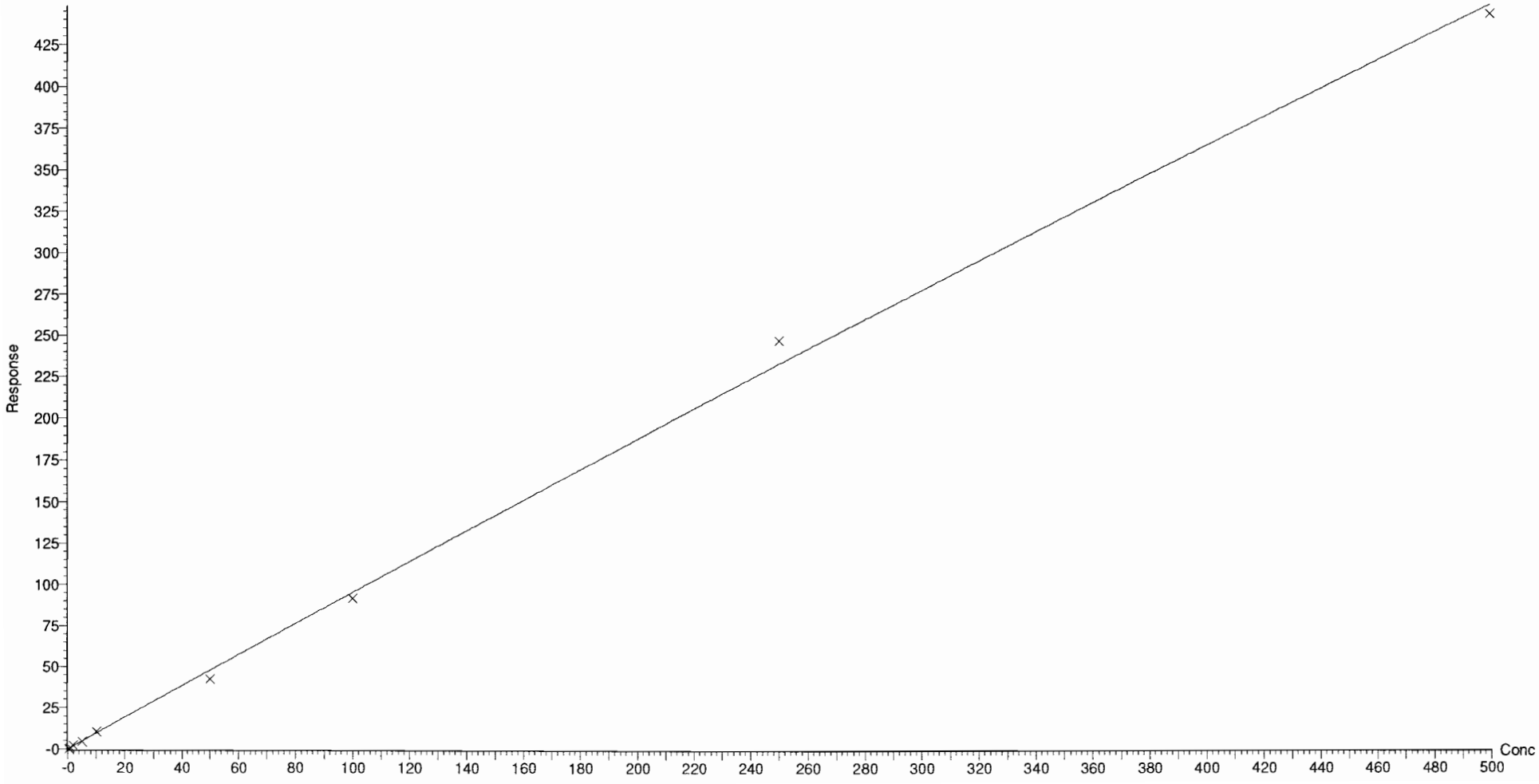
Compound name: L-EtFOSAA
Coefficient of Determination: R^2 = 0.999646
Calibration curve: -0.00010475 * x^2 + 1.14871 * x + -0.0588573
Response type: Internal Std (Ref 51), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

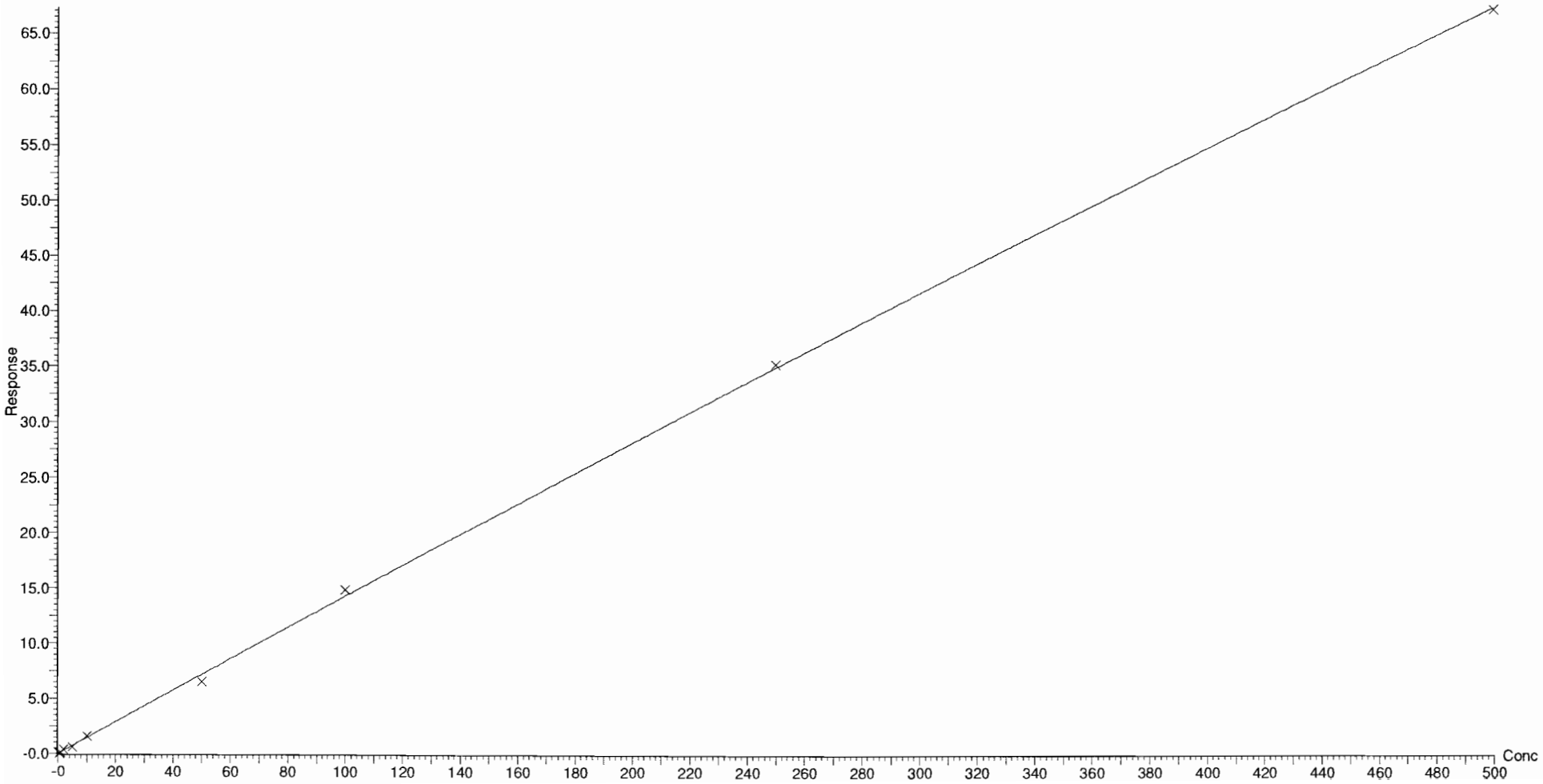
Compound name: PFUdA
Coefficient of Determination: R^2 = 0.997692
Calibration curve: -0.00013883 * x^2 + 0.96625 * x + 0.0663674
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

Compound name: PFDS
Coefficient of Determination: R^2 = 0.998713
Calibration curve: -2.08709e-005 * x^2 + 0.145076 * x + -0.00507523
Response type: Internal Std (Ref 52), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

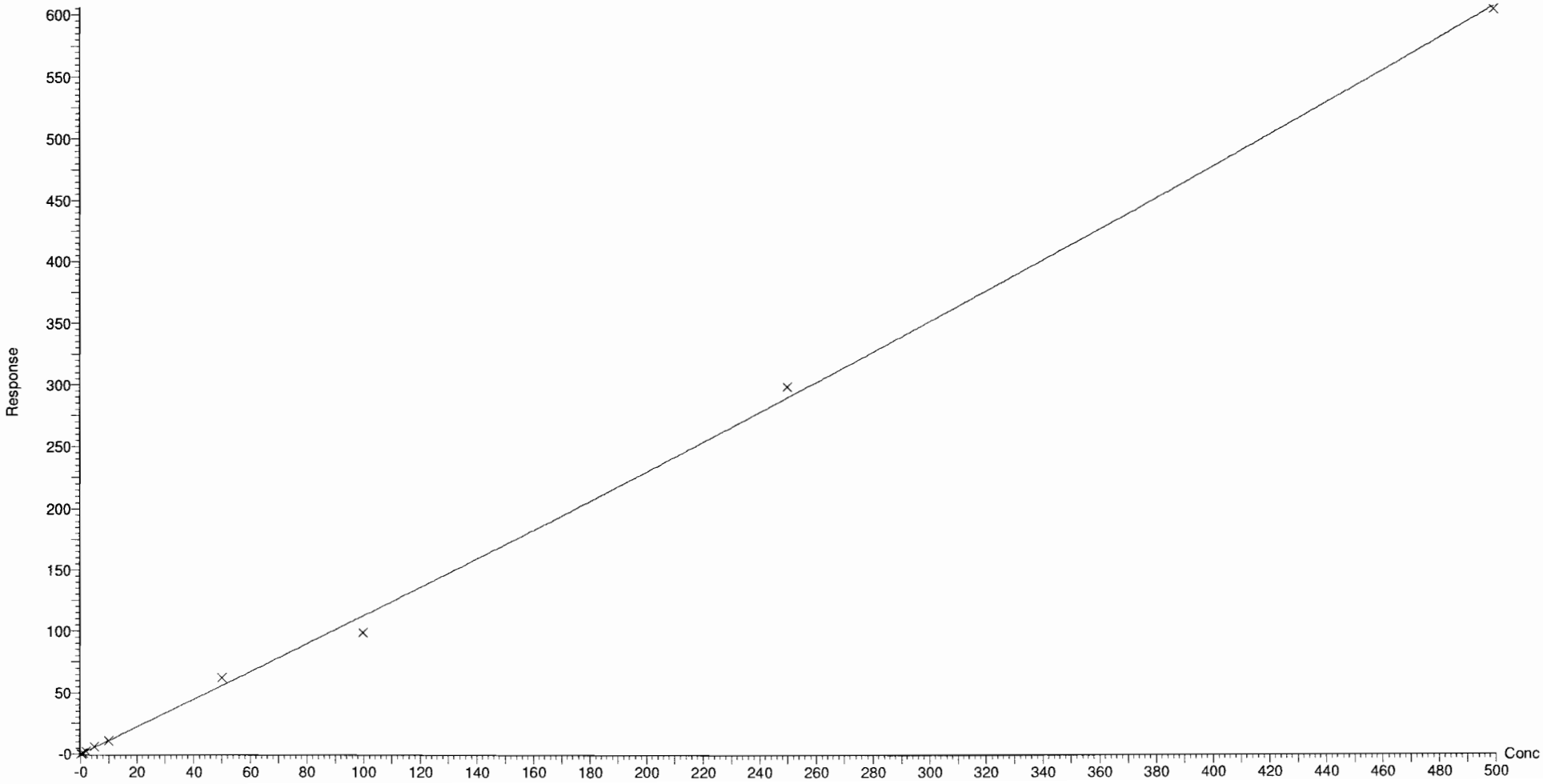


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

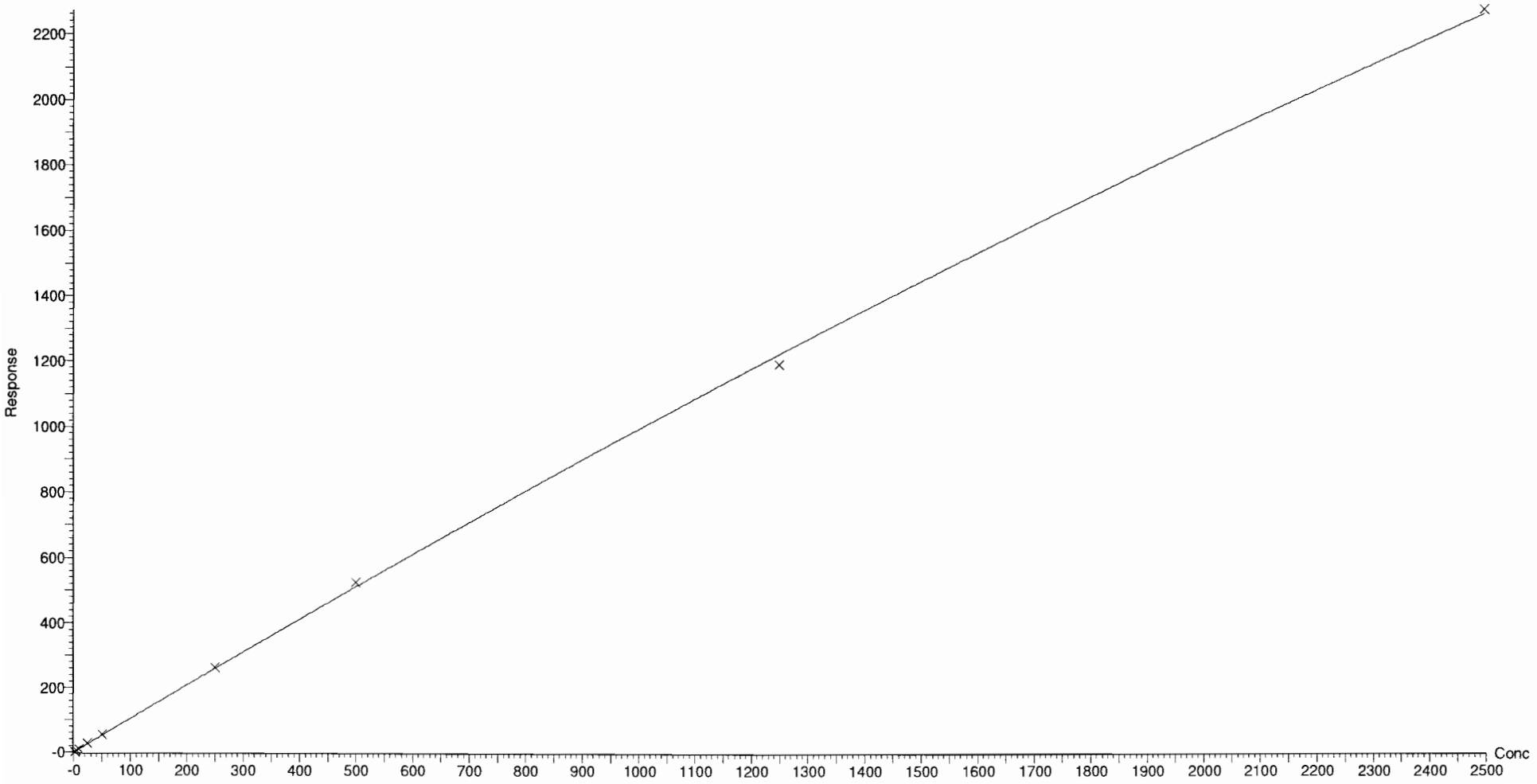
Compound name: PFDoA
Coefficient of Determination: R^2 = 0.997401
Calibration curve: 0.000212677 * x^2 + 1.10562 * x + 0.0813564
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

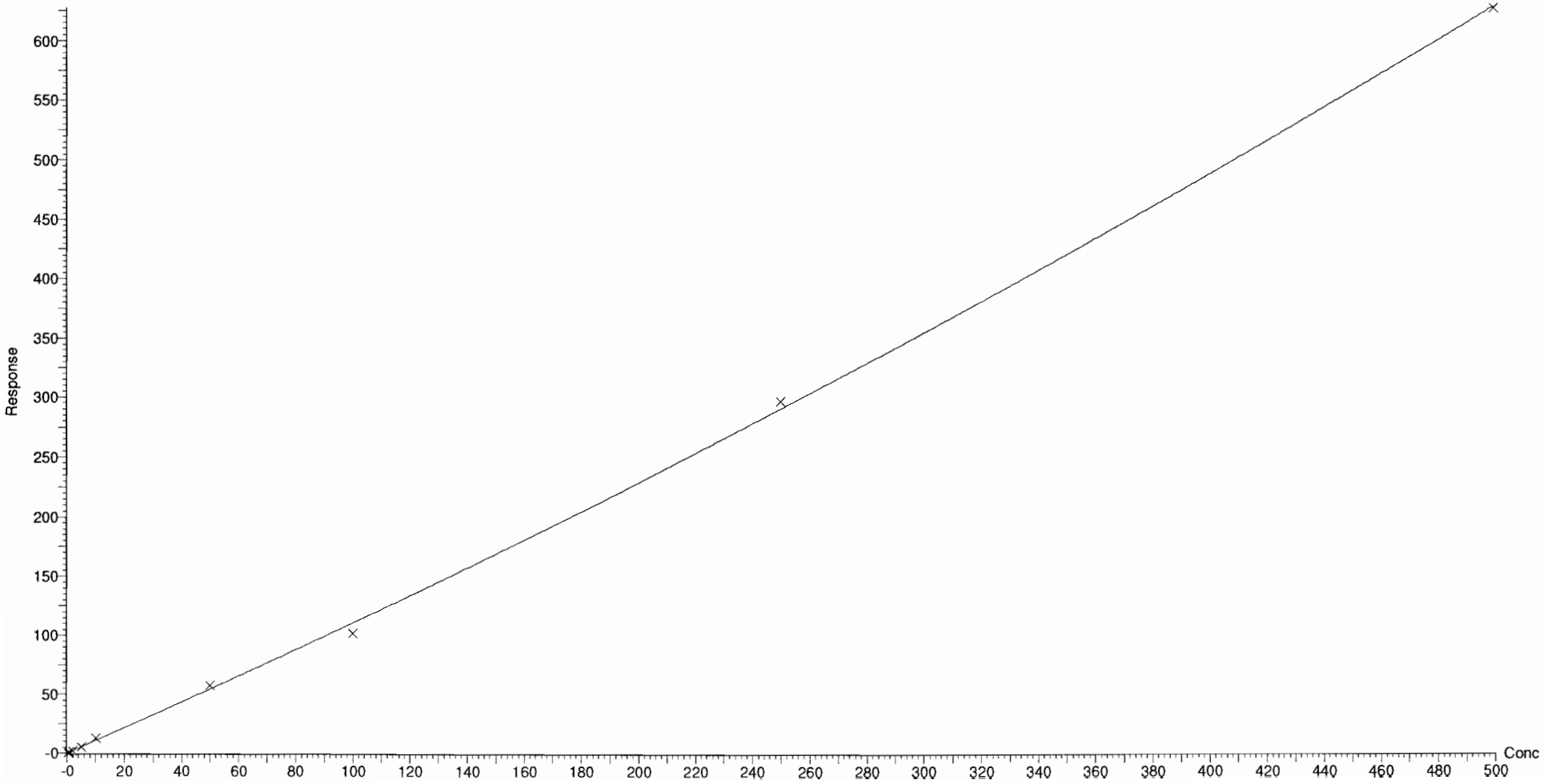
Compound name: N-MeFOSA
Coefficient of Determination: R^2 = 0.999647
Calibration curve: -6.00765e-005 * x^2 + 1.05382 * x + 1.43912e-005
Response type: Internal Std (Ref 54), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

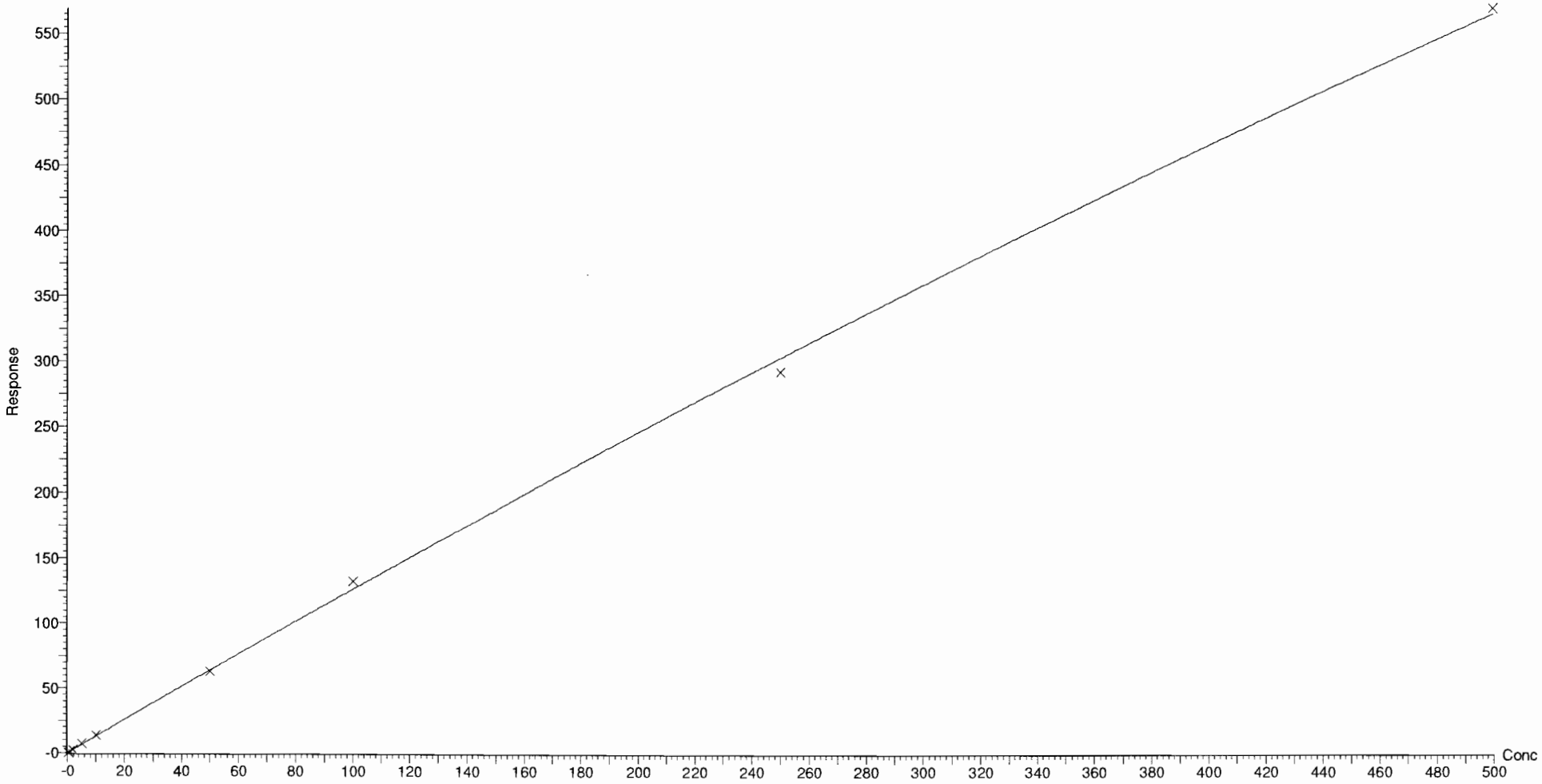
Compound name: PFTrDA
Coefficient of Determination: R^2 = 0.998885
Calibration curve: 0.000371643 * x^2 + 1.06917 * x + 0.144786
Response type: Internal Std (Ref 53), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

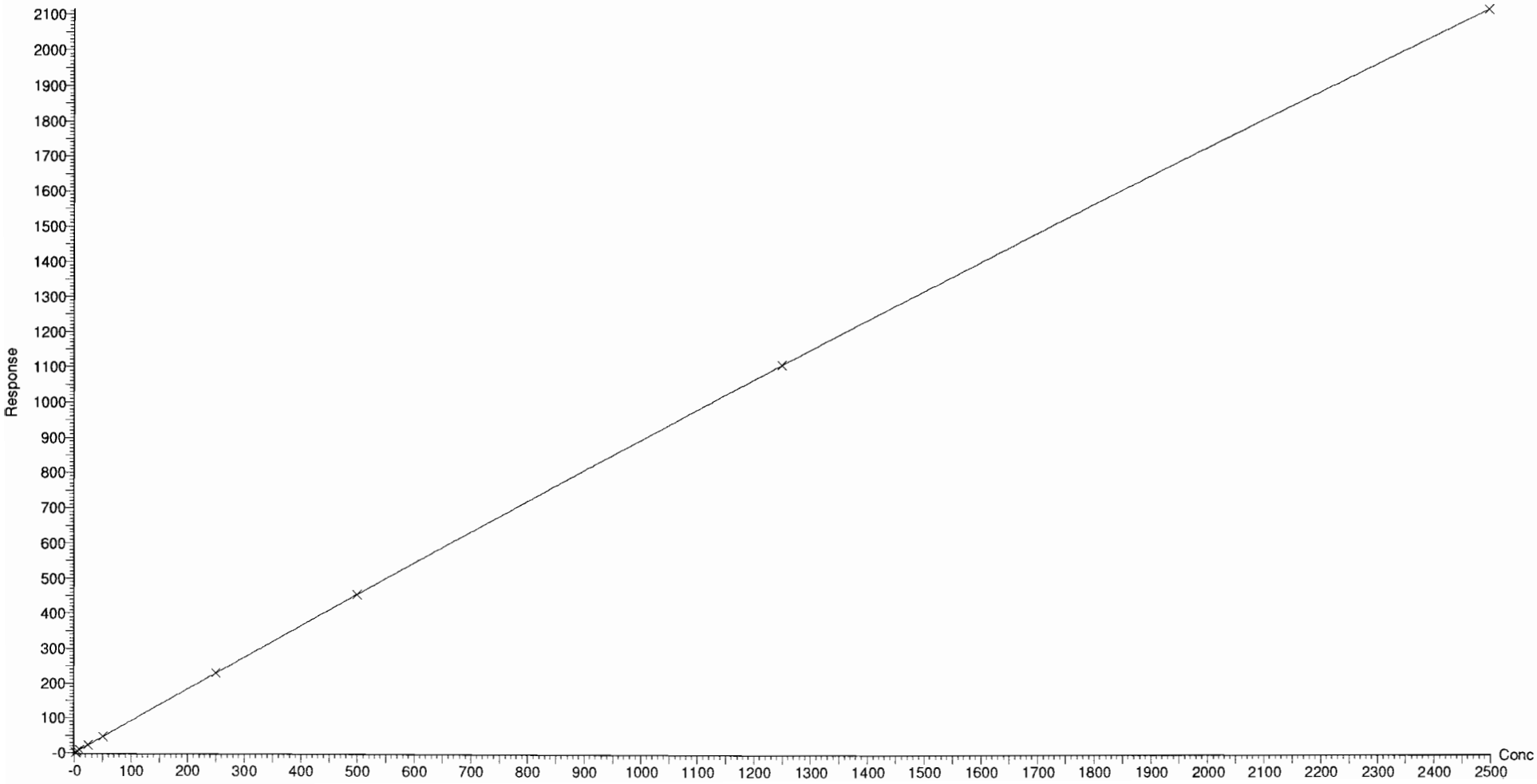
Compound name: PFTeDA
Coefficient of Determination: R^2 = 0.999161
Calibration curve: -0.000334653 * x^2 + 1.29716 * x + 0.0524742
Response type: Internal Std (Ref 55), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

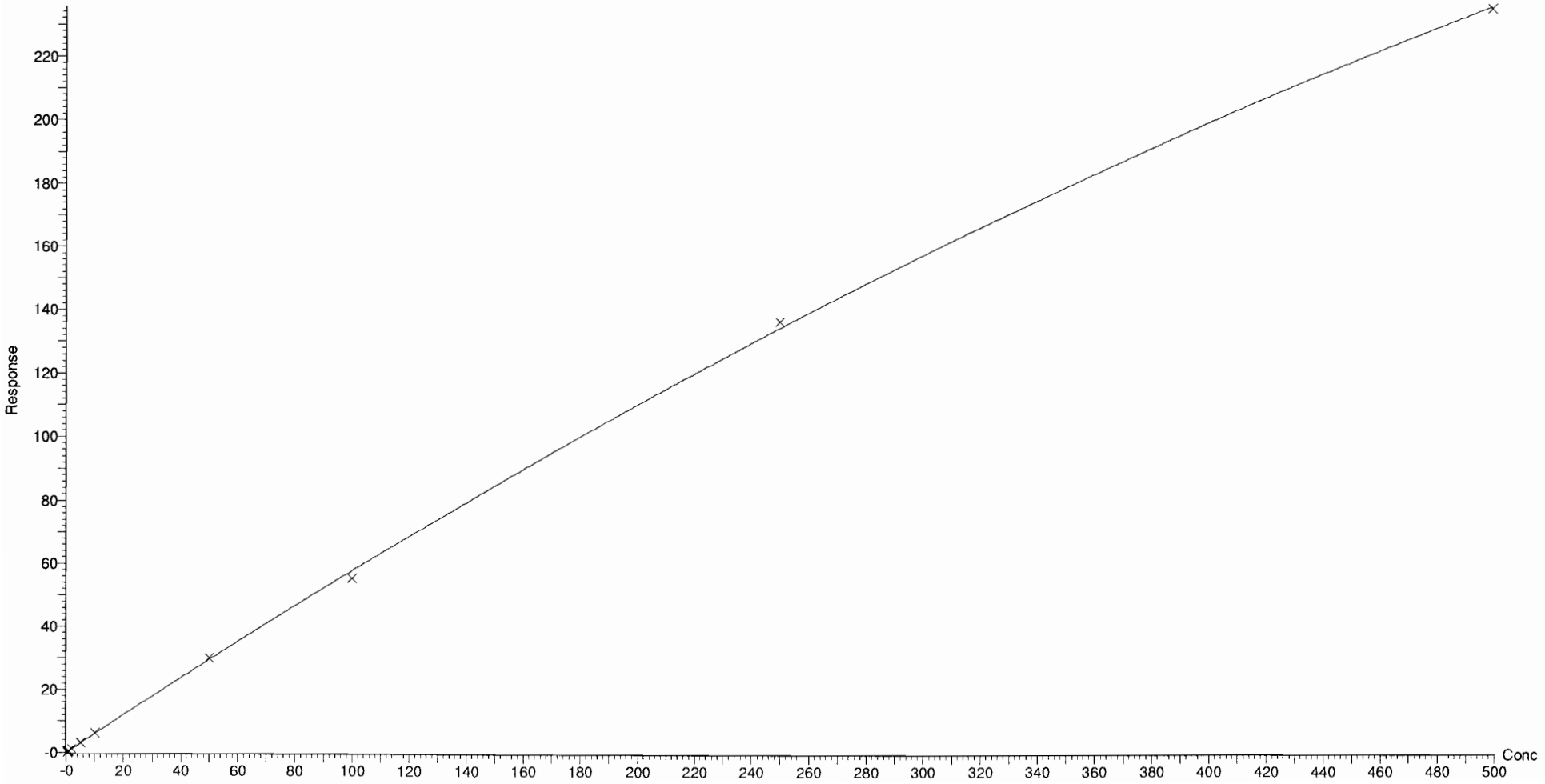
Compound name: N-EtFOSA
Coefficient of Determination: R^2 = 0.999998
Calibration curve: -3.24276e-005 * x^2 + 0.927207 * x + 0.0223365
Response type: Internal Std (Ref 56), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

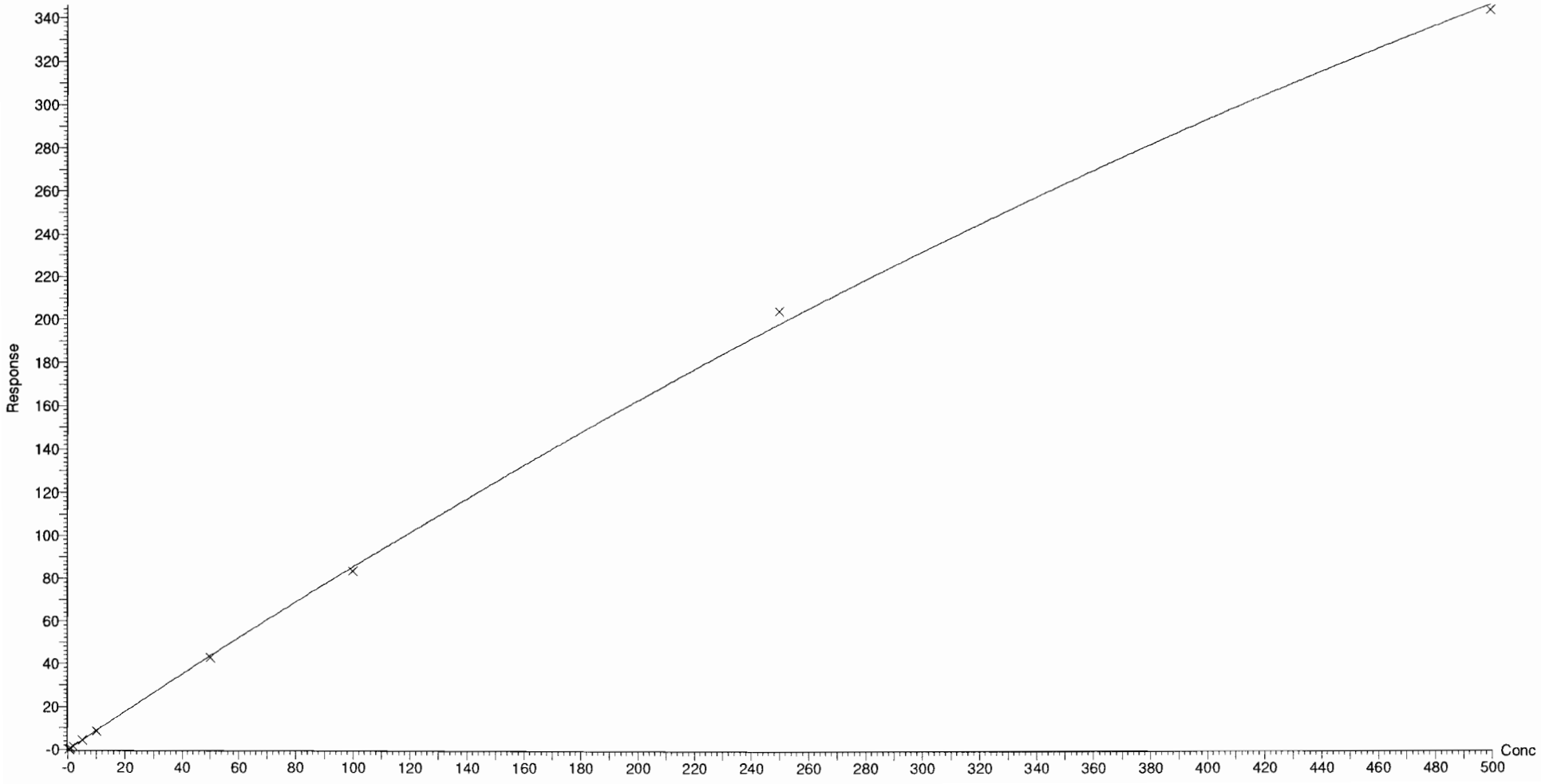
Compound name: PFHxDA
Coefficient of Determination: R^2 = 0.999511
Calibration curve: -0.000267807 * x^2 + 0.605113 * x + 0.0392849
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

Compound name: PFODA
Coefficient of Determination: R^2 = 0.999491
Calibration curve: -0.000404358 * x^2 + 0.894092 * x + -0.0222858
Response type: Internal Std (Ref 57), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Include, Weighting: 1/x, Axis trans: None

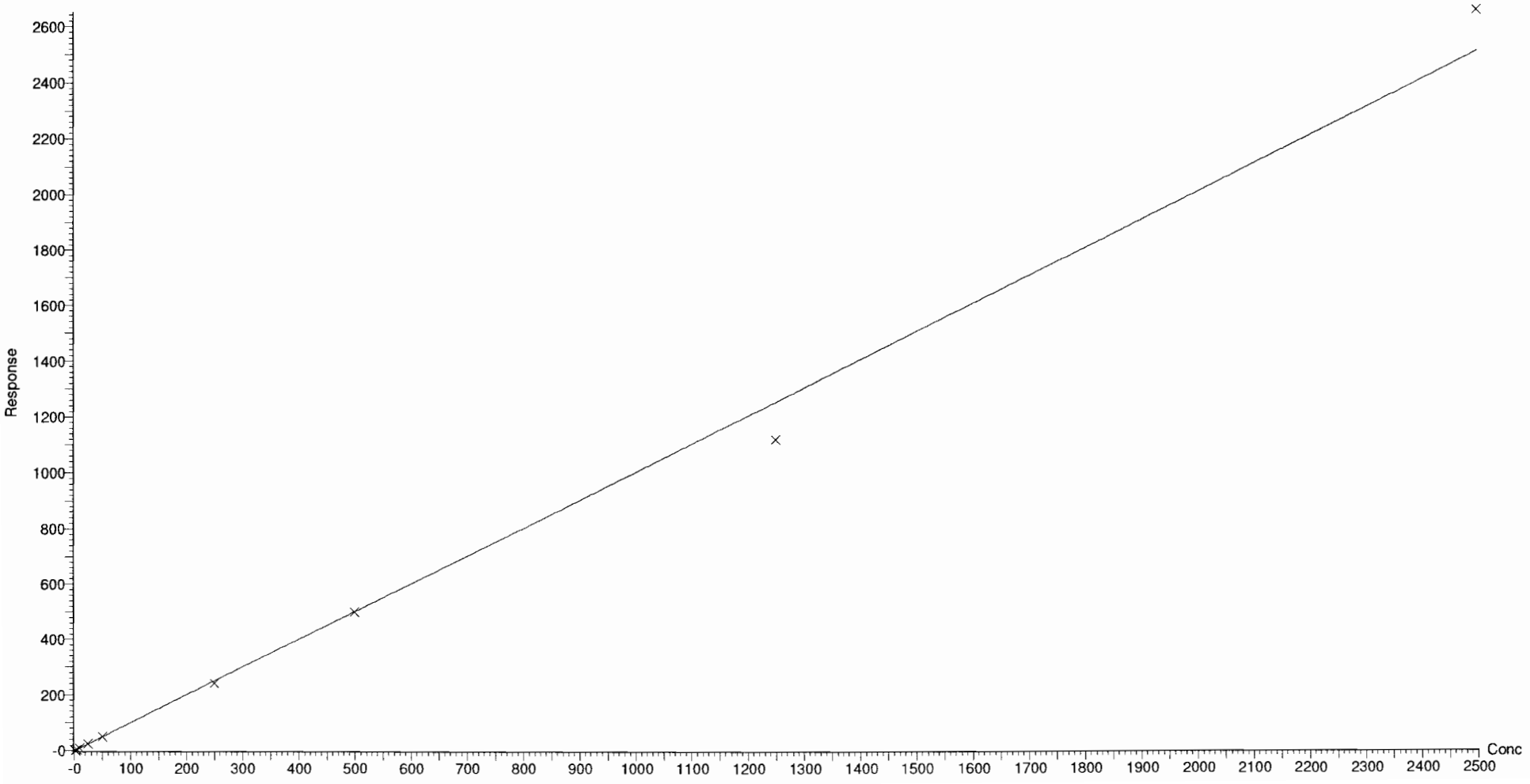


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

Compound name: N-MeFOSE
Correlation coefficient: r = 0.997461, r^2 = 0.994929
Calibration curve: 1.00285 * x + -0.37541
Response type: Internal Std (Ref 58), Area * (IS Conc. / IS Area)
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None

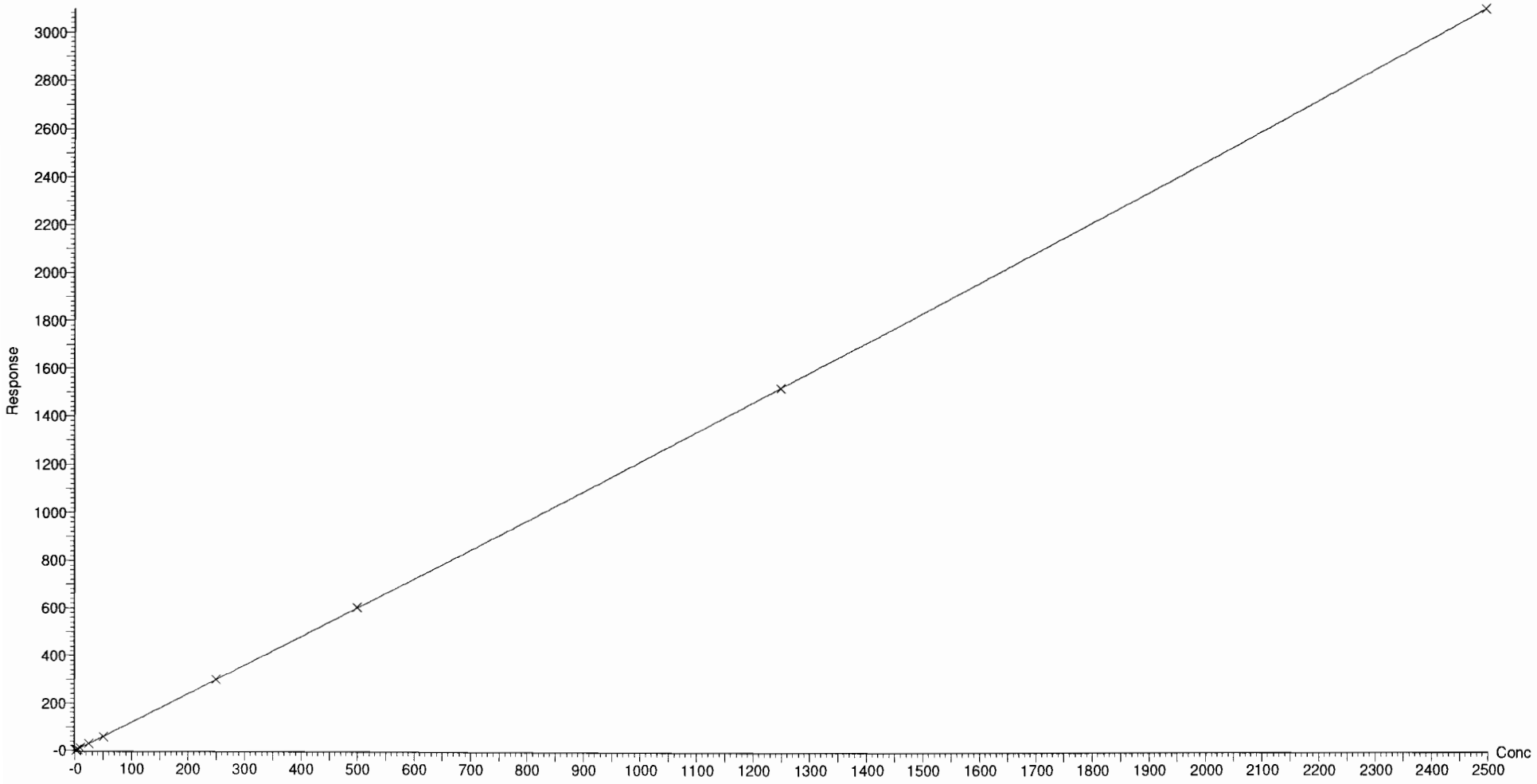


Vista Analytical Laboratory Q1

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:53:48 Pacific Daylight Time

Compound name: N-EtFOSE
Coefficient of Determination: R^2 = 0.999985
Calibration curve: 1.74191e-005 * x^2 + 1.19563 * x + -0.124308
Response type: Internal Std (Ref 59), Area * (IS Conc. / IS Area)
Curve type: 2nd Order, Origin: Exclude, Weighting: 1/x, Axis trans: None



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

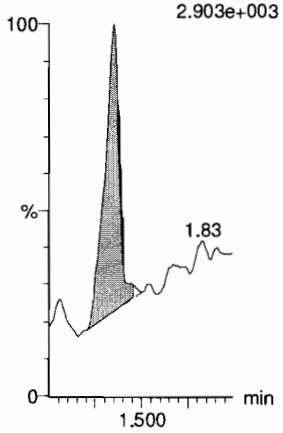
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: 05 Jun 2018 10:50:38

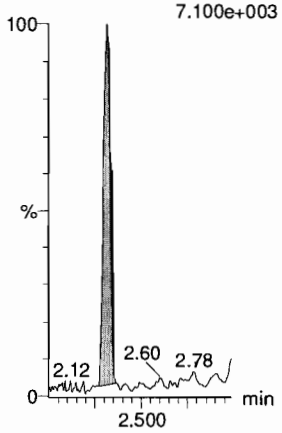
1 dm 6/5/18

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

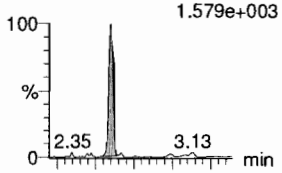
PFBA
F2:MRM of 1 channel,ES-
213.0 > 168.8
2.903e+003



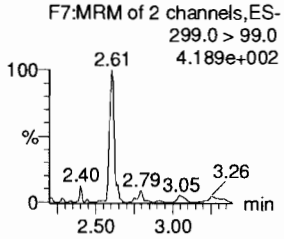
PFPeA
F5:MRM of 1 channel,ES-
263.1 > 218.9
7.100e+003



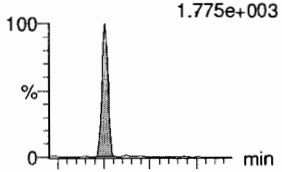
PFBS
F7:MRM of 2 channels,ES-
299.0 > 79.7
1.579e+003



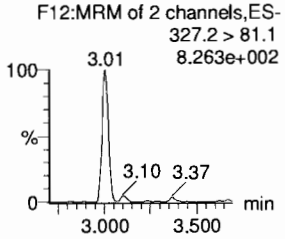
F7:MRM of 2 channels,ES-
299.0 > 99.0
4.189e+002



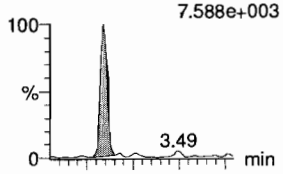
4:2 FTS
F12:MRM of 2 channels,ES-
327.2 > 307.2
1.775e+003



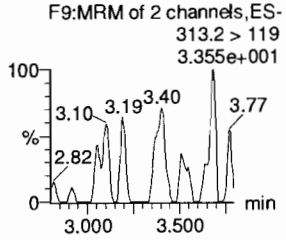
F12:MRM of 2 channels,ES-
327.2 > 81.1
8.263e+002



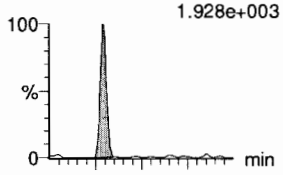
PFHxA
F9:MRM of 2 channels,ES-
313.2 > 268.9
7.588e+003



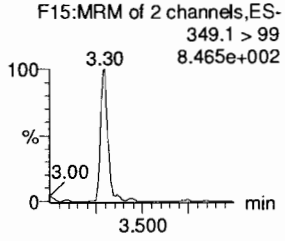
F9:MRM of 2 channels,ES-
313.2 > 119
3.355e+001



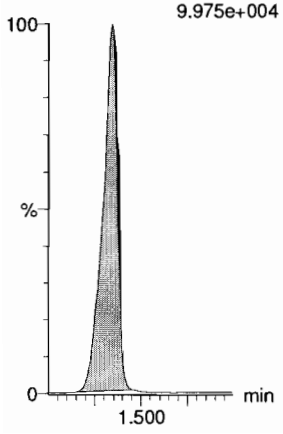
PFPeS
F15:MRM of 2 channels,ES-
349.1 > 80.1
1.928e+003



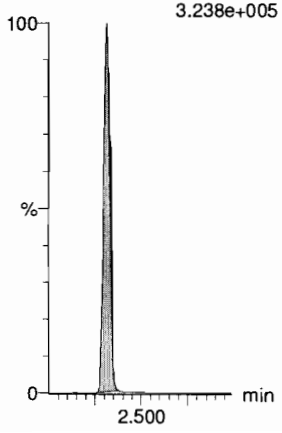
F15:MRM of 2 channels,ES-
349.1 > 99
8.465e+002



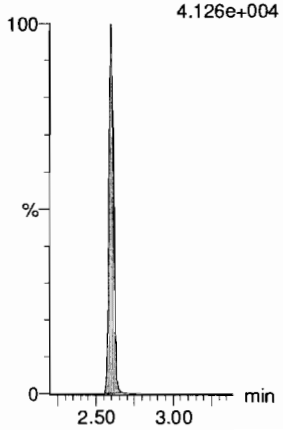
13C3-PFBA
F3:MRM of 1 channel,ES-
216.1 > 171.8
9.975e+004



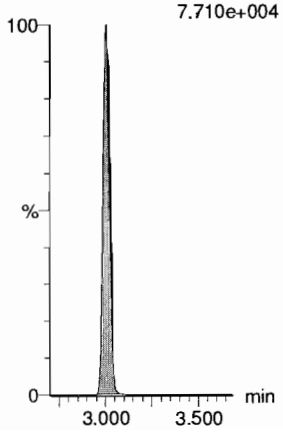
13C3-PFPeA
F6:MRM of 1 channel,ES-
266. > 221.8
3.238e+005



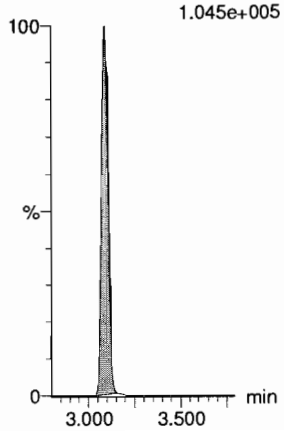
13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.126e+004



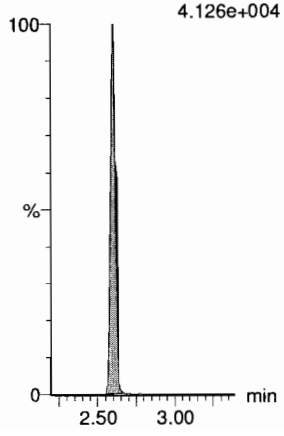
13C2-4:2 FTS
F13:MRM of 1 channel,ES-
329.2 > 308.9
7.710e+004



13C2-PFHxA
F10:MRM of 1 channel,ES-
315 > 269.8
1.045e+005



13C3-PFBS
F8:MRM of 1 channel,ES-
302. > 98.8
4.126e+004

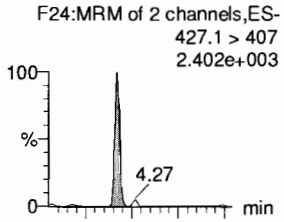


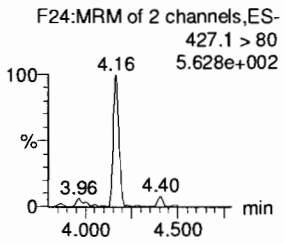
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

6:2 FTS





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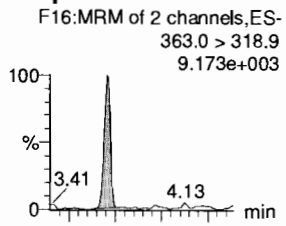

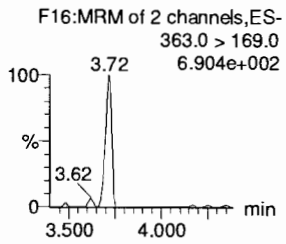

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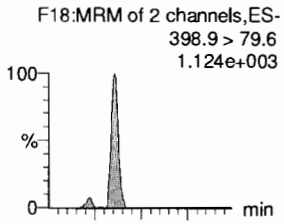

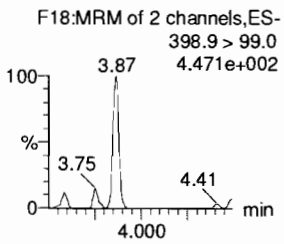

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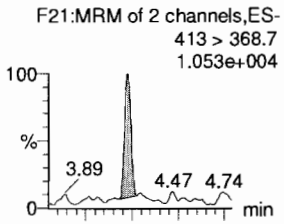

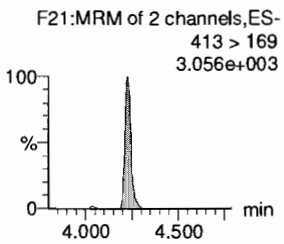

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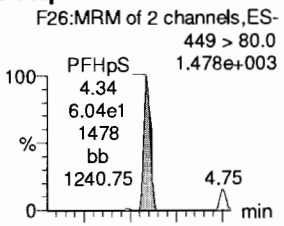

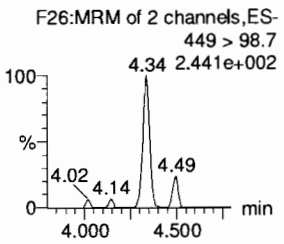

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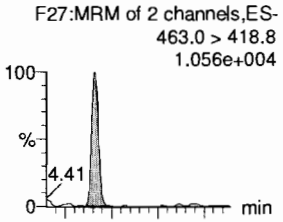
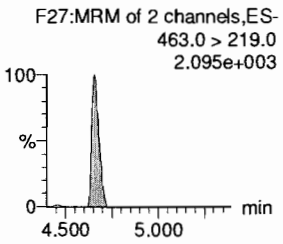
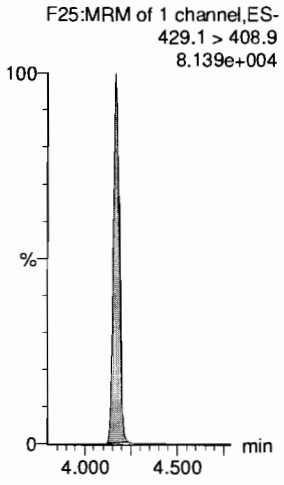
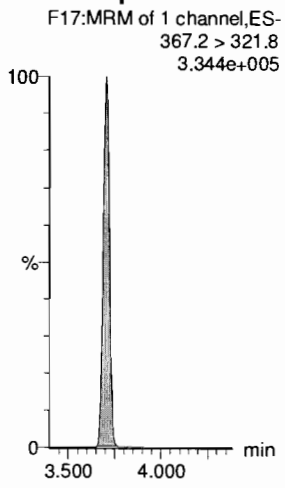




13C2-6:2 FTS



13C4-PFHpA



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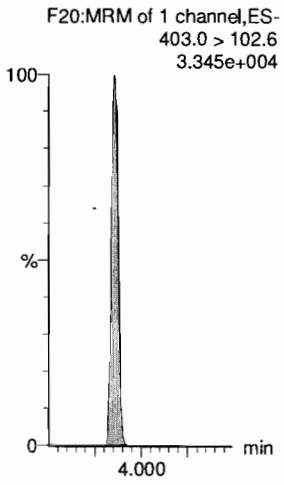

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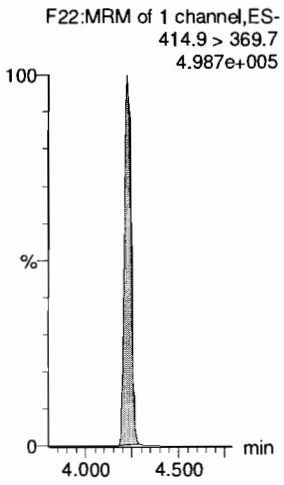

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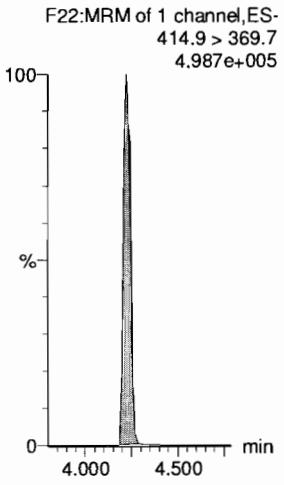

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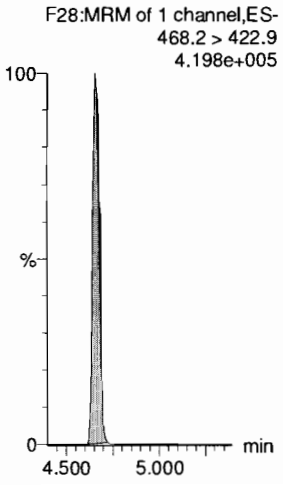

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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

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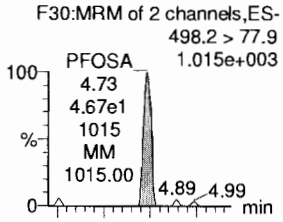

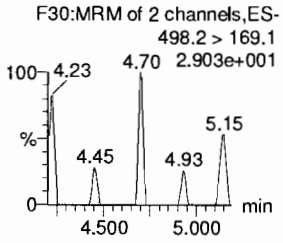

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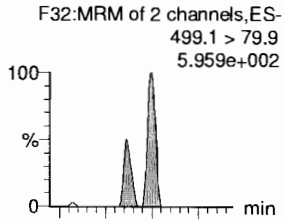

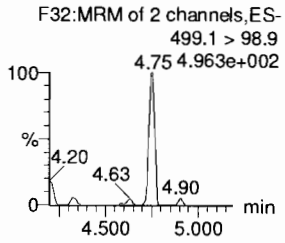

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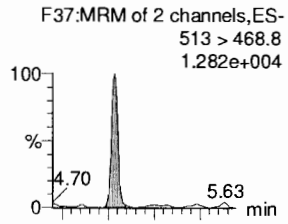
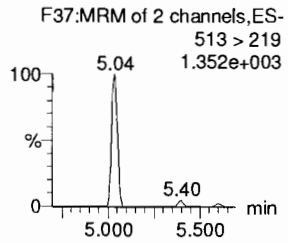
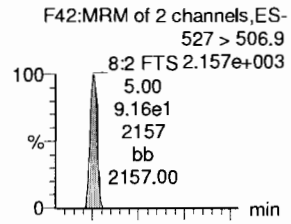
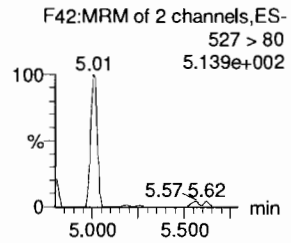




8:2 FTS





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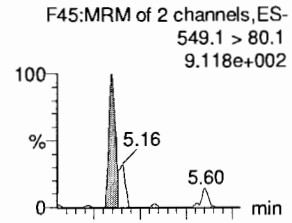

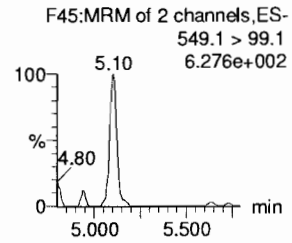

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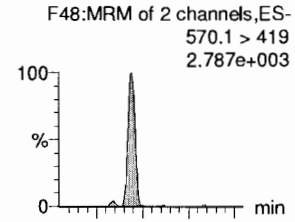

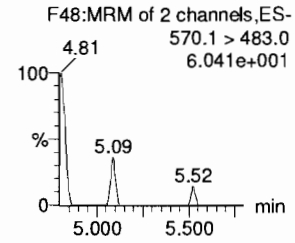

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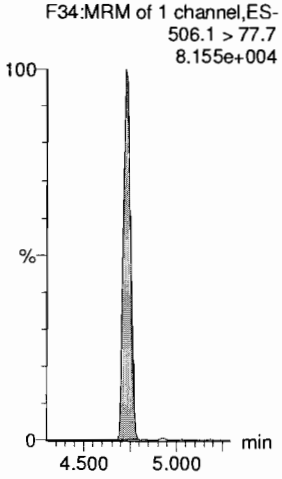

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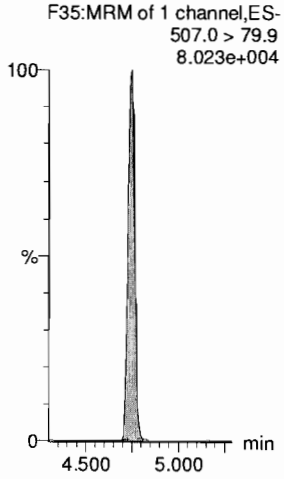

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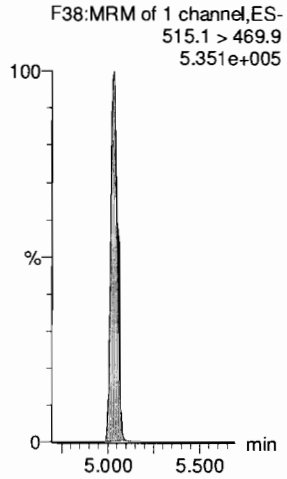
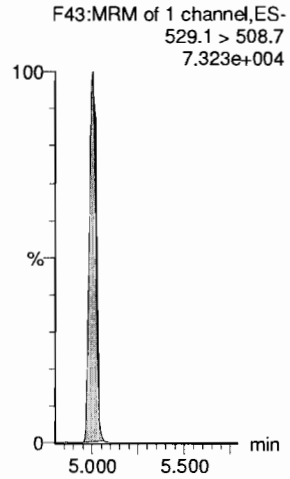


13C2-8:2 FTS



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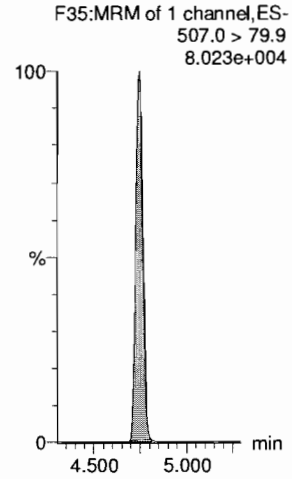

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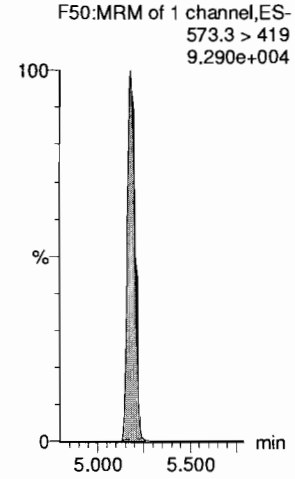

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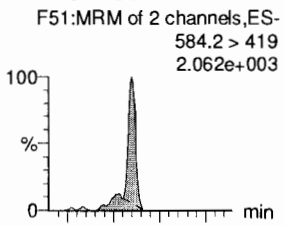
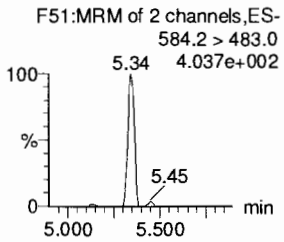
L-EtFOSAA





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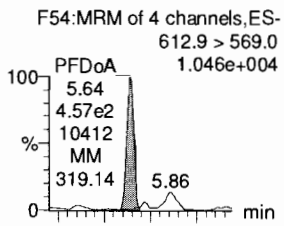

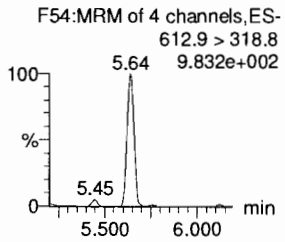

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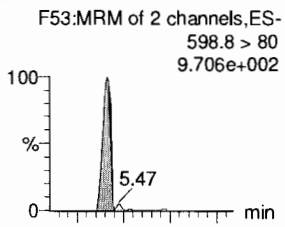

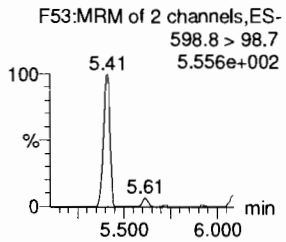

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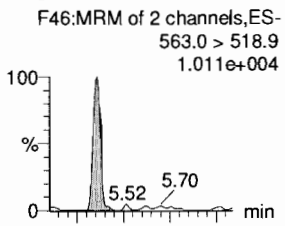

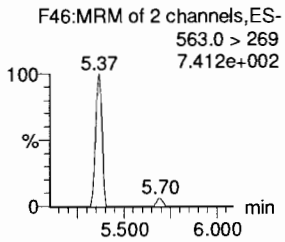

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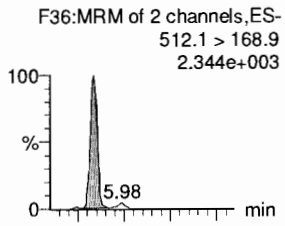

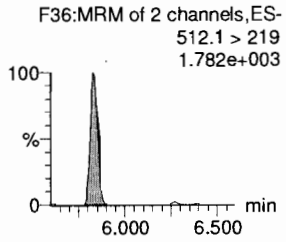

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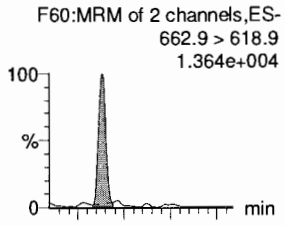

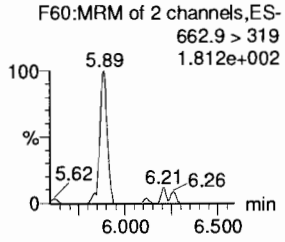

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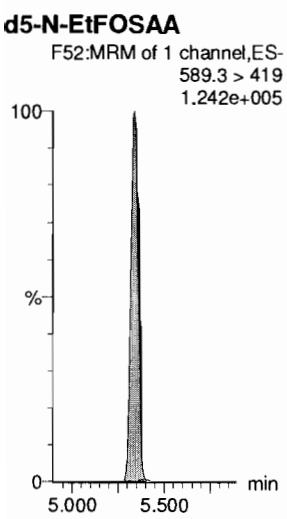

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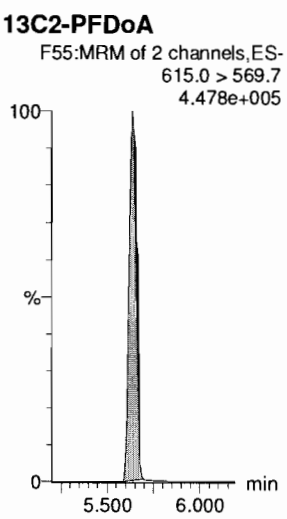

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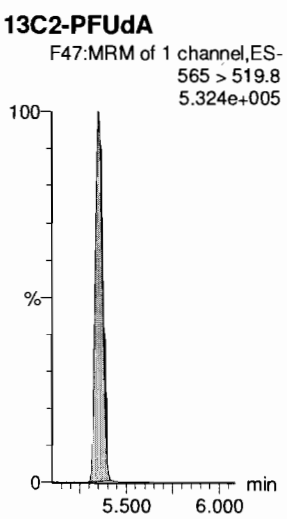

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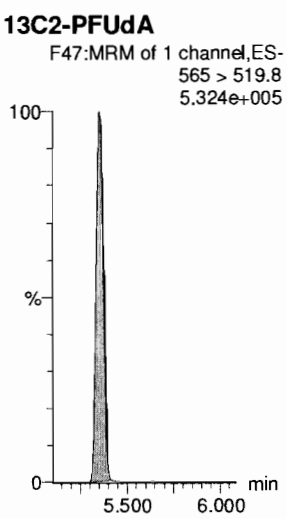

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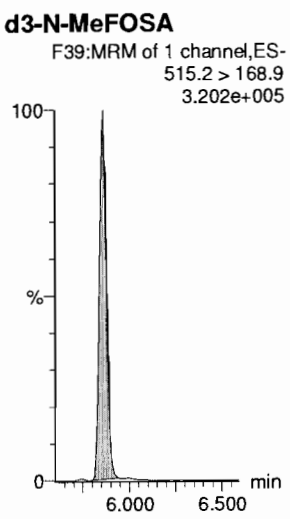

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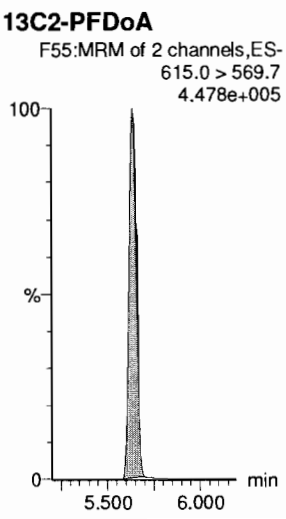

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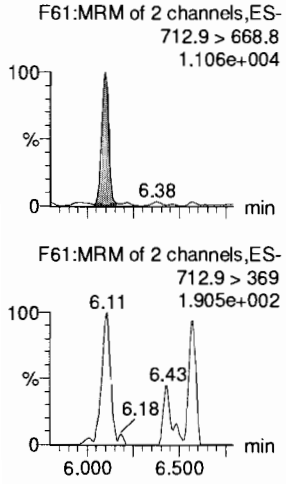
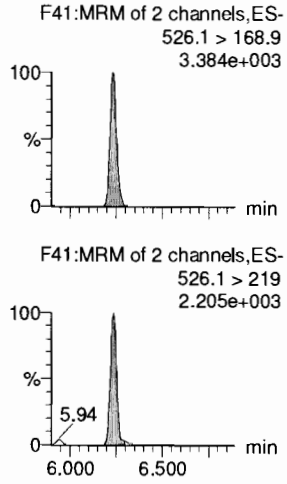
Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

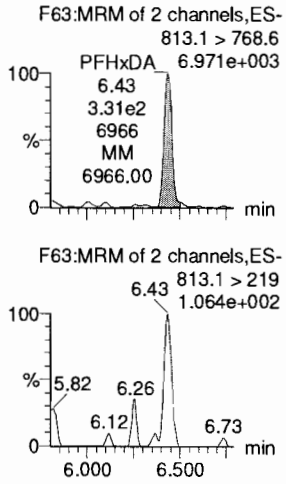
PFTeDA



N-EtFOSA



PFHxDA



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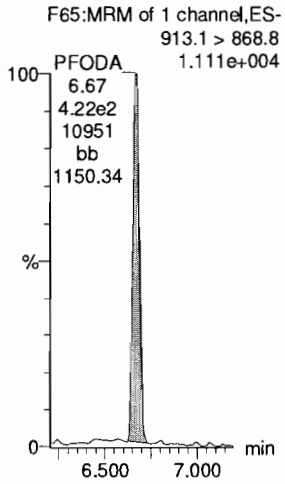
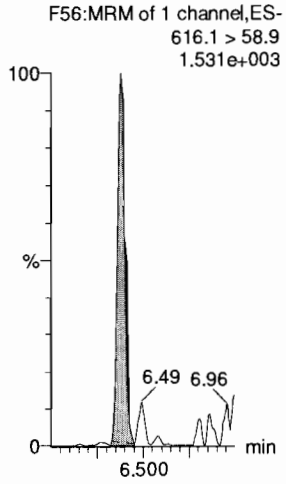
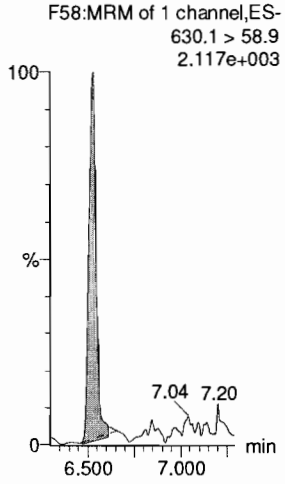


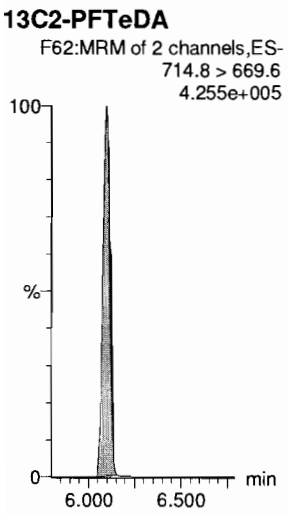
N-MeFOSE



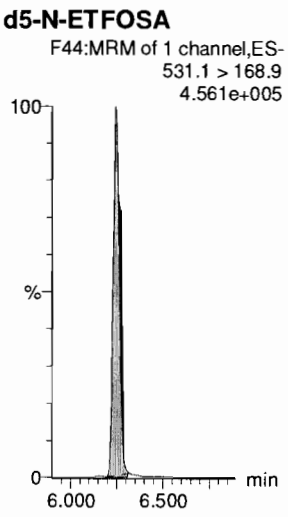
N-EtFOSE



13C2-PFTeDA



d5-N-ETFOSA



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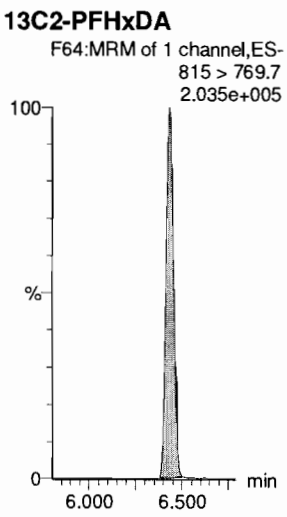

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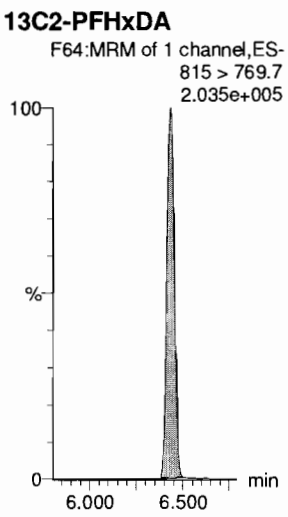
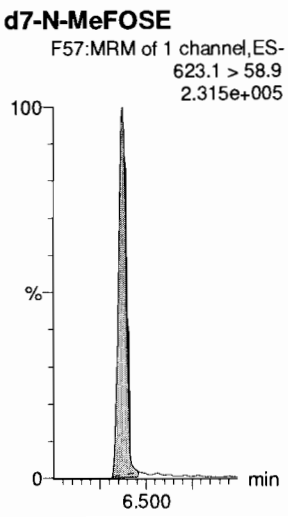
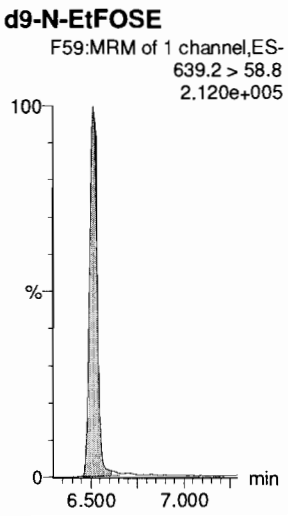


d7-N-MeFOSE



d9-N-EtFOSE

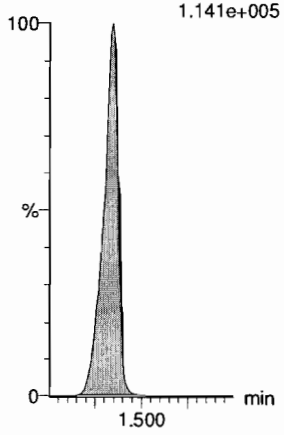


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

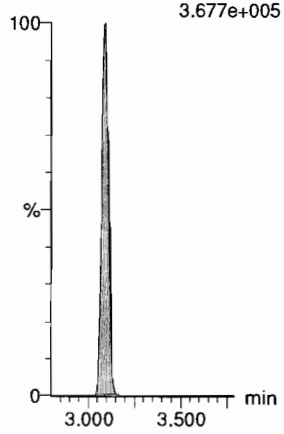
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_2, Date: 04-Jun-2018, Time: 19:11:49, ID: ST180604M2-2 PFC CS-2 18E2902, Description: PFC CS-2 18E2902

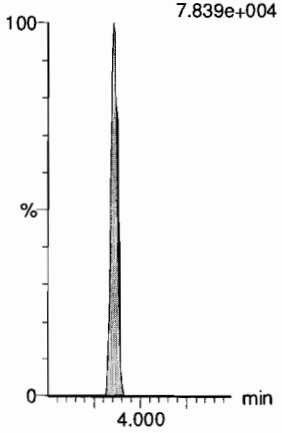
13C4-PFBA



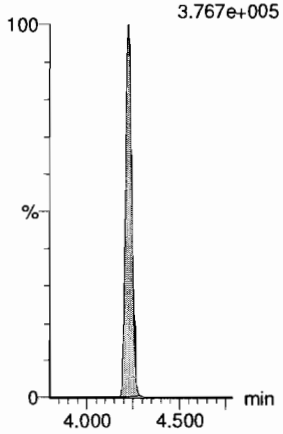
13C5-PFHxA



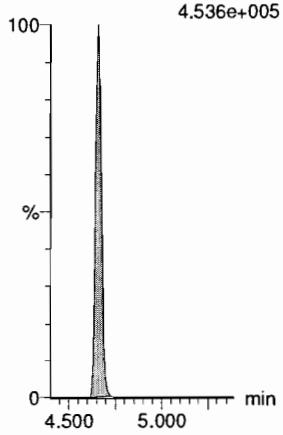
13C3-PFHxS



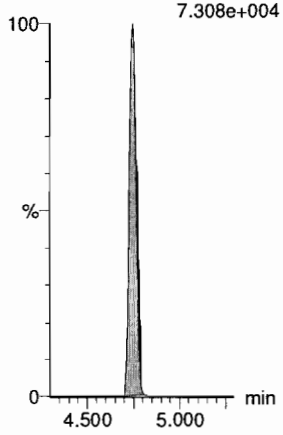
13C8-PFOA



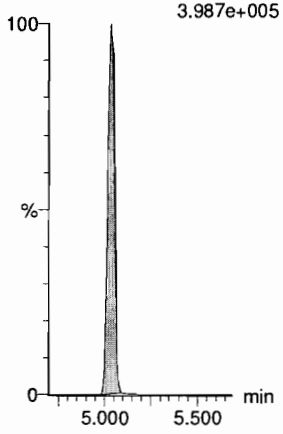
13C9-PFNA



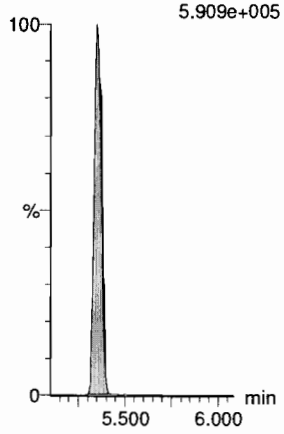
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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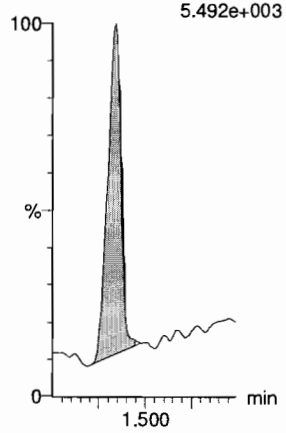
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

PFBA



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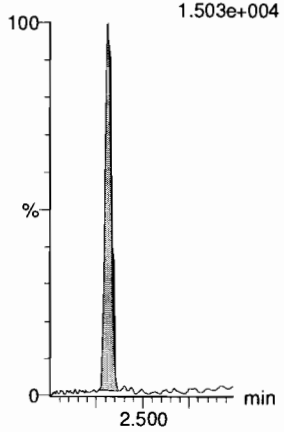
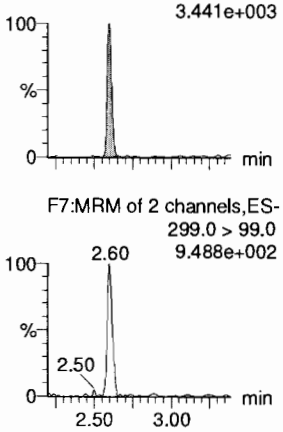
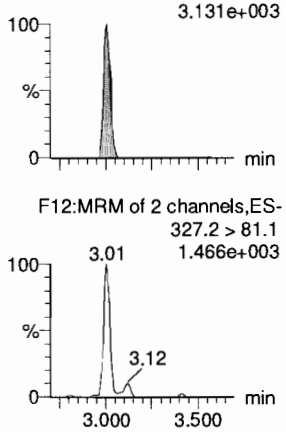


PFBS



4:2 FTS



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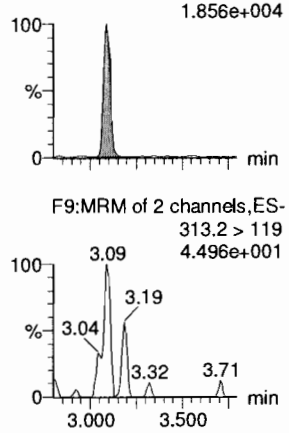

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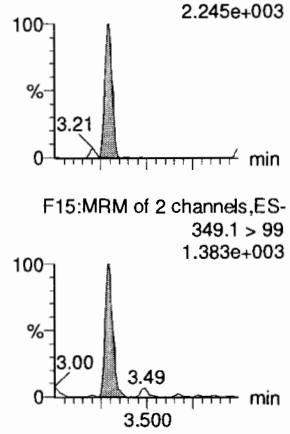
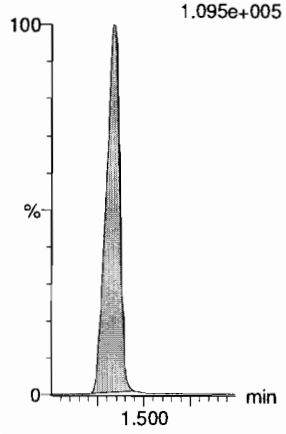


13C3-PFBA



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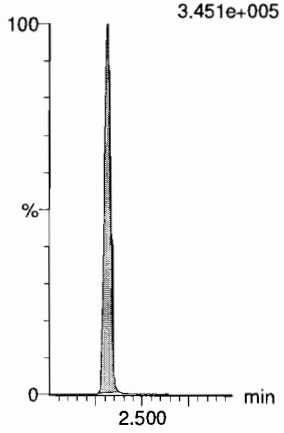

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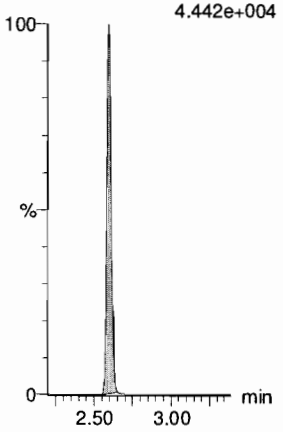
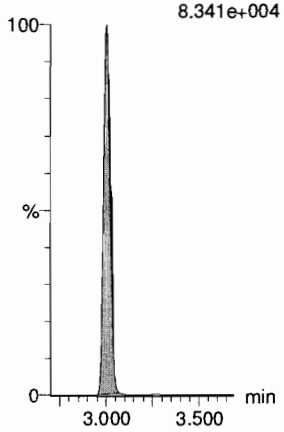


13C2-4:2 FTS



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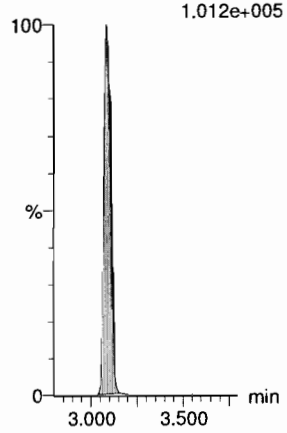

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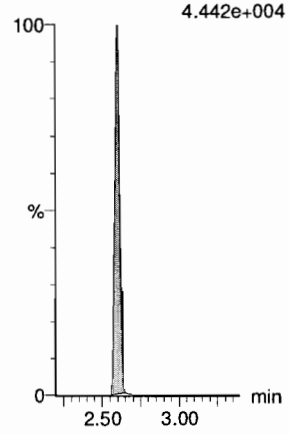

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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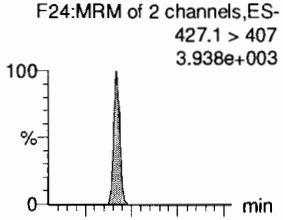
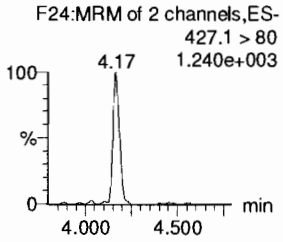
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

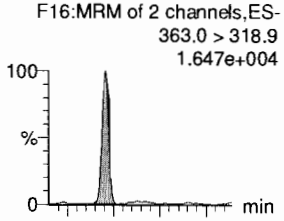
Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

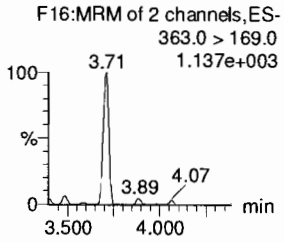
6:2 FTS



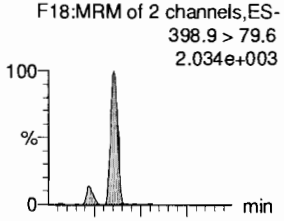


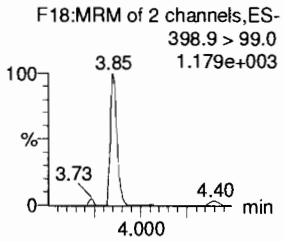
PFHpA



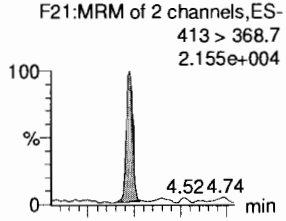


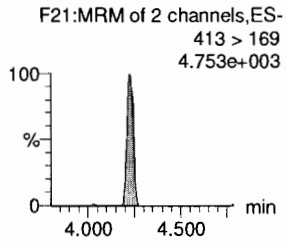
L-PFHxS



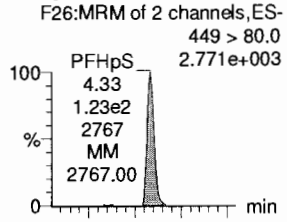


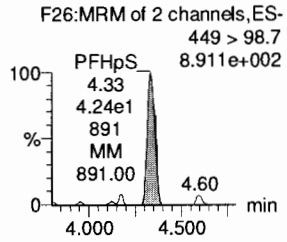
L-PFOA





PFHpS





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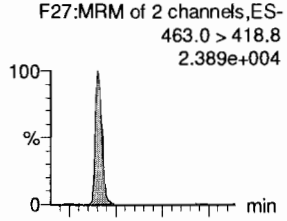
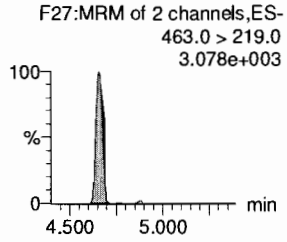
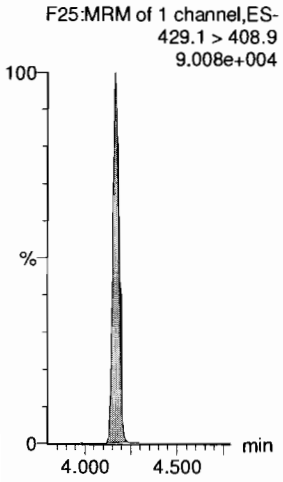
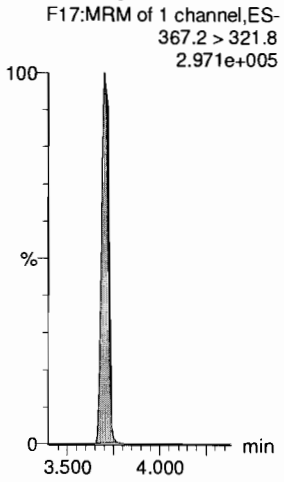




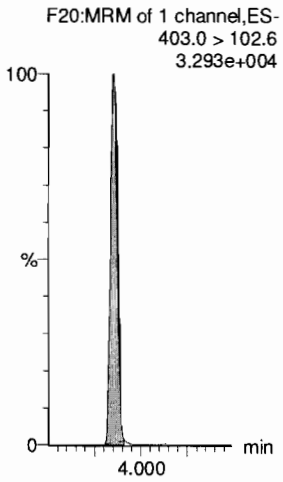
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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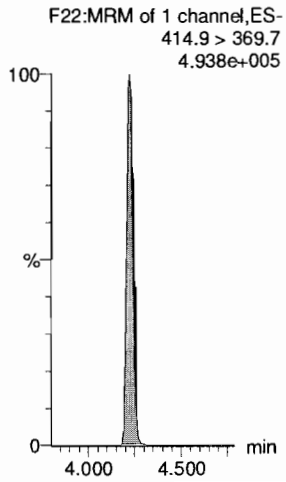

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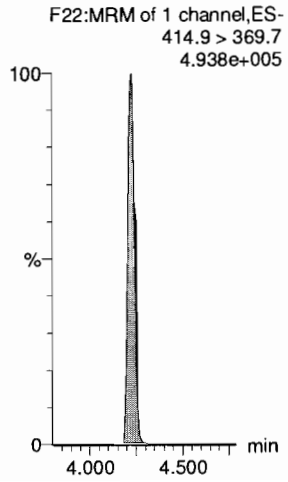

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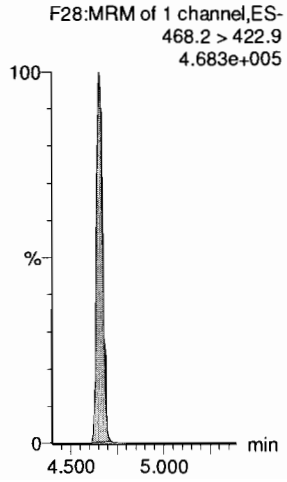
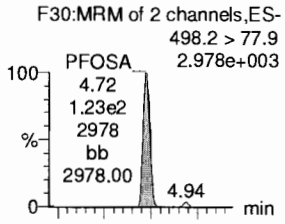


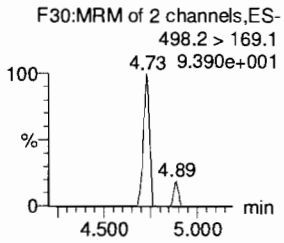
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

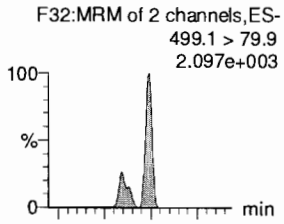
Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

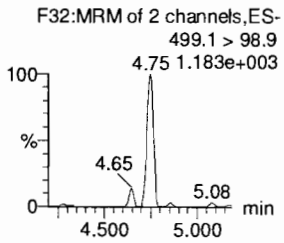
PFOSA





L-PFOS





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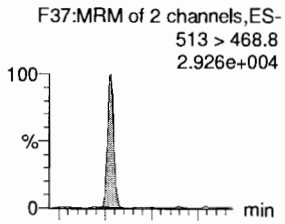
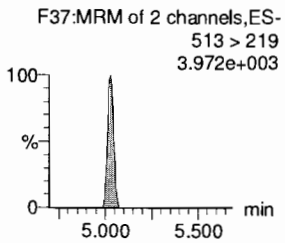
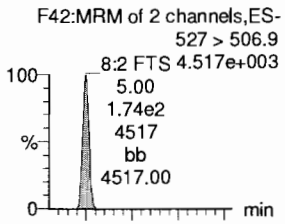
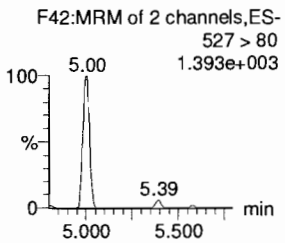




8:2 FTS





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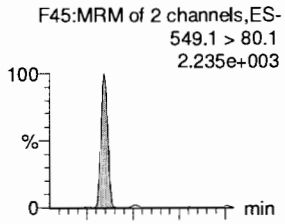

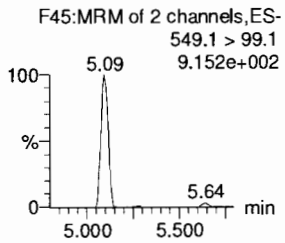

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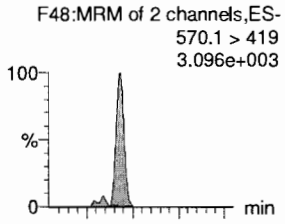

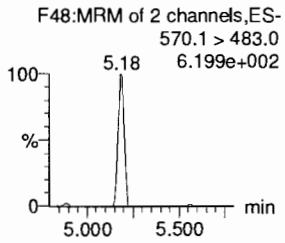

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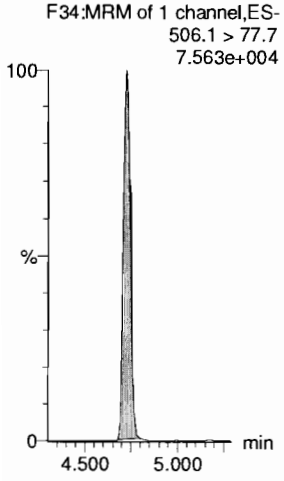

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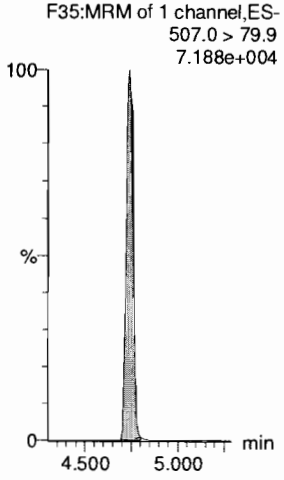

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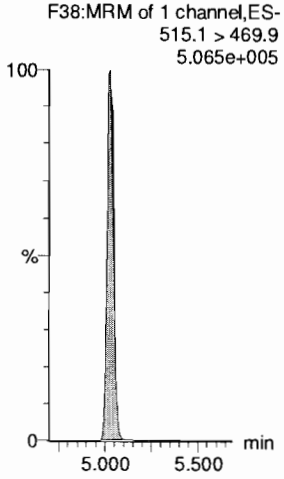

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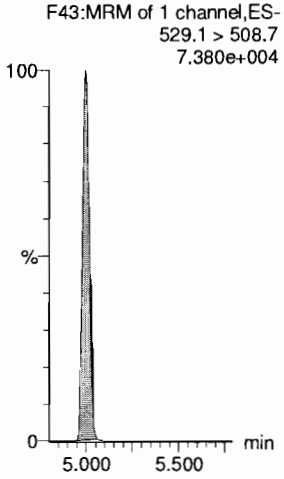

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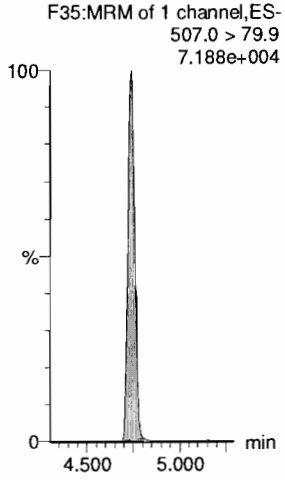

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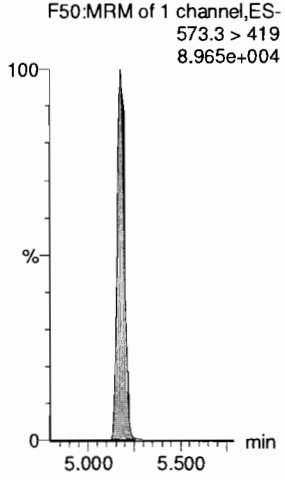

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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
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Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

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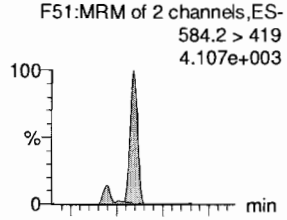

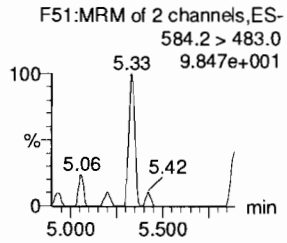

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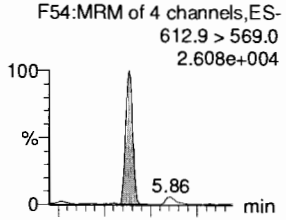

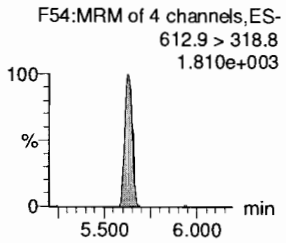

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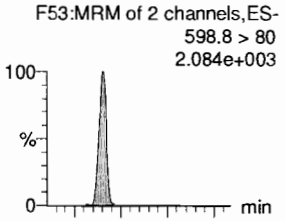

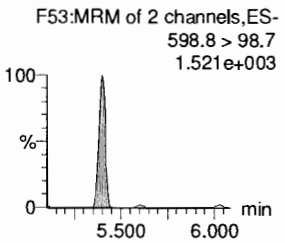

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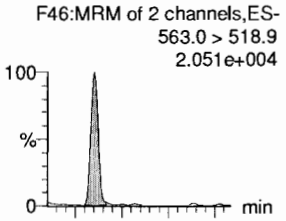

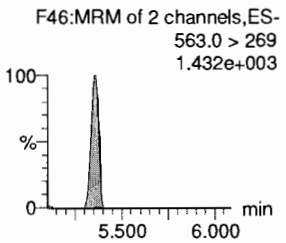

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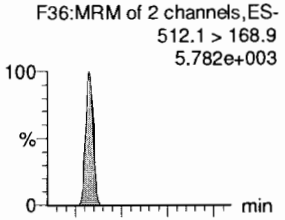

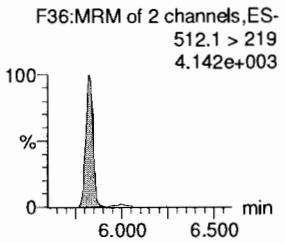

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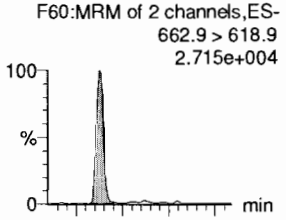
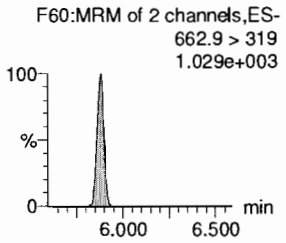
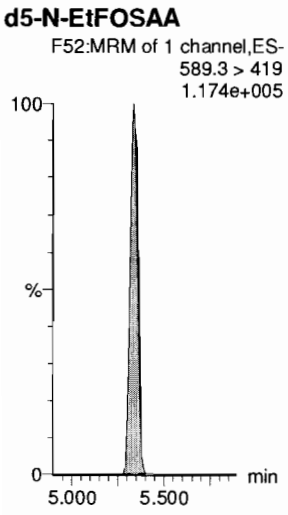




d5-N-EtFOSAA



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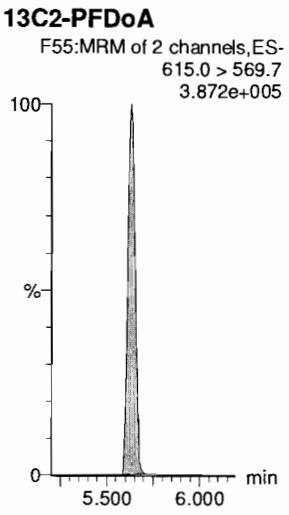

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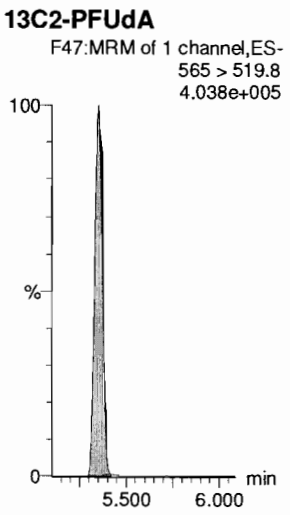

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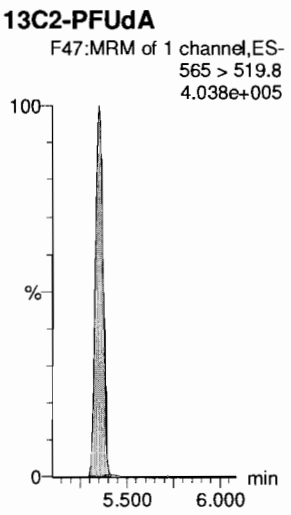

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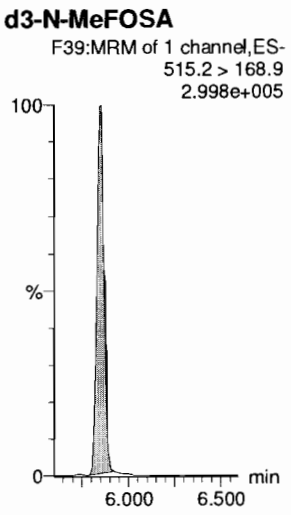

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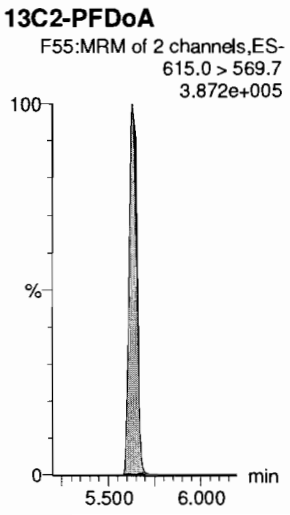

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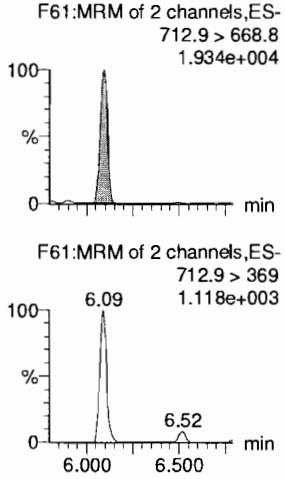
Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

PFTeDA



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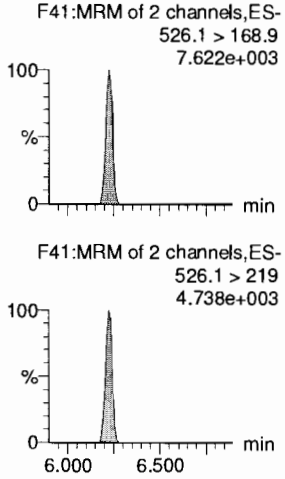

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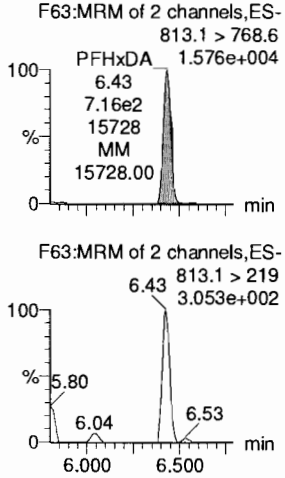

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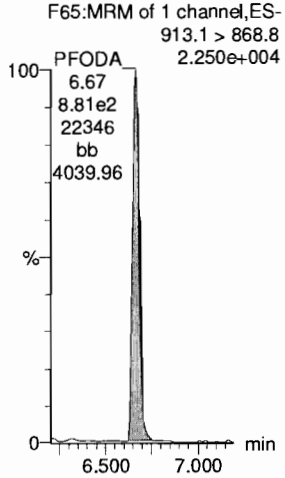
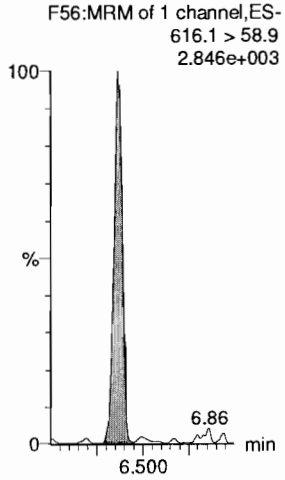


N-MeFOSE



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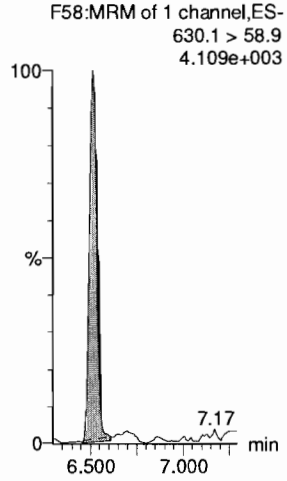

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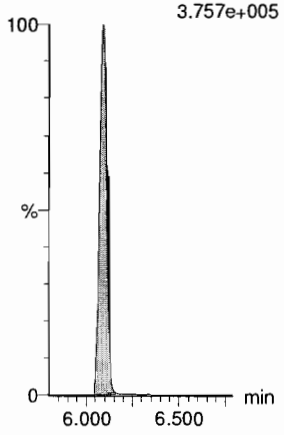
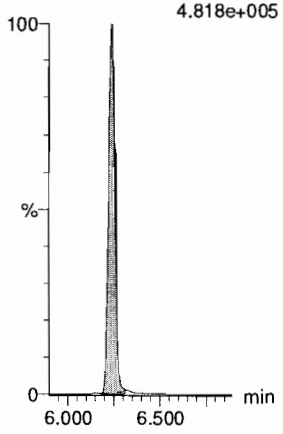


d5-N-ETFOSA



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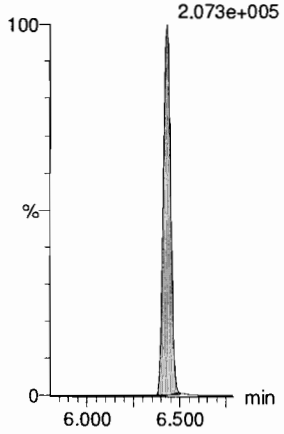

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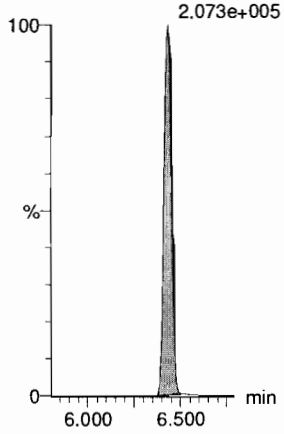

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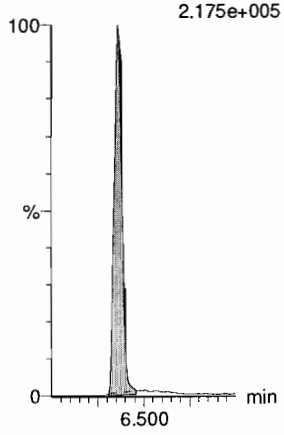

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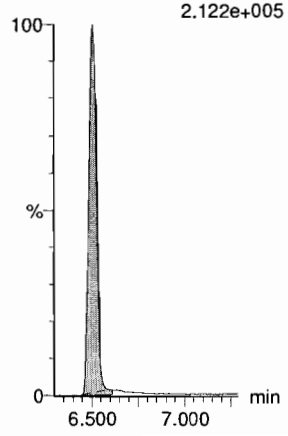

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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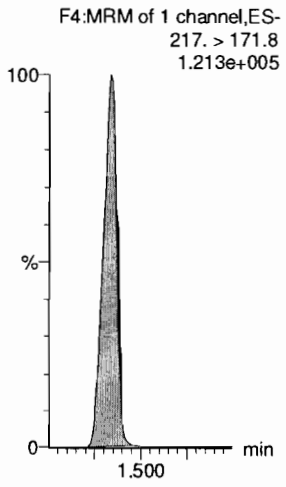
Name: 180604M2_3, Date: 04-Jun-2018, Time: 19:22:13, ID: ST180604M2-2 PFC CS-1 18E2903, Description: PFC CS-1 18E2903

13C4-PFBA



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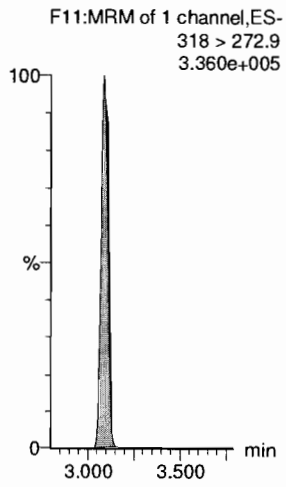
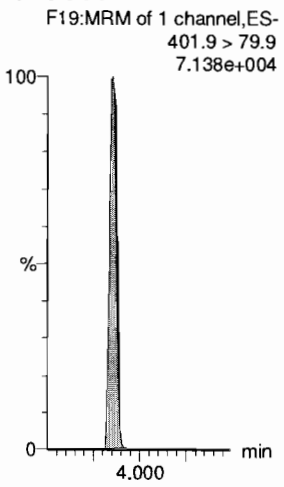


13C3-PFHxS



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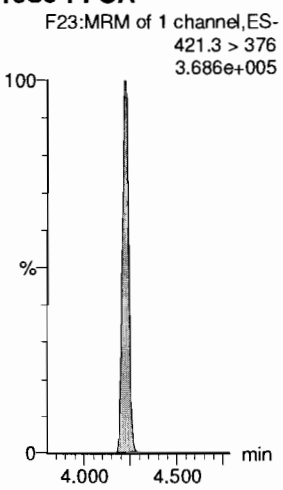

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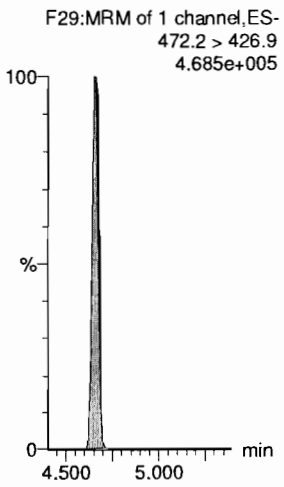

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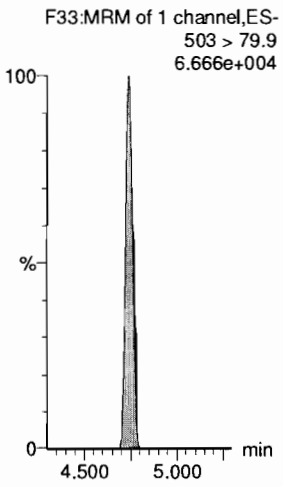

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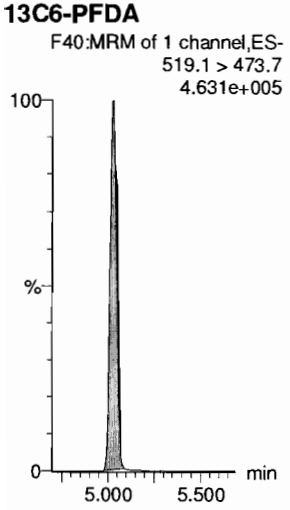
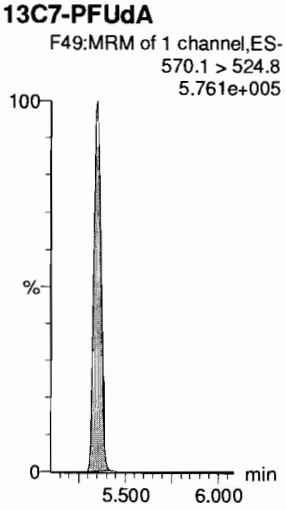


13C7-PFUdA



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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

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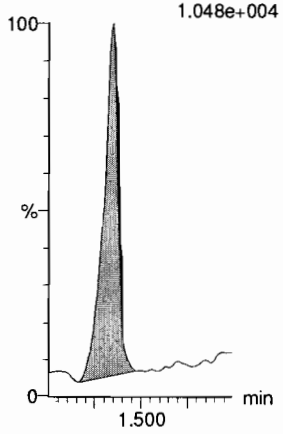

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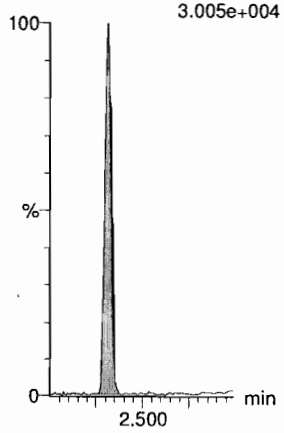

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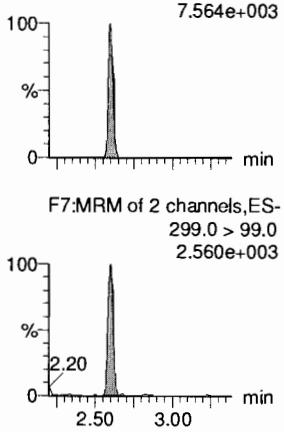

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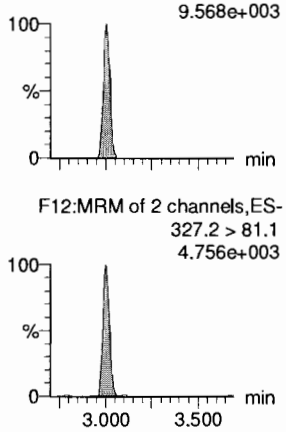

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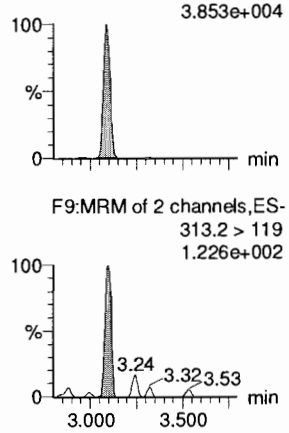

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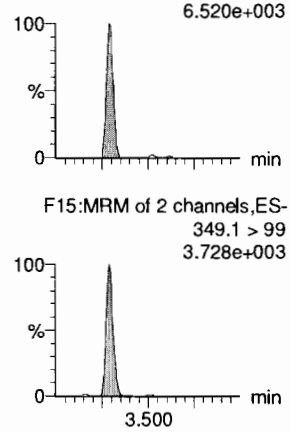

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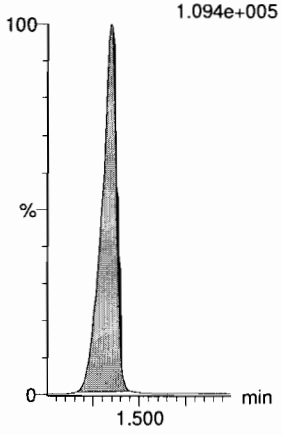

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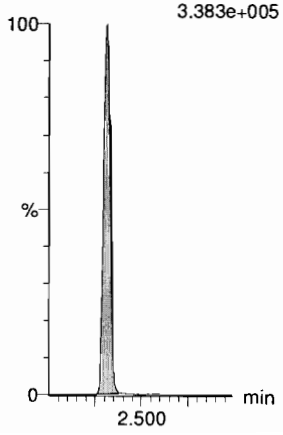

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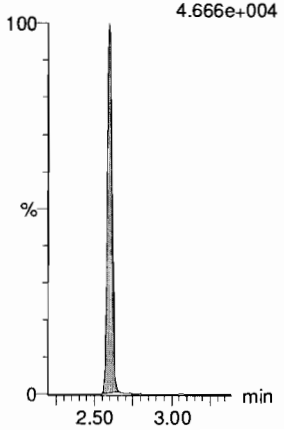
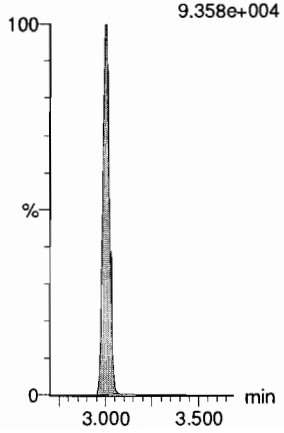


13C2-4:2 FTS



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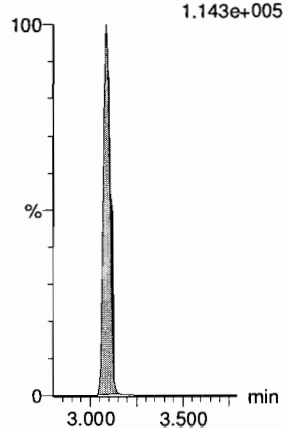

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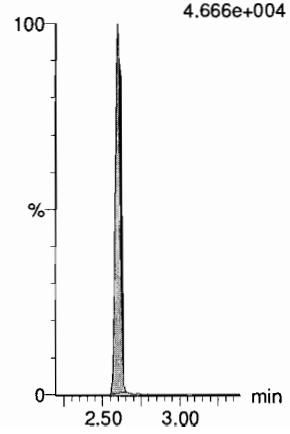

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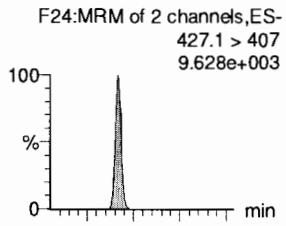
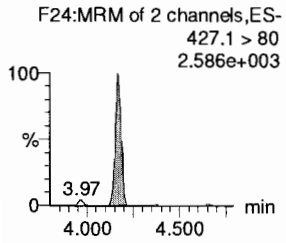
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

6:2 FTS





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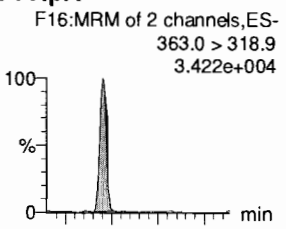

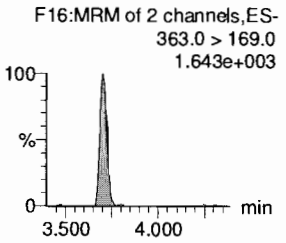

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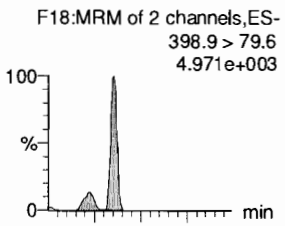

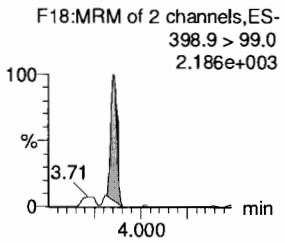

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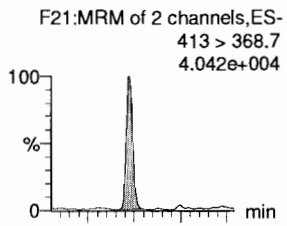

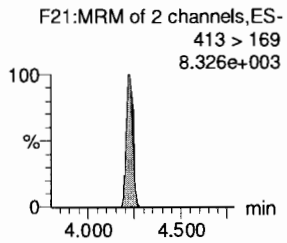

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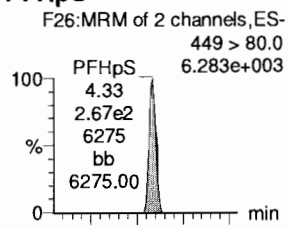

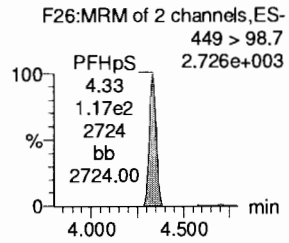

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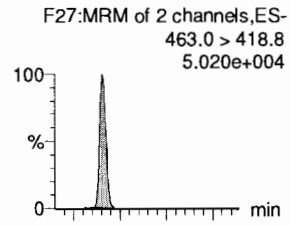

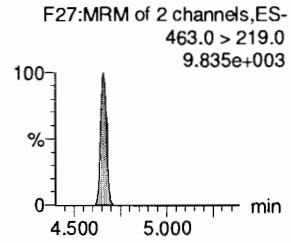

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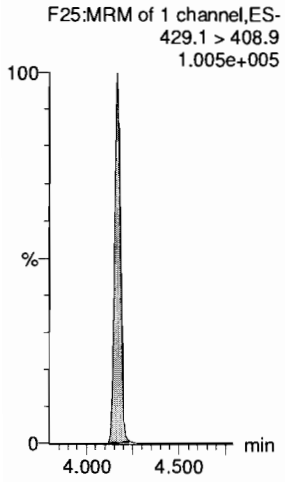
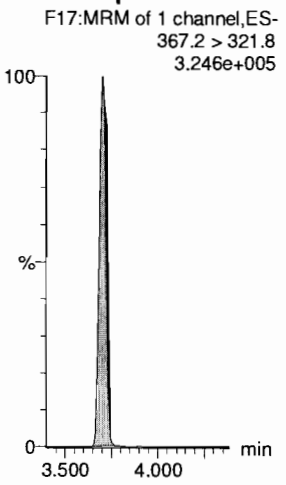


13C4-PFHpA



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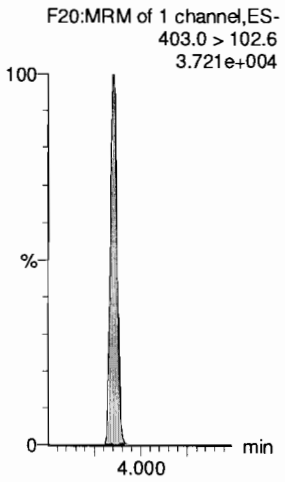

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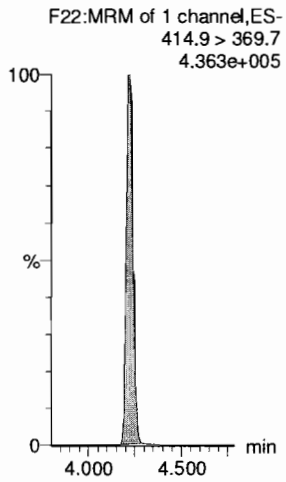

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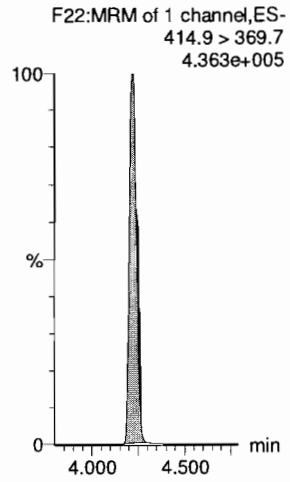

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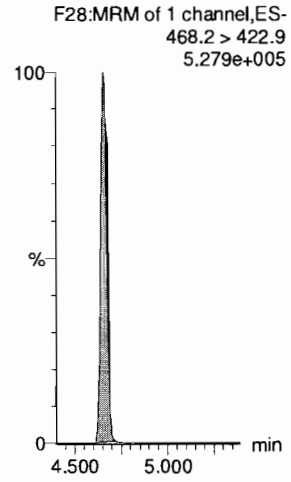

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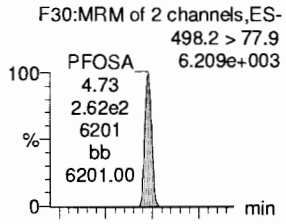
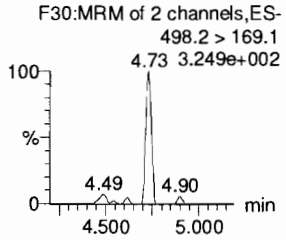
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

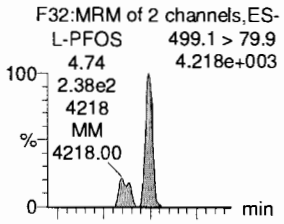
Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

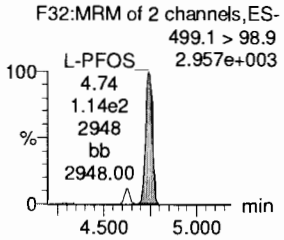
PFOSA





L-PFOS





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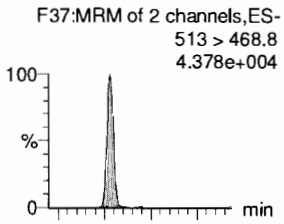
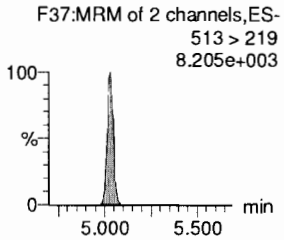
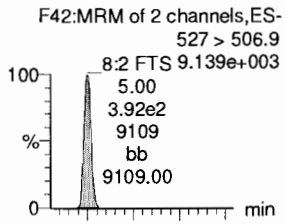
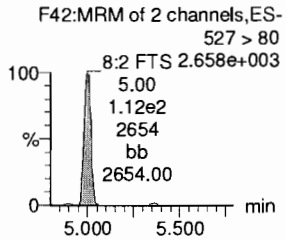




8:2 FTS





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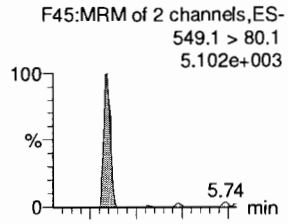

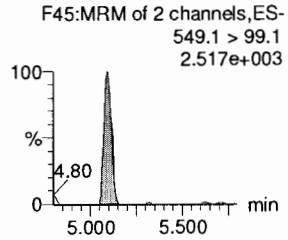

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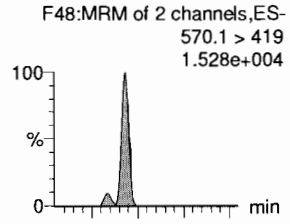

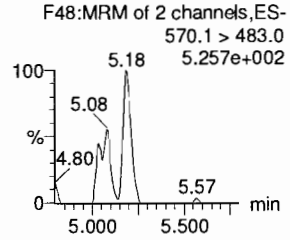

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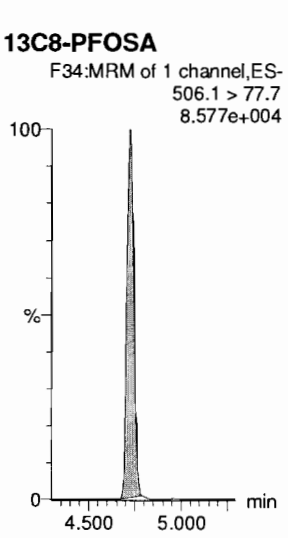

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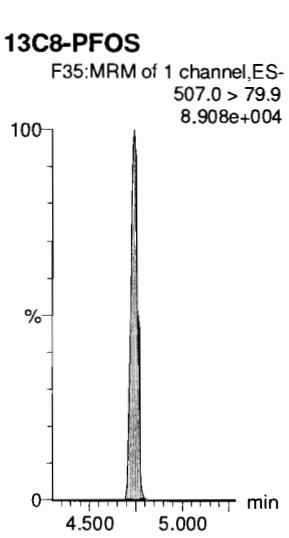

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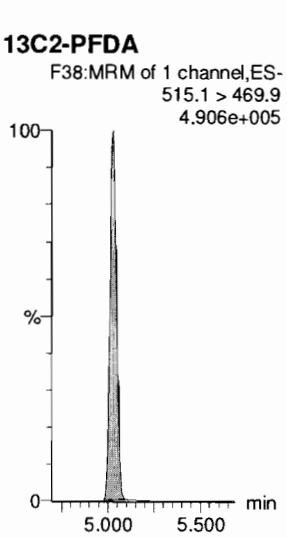
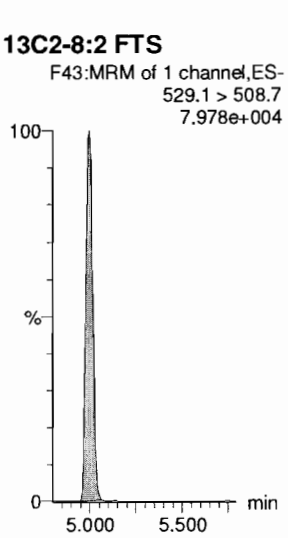


13C2-8:2 FTS



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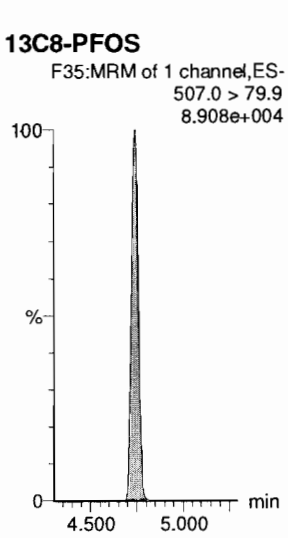

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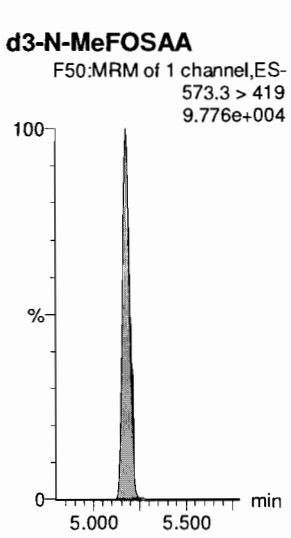

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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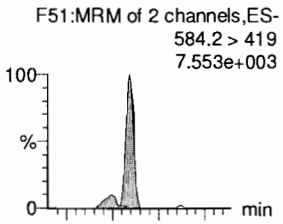
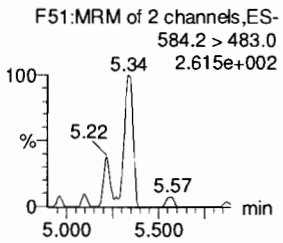
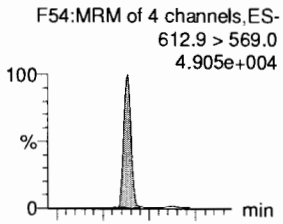
Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

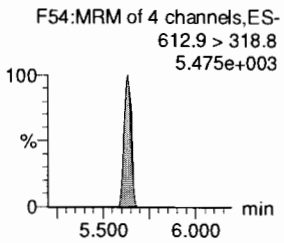
L-EtFOSAA



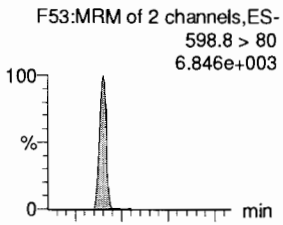


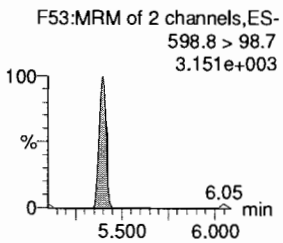
PFDoA



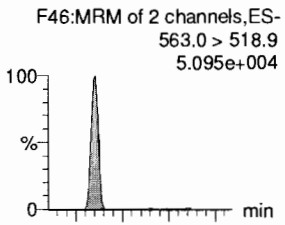


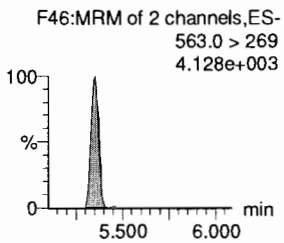
PFDS



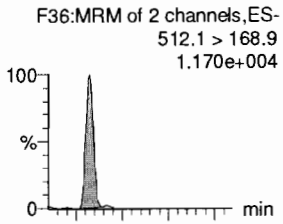


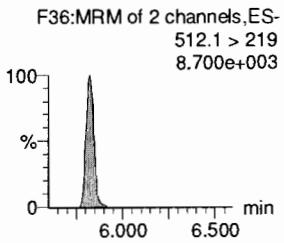
PFUdA





N-MeFOSA





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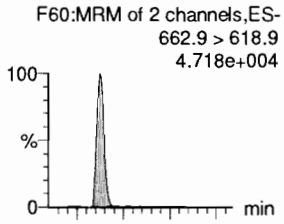
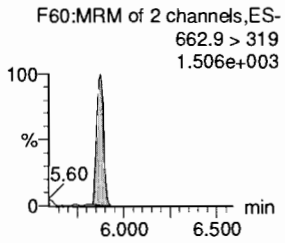
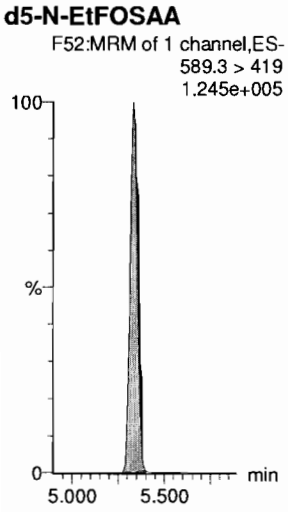
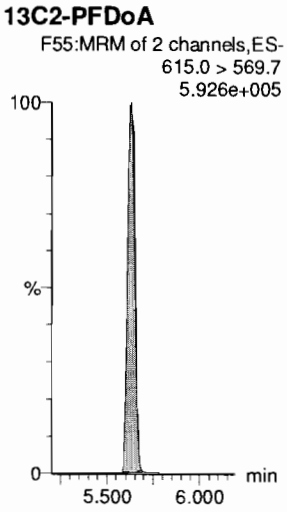




d5-N-EtFOSAA



13C2-PFDoA



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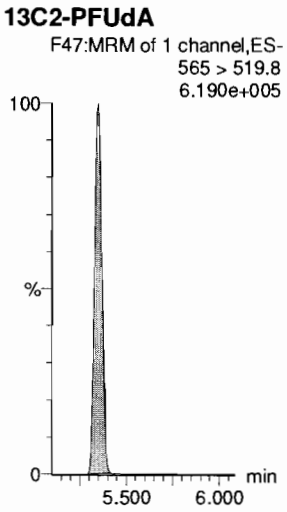

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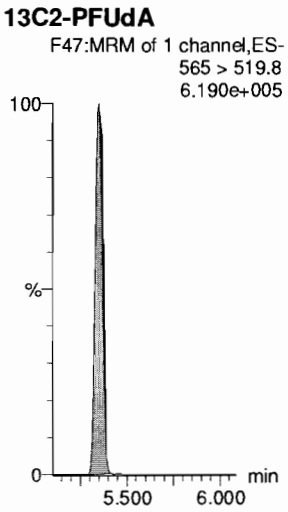

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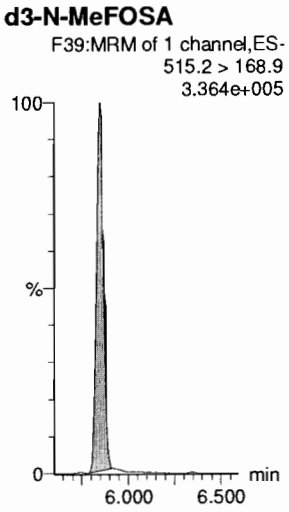

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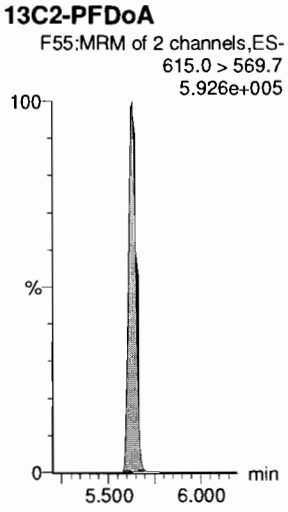
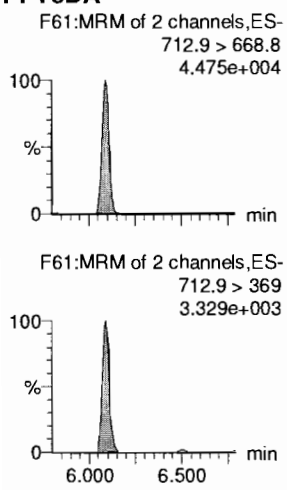


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

PFTeDA



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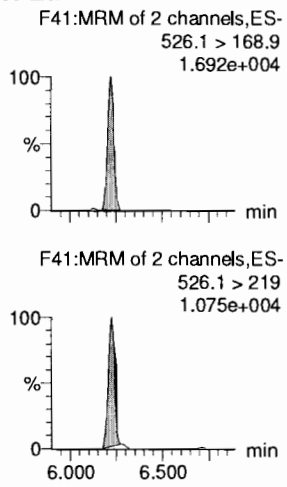
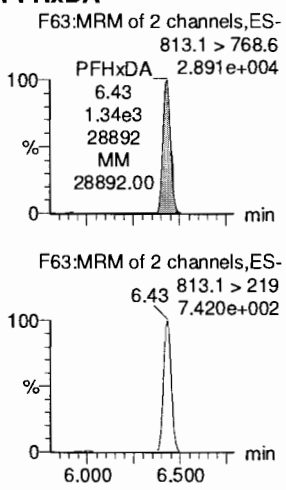
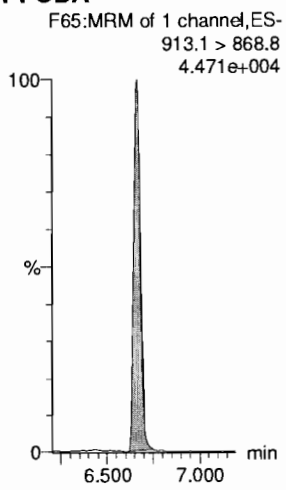


PFHxDA



PFODA



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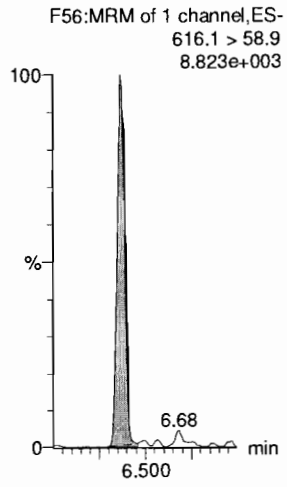

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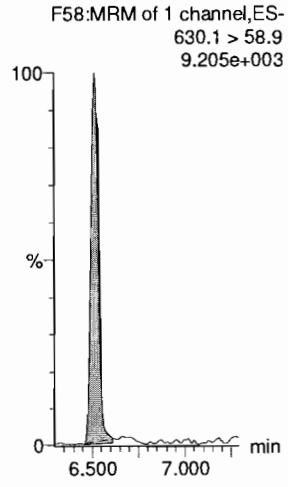

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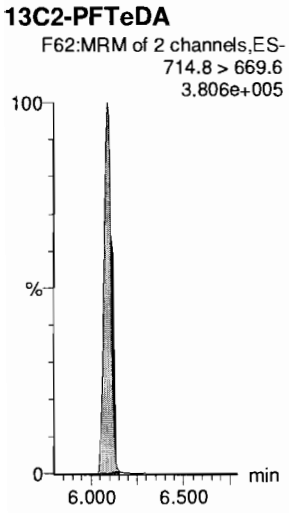
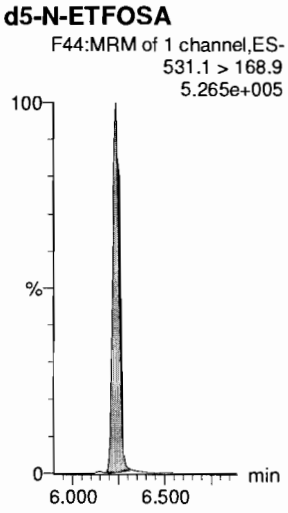


d5-N-ETFOSA



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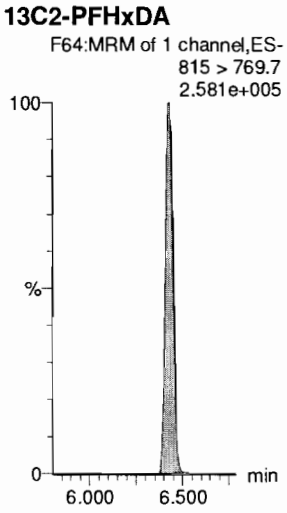

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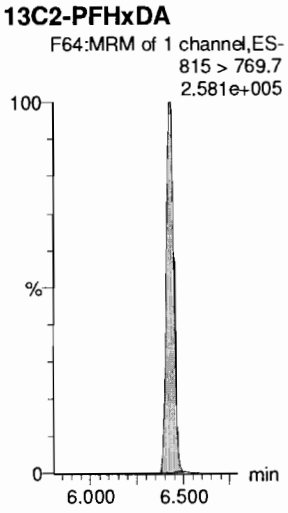
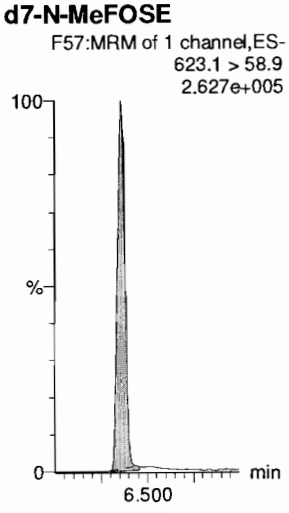
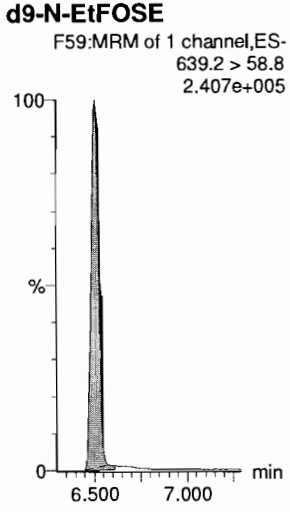


d7-N-MeFOSE



d9-N-EtFOSE



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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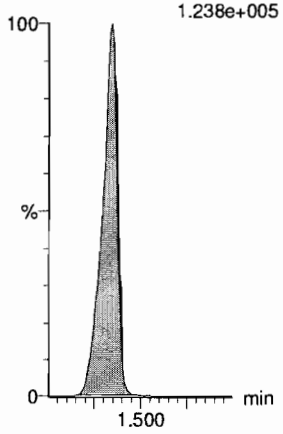
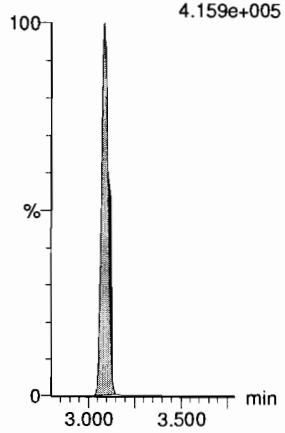
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_4, Date: 04-Jun-2018, Time: 19:32:43, ID: ST180604M2-3 PFC CS0 18E2904, Description: PFC CS0 18E2904

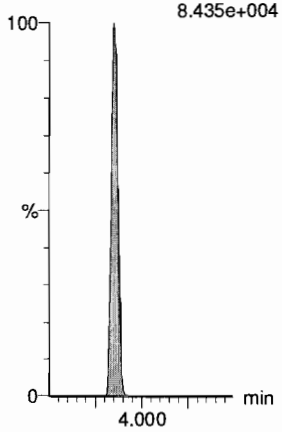
13C4-PFBA



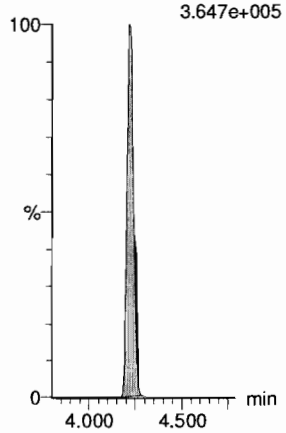
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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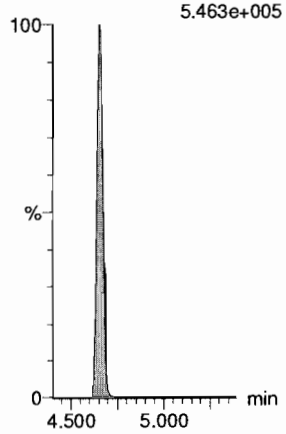
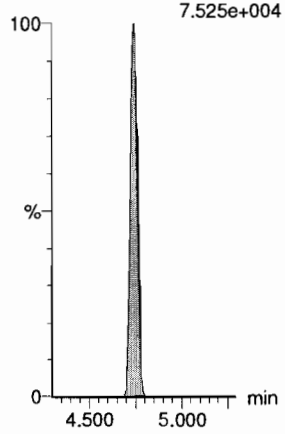
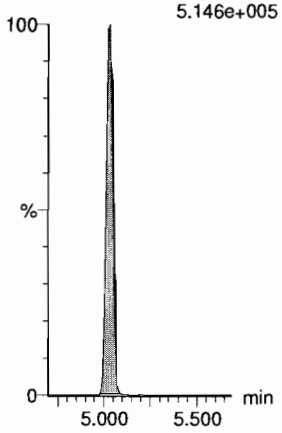


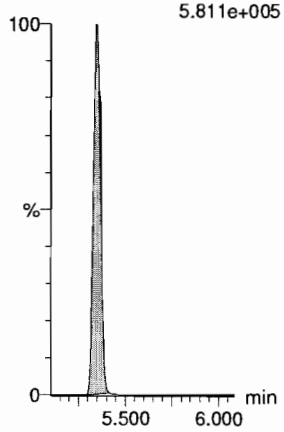
13C4-PFOS



13C6-PFDA



13C7-PFUdA

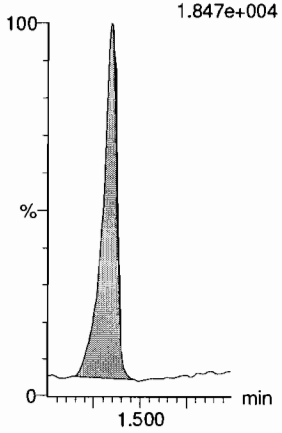


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

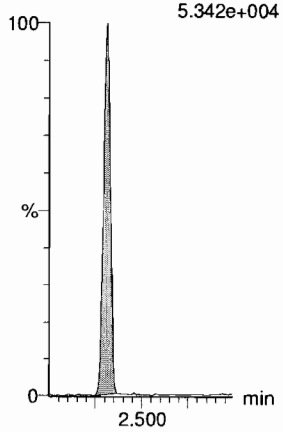
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_5, Date: 04-Jun-2018, Time: 19:43:08, ID: ST180604M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

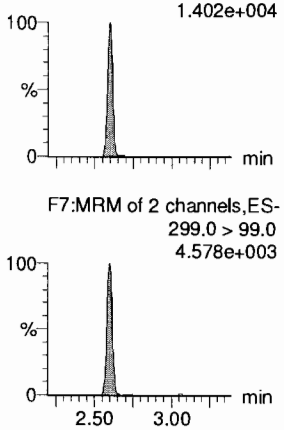
PFBA



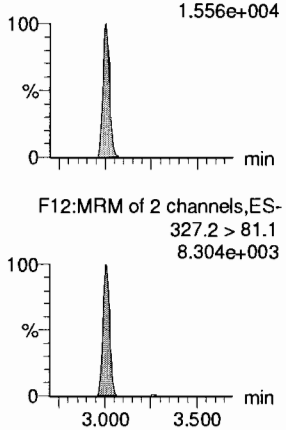
PFPeA



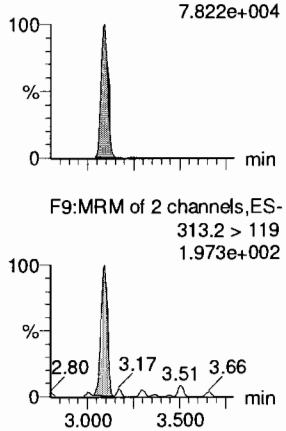
PFBS



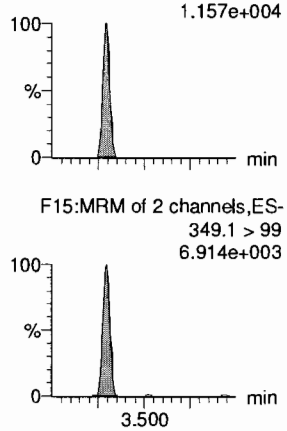
4:2 FTS



PFHxA



PFPeS



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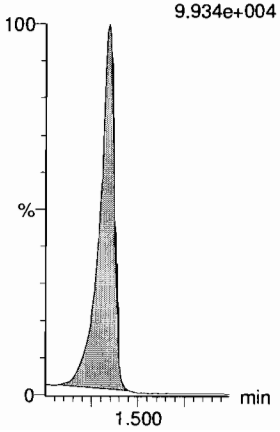
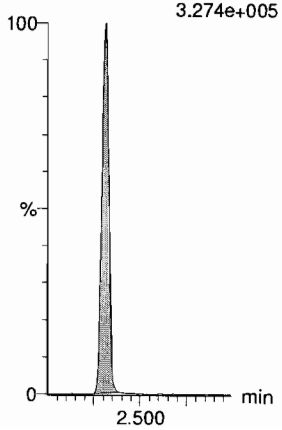


13C3-PFPeA



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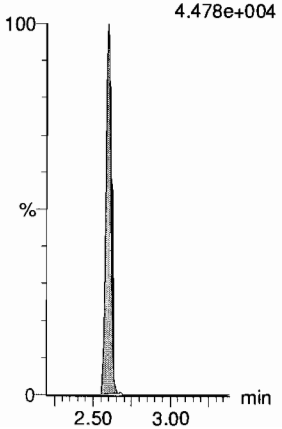
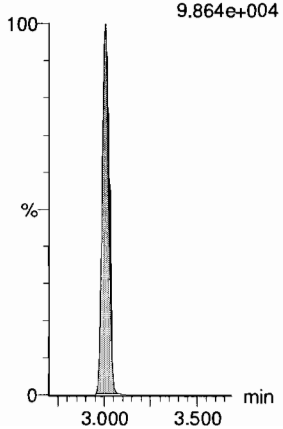
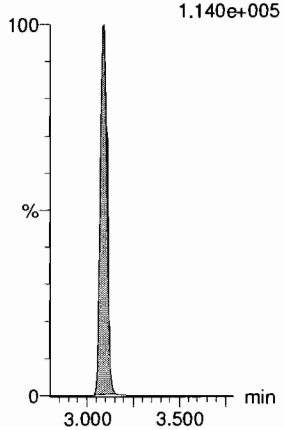


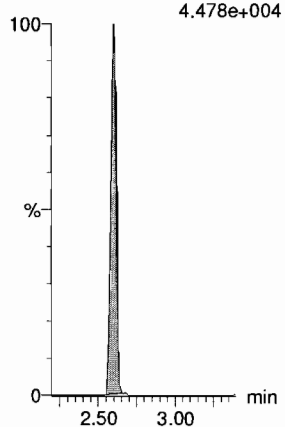
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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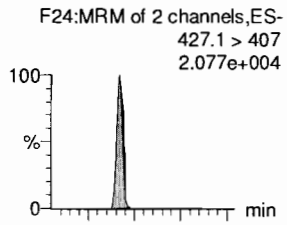
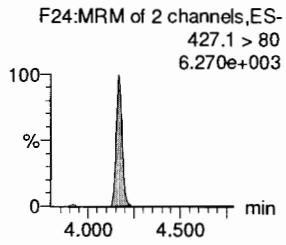
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

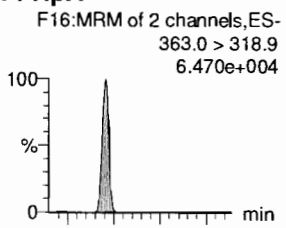
Name: 180604M2_5, Date: 04-Jun-2018, Time: 19:43:08, ID: ST180604M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

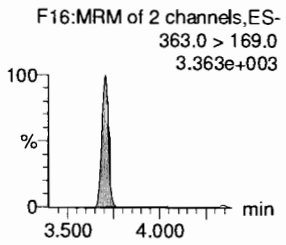
6:2 FTS





PFHpA





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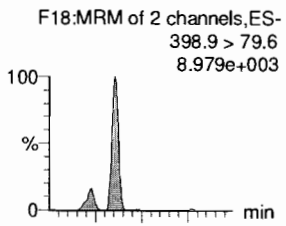

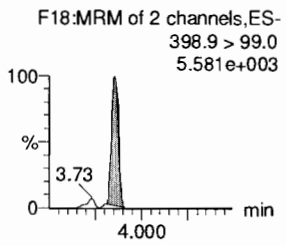

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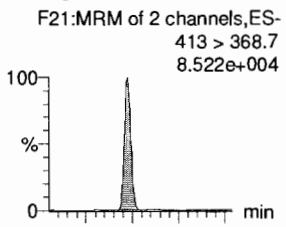

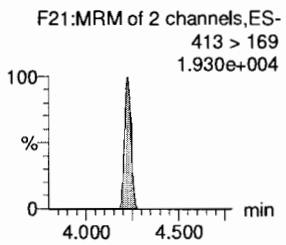

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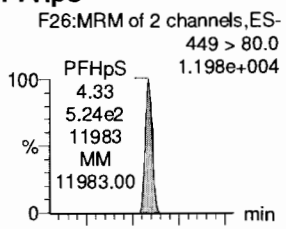

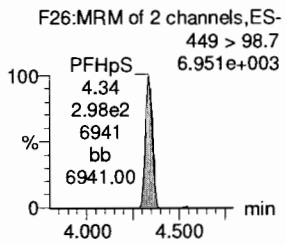

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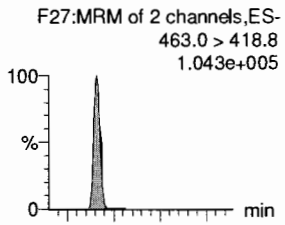
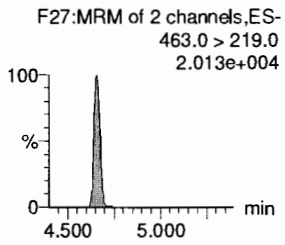
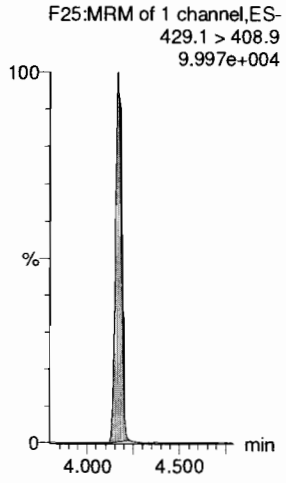
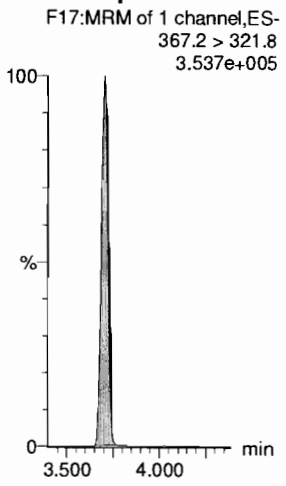




13C2-6:2 FTS



13C4-PFHpA



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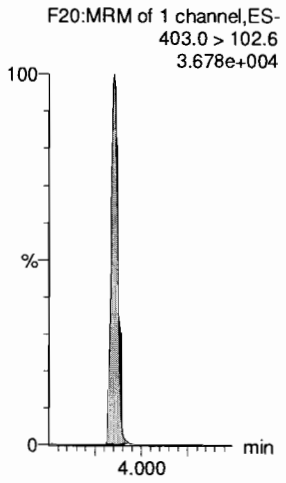

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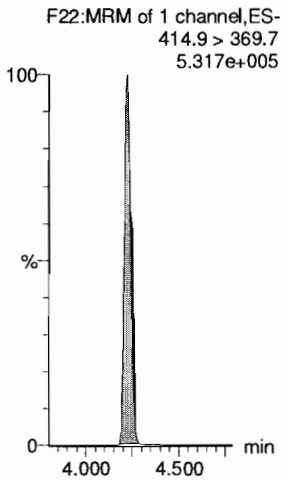

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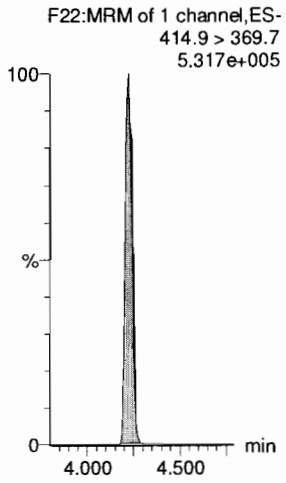

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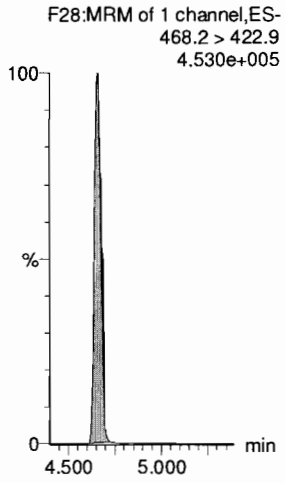

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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_5, Date: 04-Jun-2018, Time: 19:43:08, ID: ST180604M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

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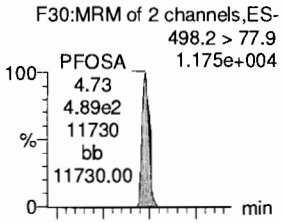

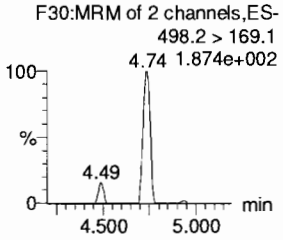

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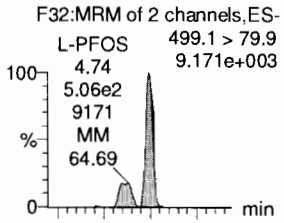

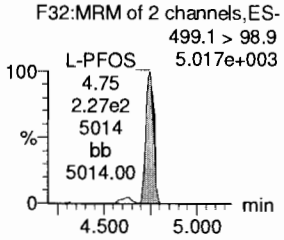

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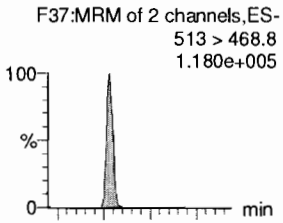

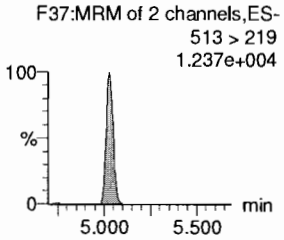

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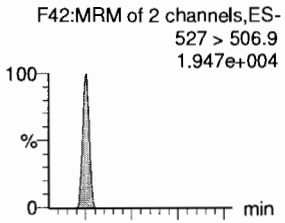

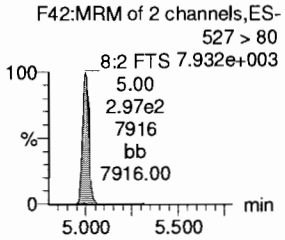

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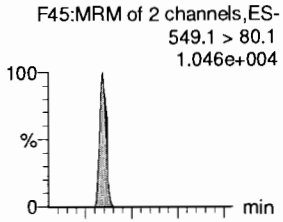

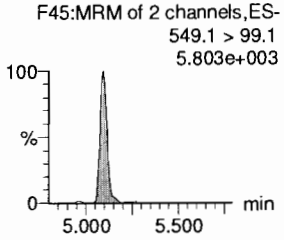

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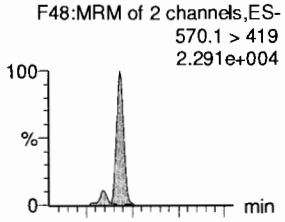

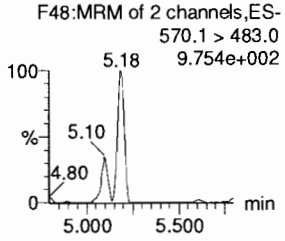

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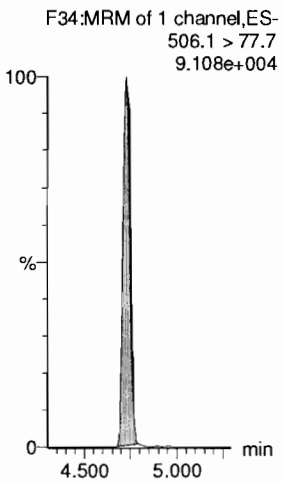

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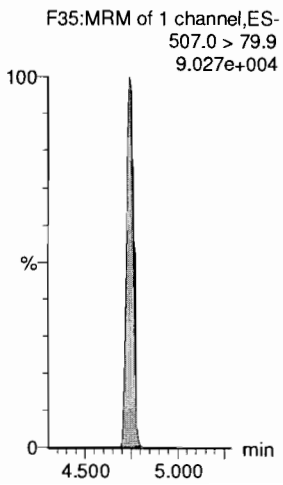

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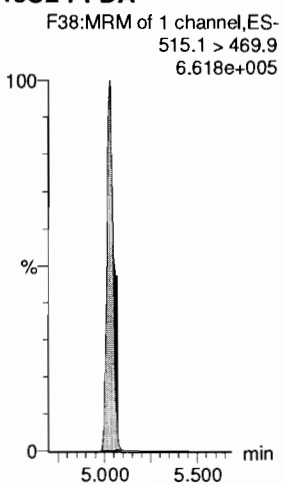
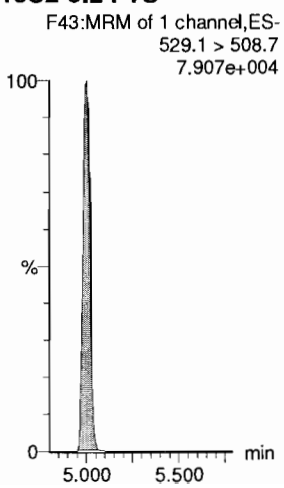


13C2-8:2 FTS



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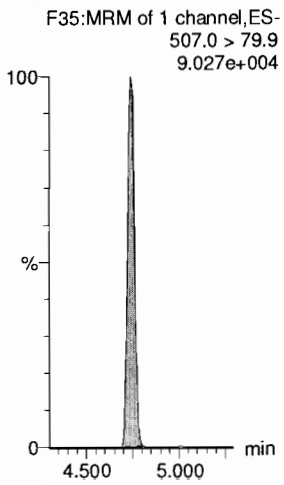

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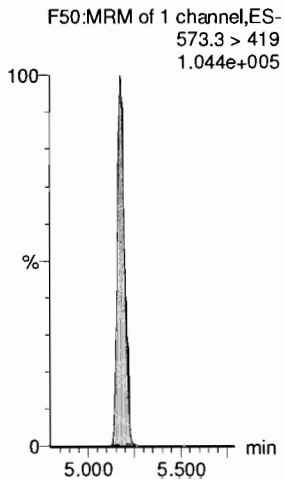

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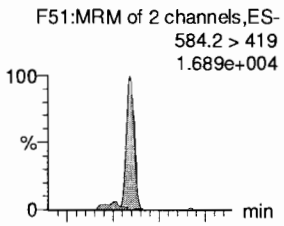

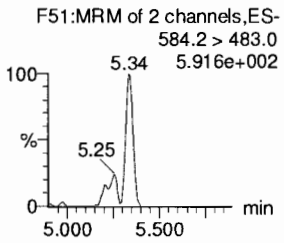

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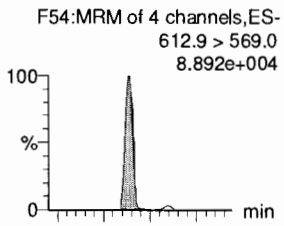

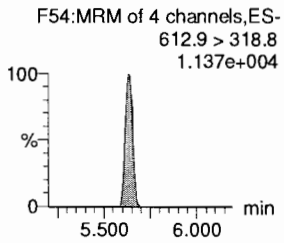

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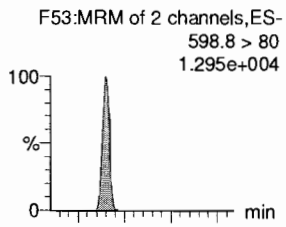

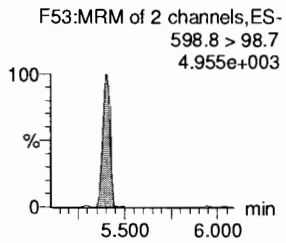

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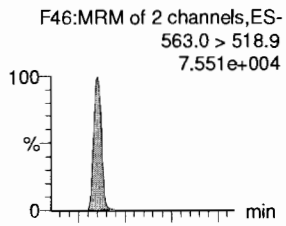

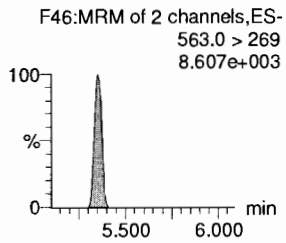

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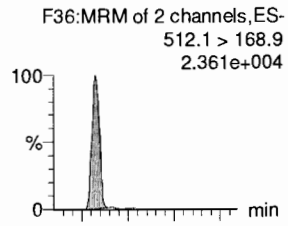

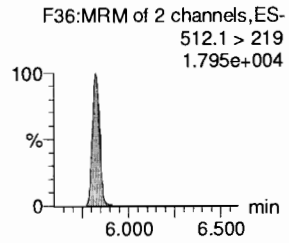

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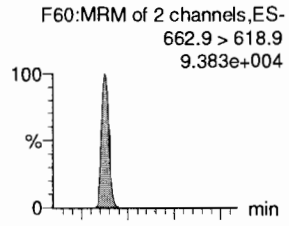
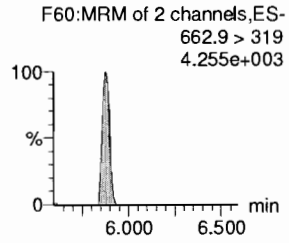
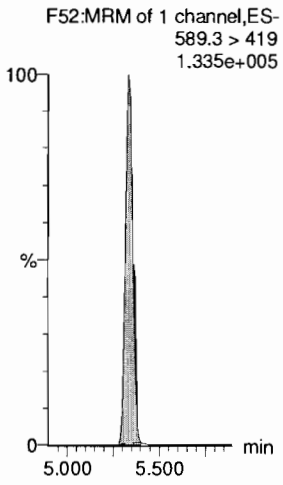




d5-N-EtFOSAA



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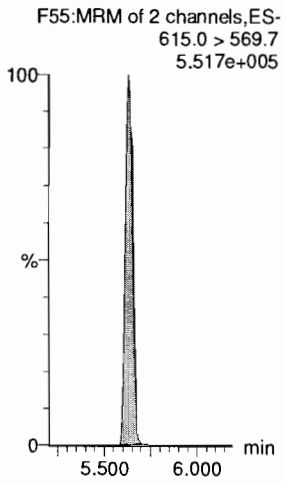

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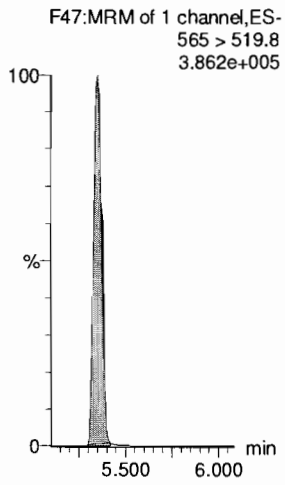

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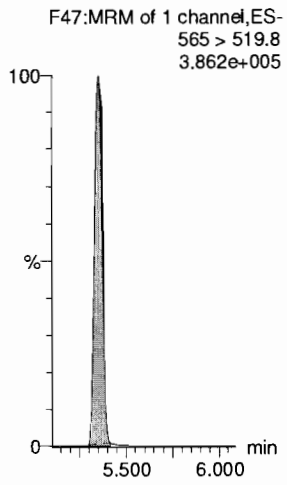

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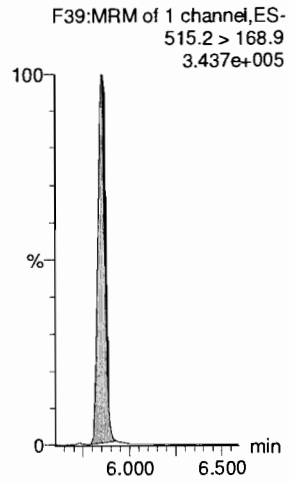

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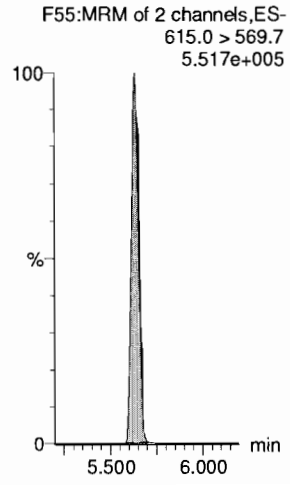

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Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

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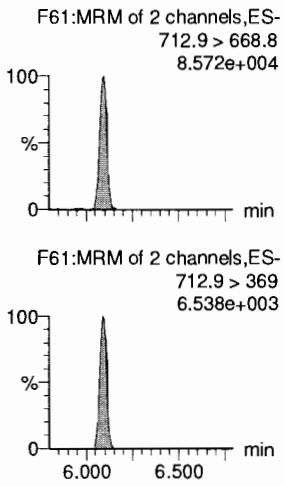
PFTeDA



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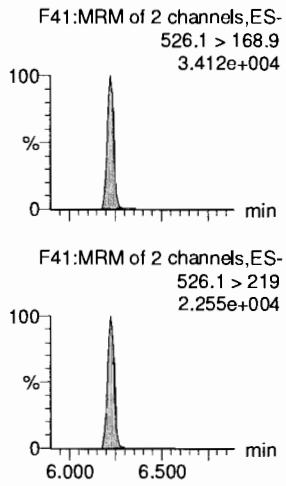

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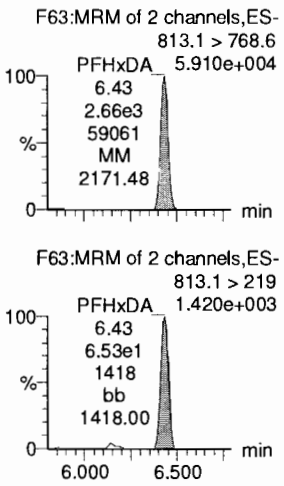

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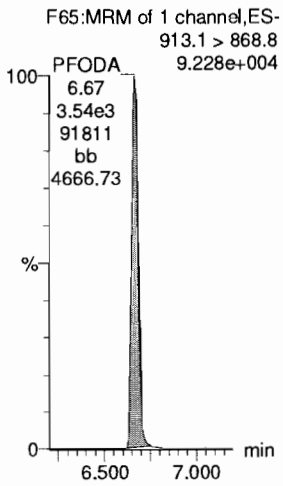
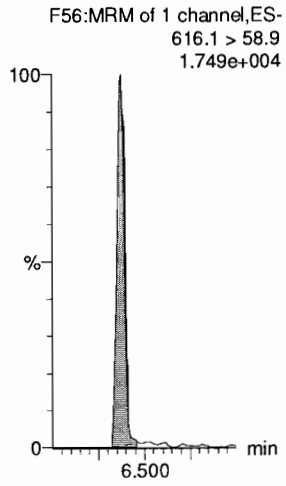
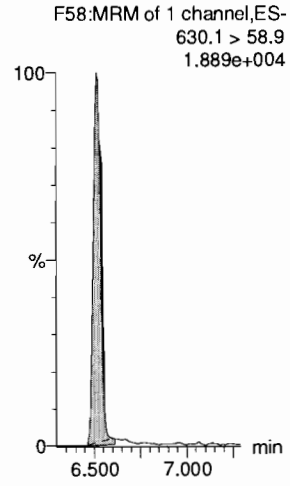


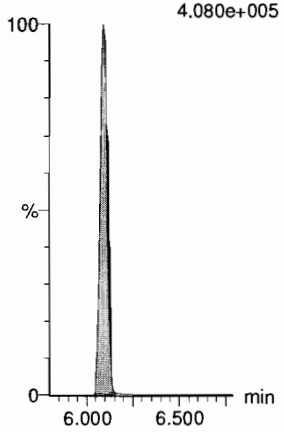
N-MeFOSE



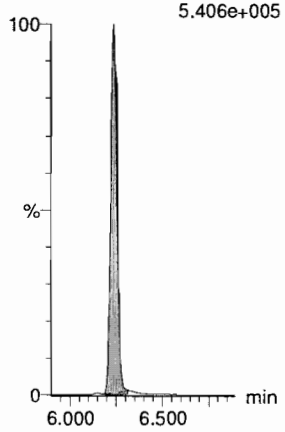
N-EtFOSE



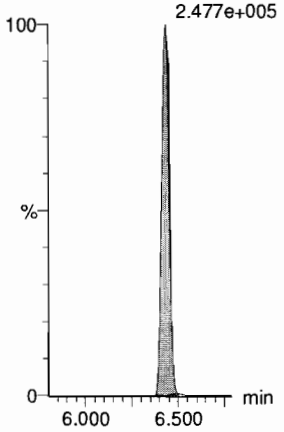
13C2-PFTeDA



d5-N-ETFOSA



13C2-PFHxDA



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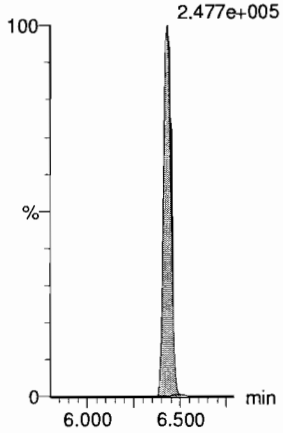
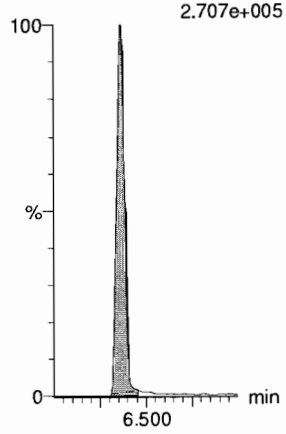
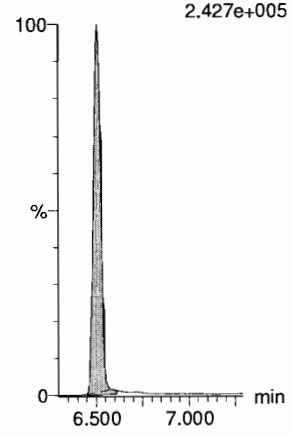


d7-N-MeFOSE



d9-N-EtFOSE



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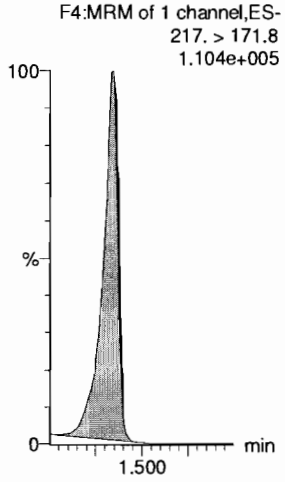
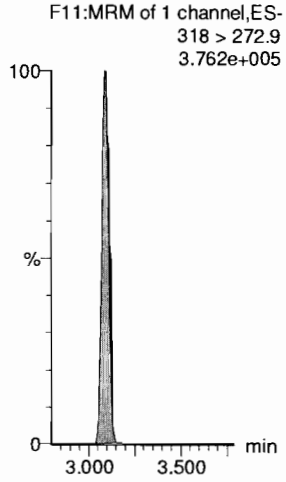
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_5, Date: 04-Jun-2018, Time: 19:43:08, ID: ST180604M2-4 PFC CS1 18E2905, Description: PFC CS1 18E2905

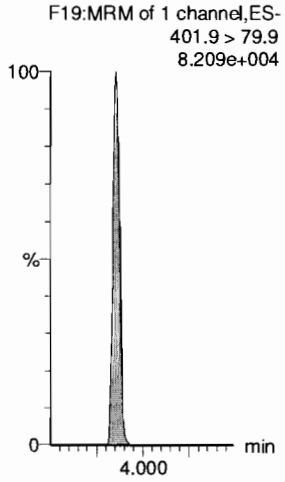
13C4-PFBA



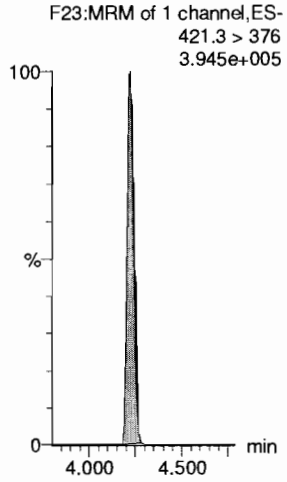
13C5-PFHxA



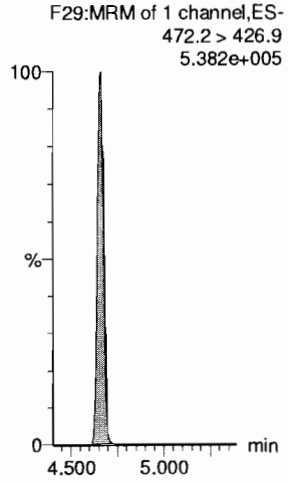
13C3-PFHxS



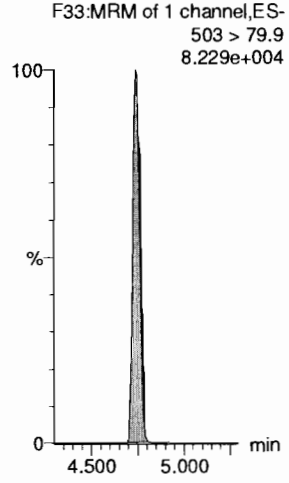
13C8-PFOA



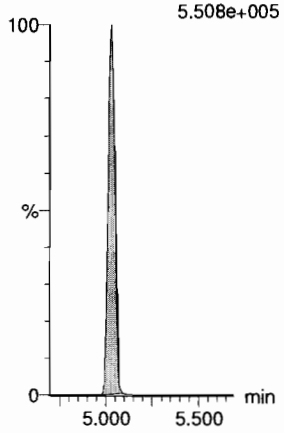
13C9-PFNA



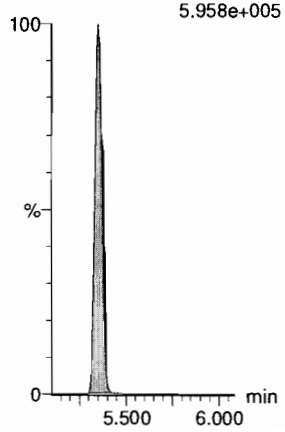
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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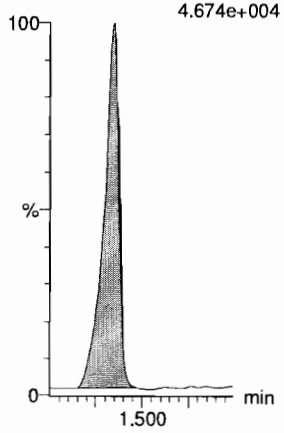
PFBA



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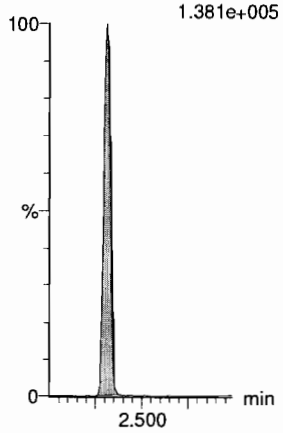
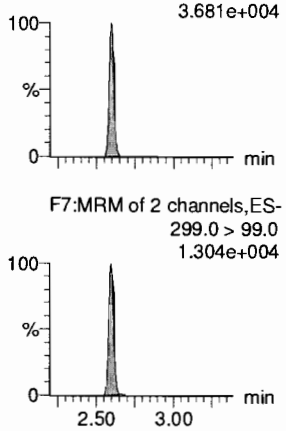
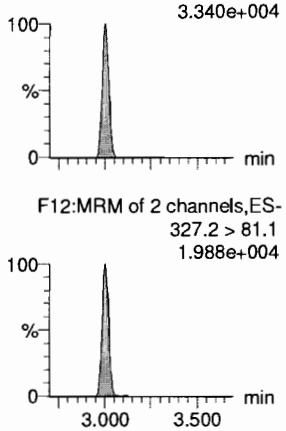


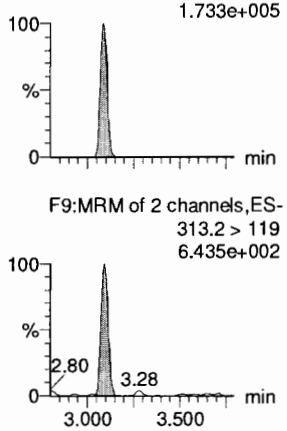
PFBS



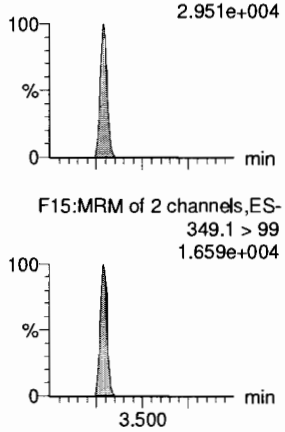
4:2 FTS



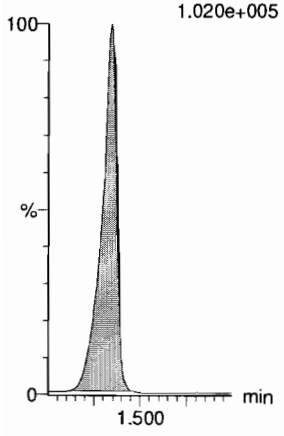
PFHxA



PFPeS



13C3-PFBA



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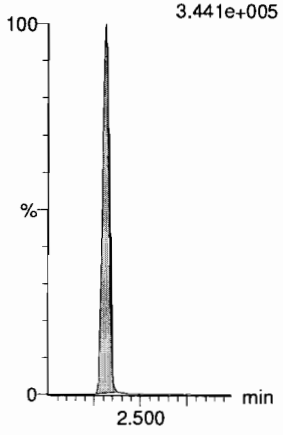

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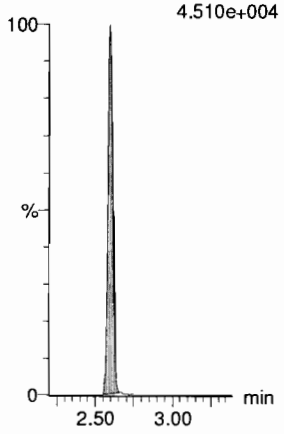
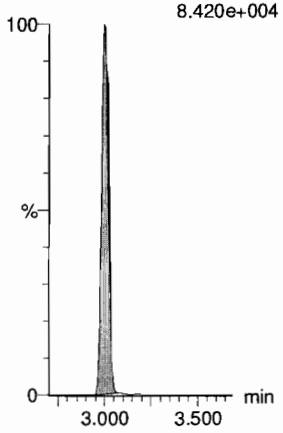


13C2-4:2 FTS



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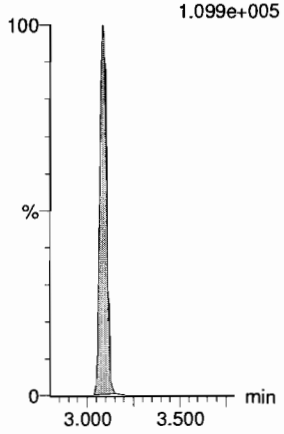

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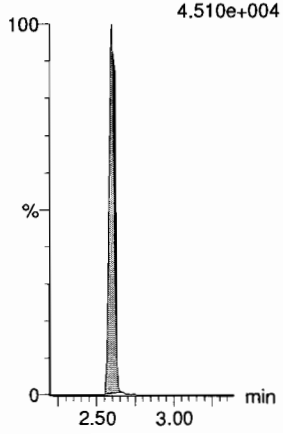

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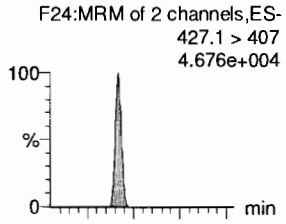
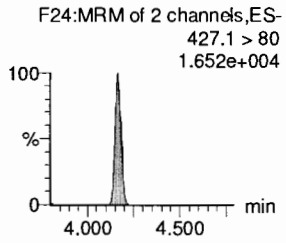
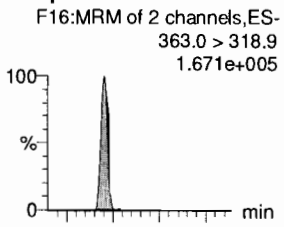
Name: 180604M2_6, Date: 04-Jun-2018, Time: 19:53:38, ID: ST180604M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

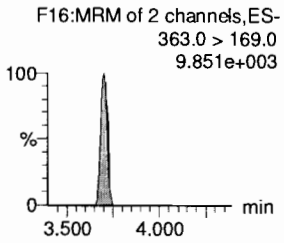
6:2 FTS



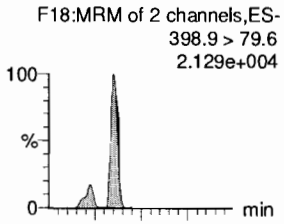


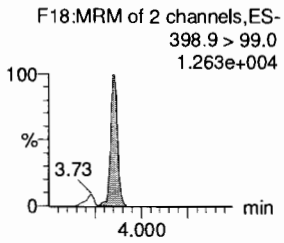
PFHpA



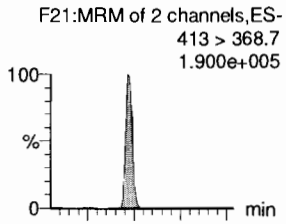


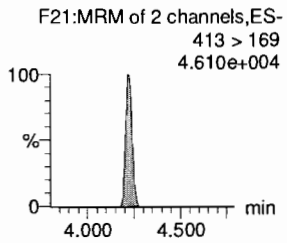
L-PFHxS



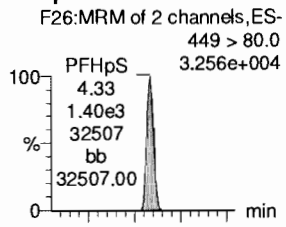


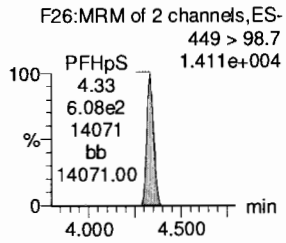
L-PFOA



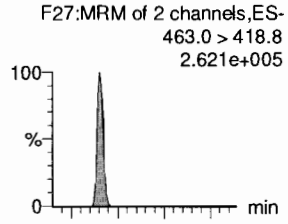


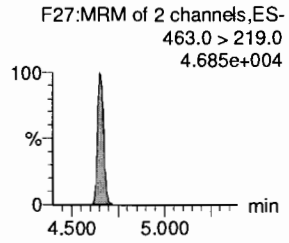
PFHpS



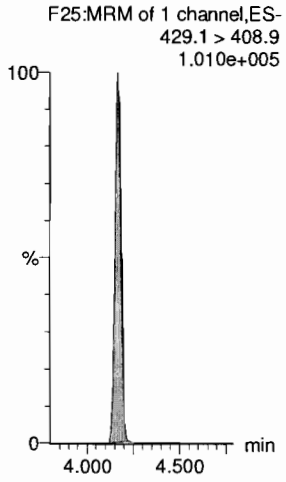


PFNA

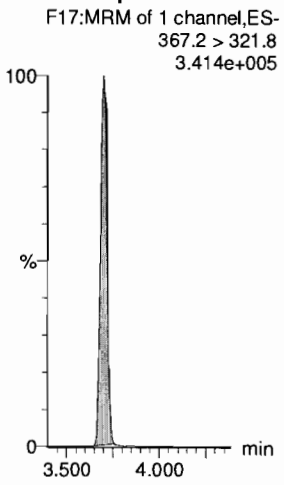




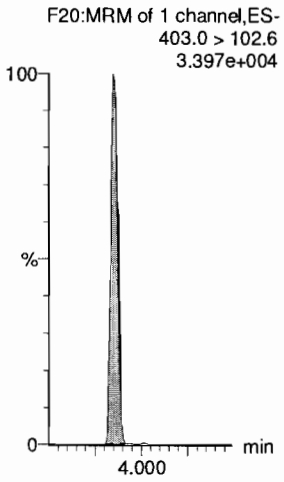
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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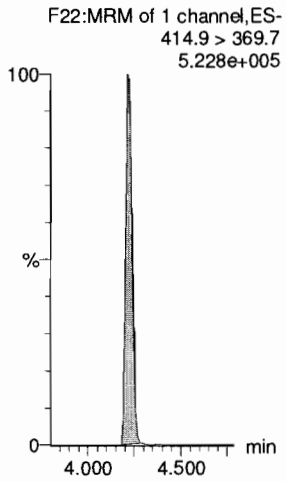

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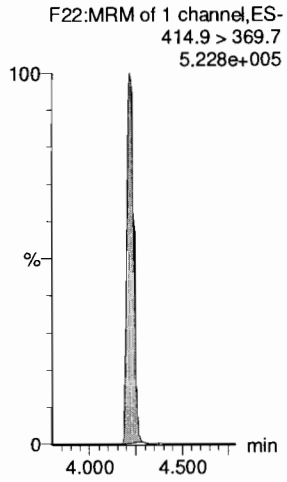
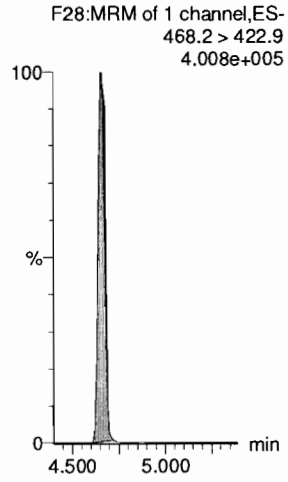


13C5-PFNA



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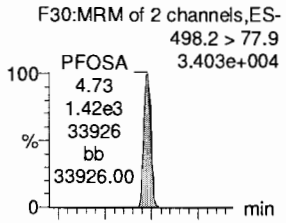
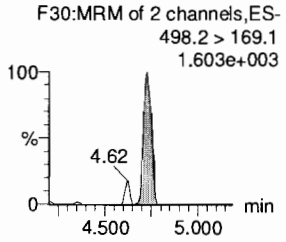
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

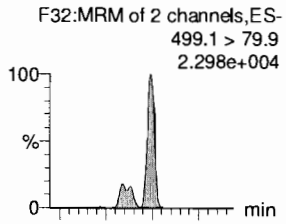
Name: 180604M2_6, Date: 04-Jun-2018, Time: 19:53:38, ID: ST180604M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

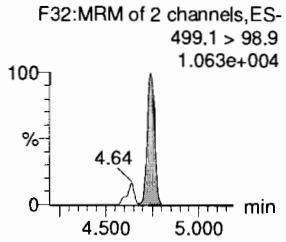
PFOSA



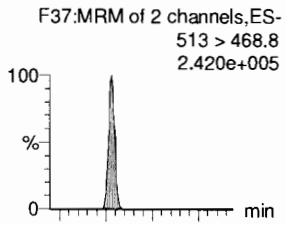


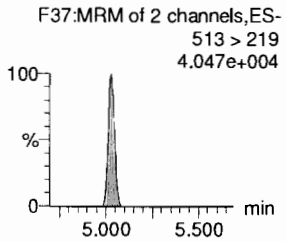
L-PFOS



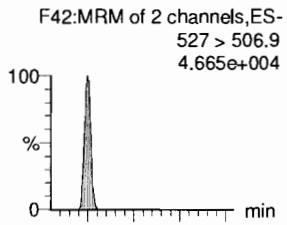


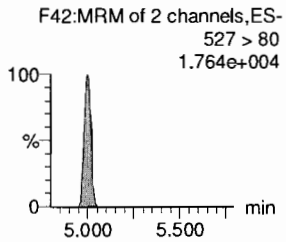
PFDA



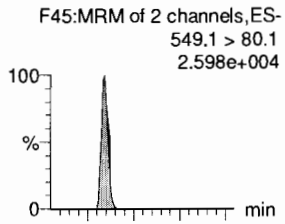


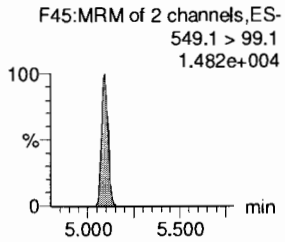
8:2 FTS



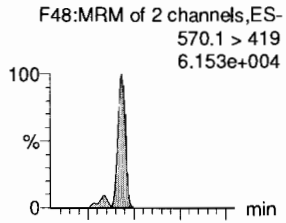


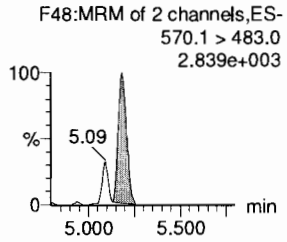
PFNS



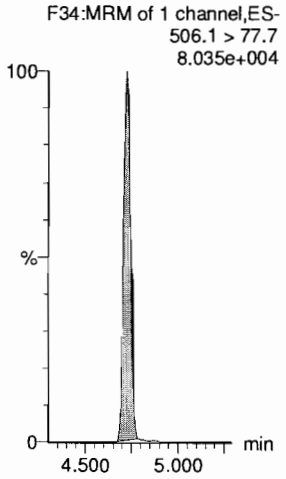


L-MeFOSAA

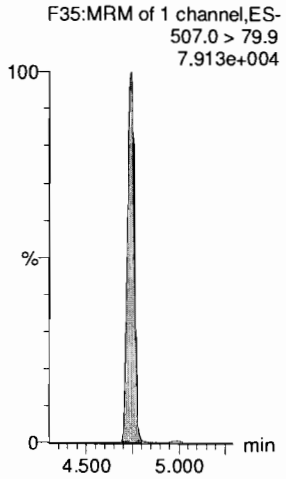




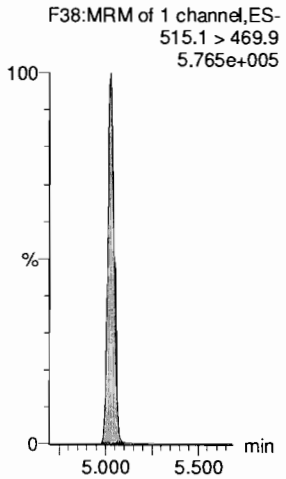
13C8-PFOSA



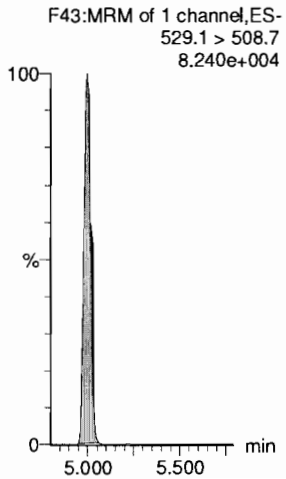
13C8-PFOS



13C2-PFDA



13C2-8:2 FTS



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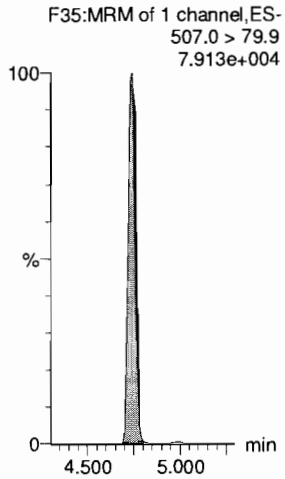
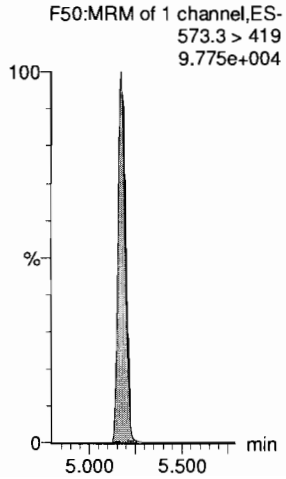


d3-N-MeFOSAA



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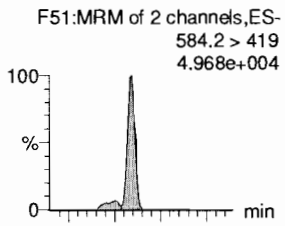
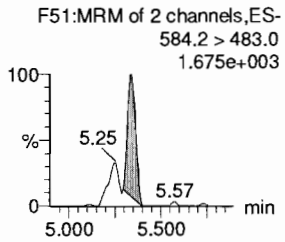
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

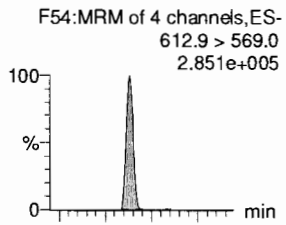
Name: 180604M2_6, Date: 04-Jun-2018, Time: 19:53:38, ID: ST180604M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

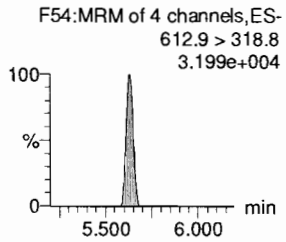
L-EtFOSAA





PFDoA





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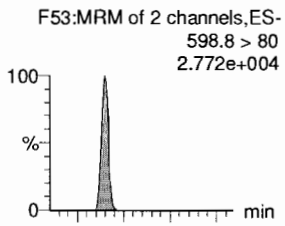

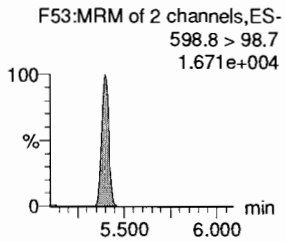

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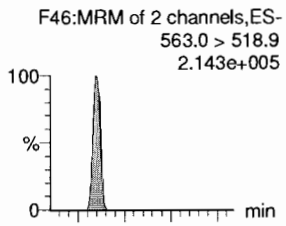

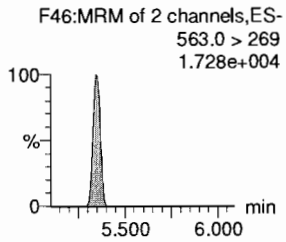

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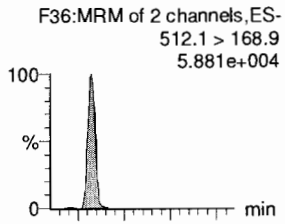

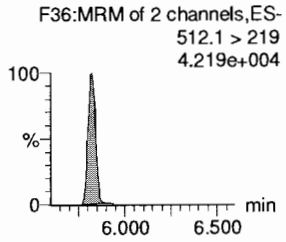

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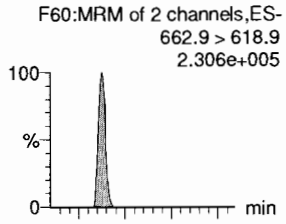
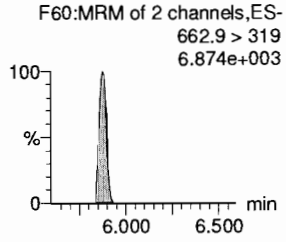
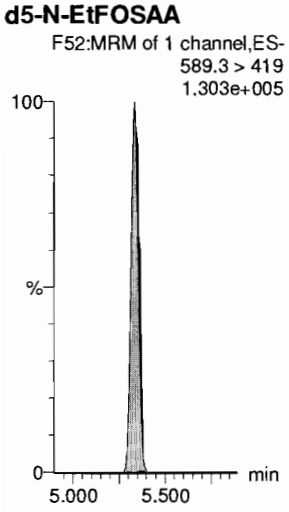
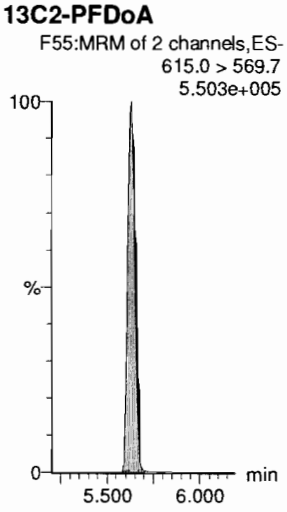




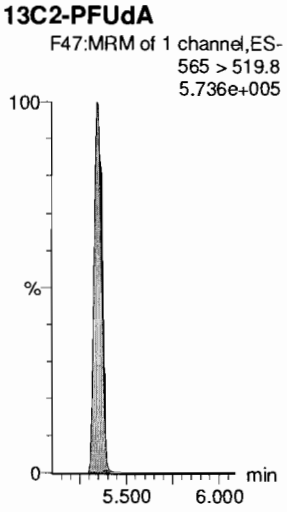
d5-N-EtFOSAA



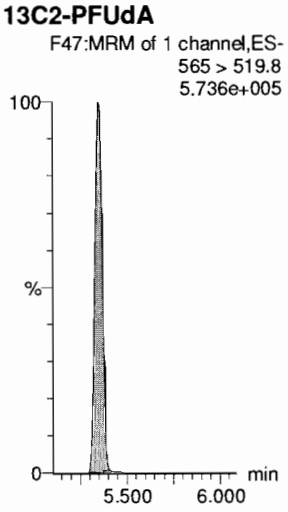
13C2-PFDoA



13C2-PFUdA



13C2-PFUdA



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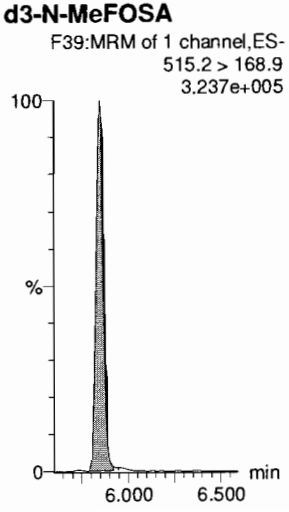

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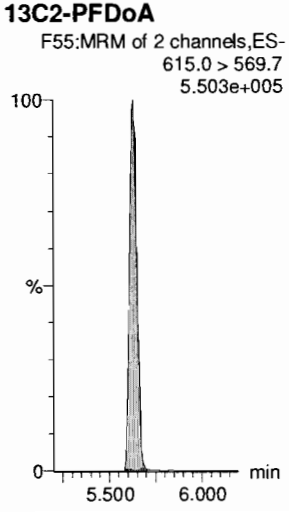

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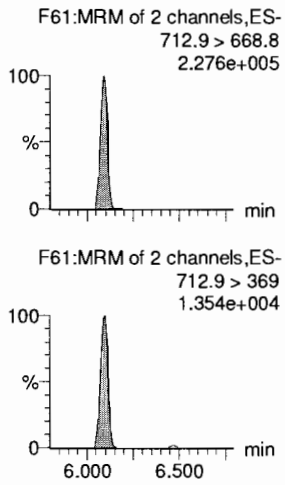
Name: 180604M2_6, Date: 04-Jun-2018, Time: 19:53:38, ID: ST180604M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

PFTeDA



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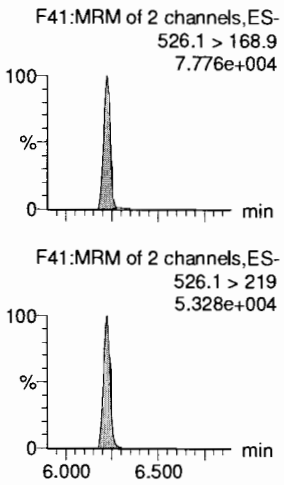
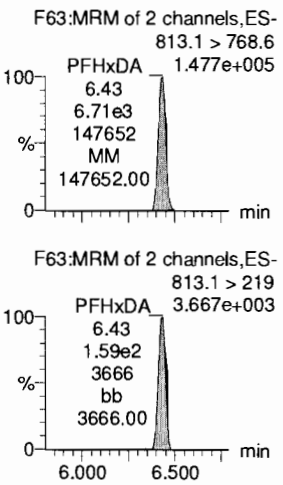
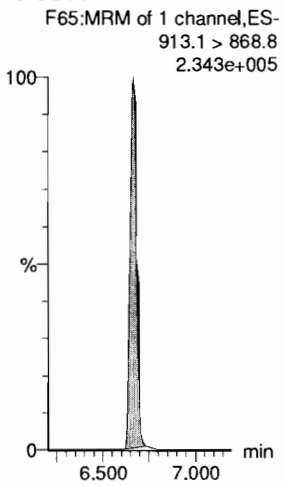


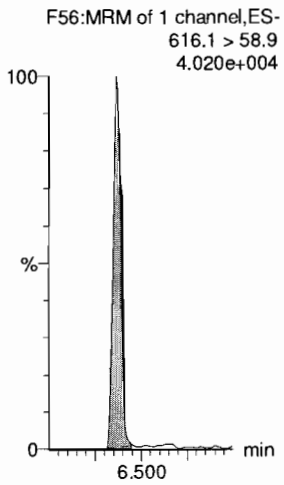
PFHxDA



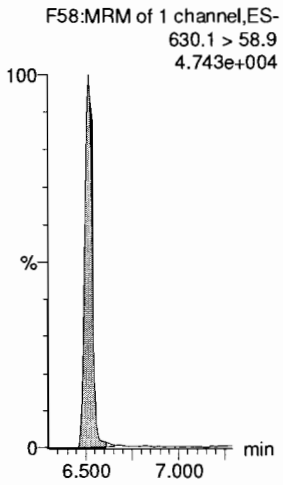
PFODA



N-MeFOSE



N-EtFOSE



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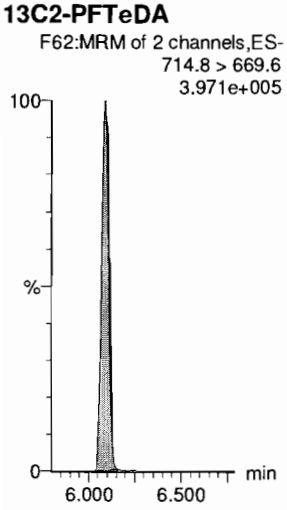
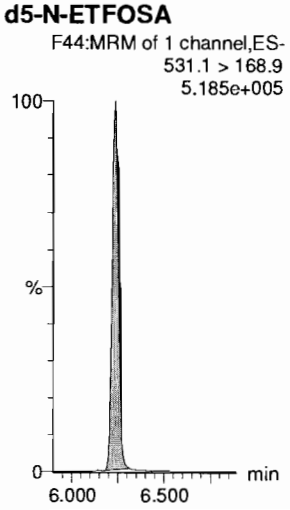


d5-N-ETFOSA



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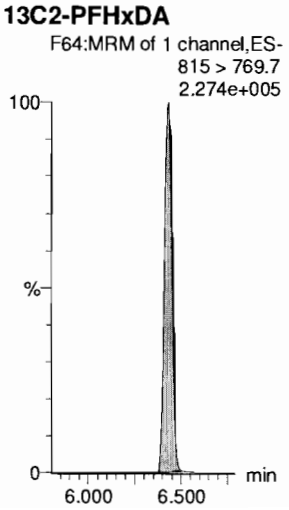
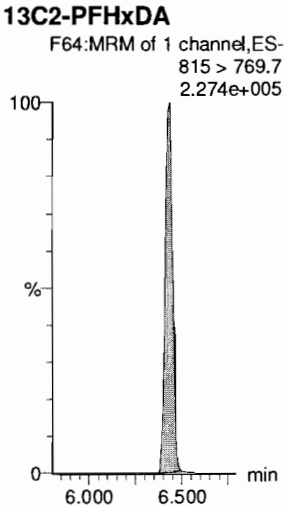
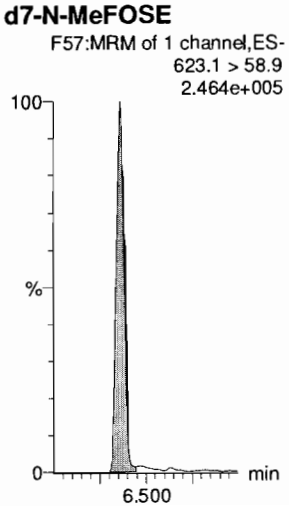


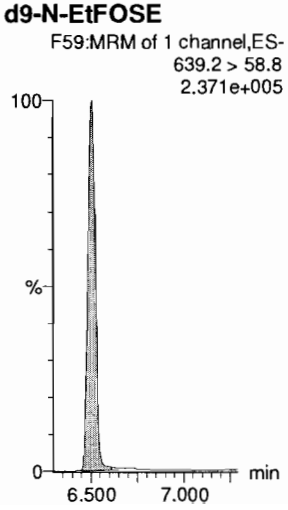
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_6, Date: 04-Jun-2018, Time: 19:53:38, ID: ST180604M2-5 PFC CS2 18E2906, Description: PFC CS2 18E2906

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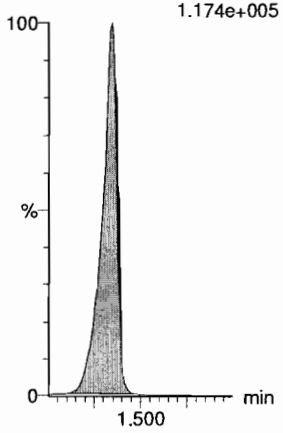
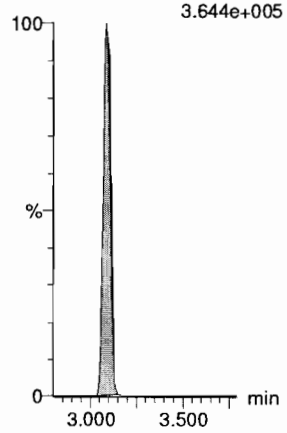
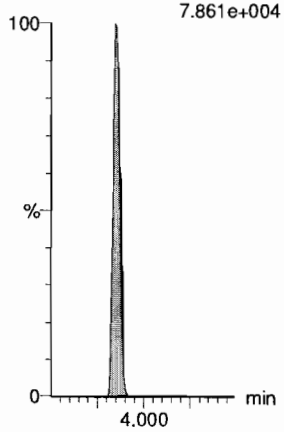


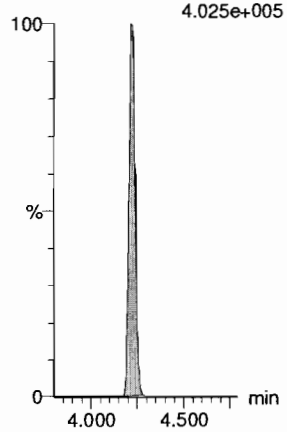
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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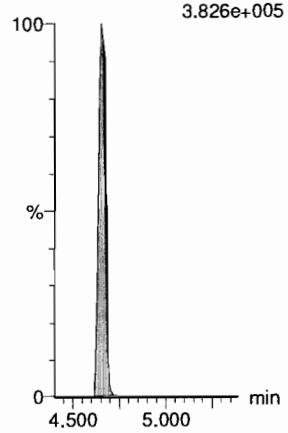
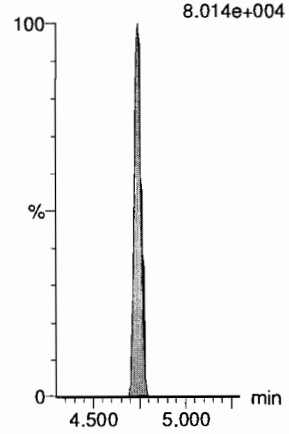
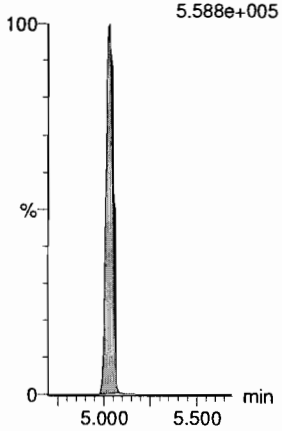


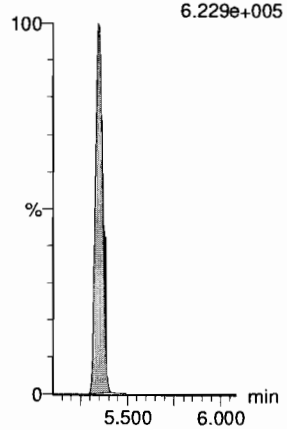
13C4-PFOS



13C6-PFDA



13C7-PFUdA



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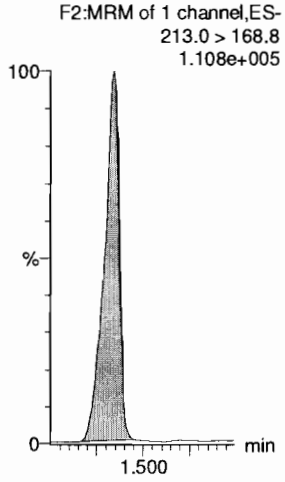
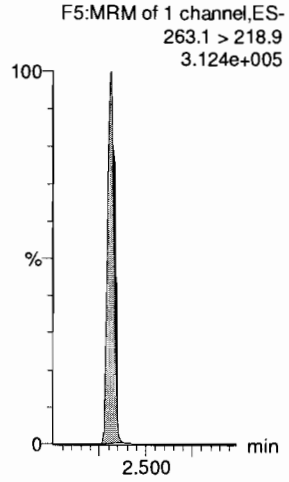
Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

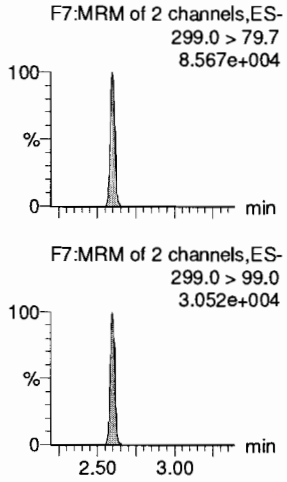
PFBA



PFPeA



PFBS



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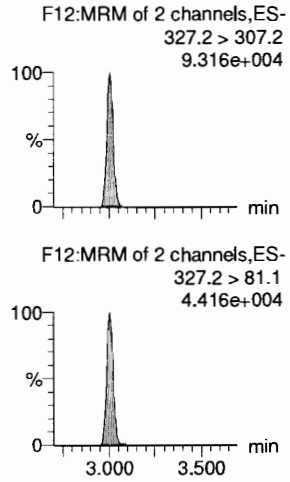

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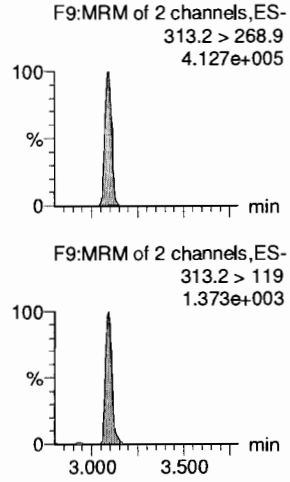

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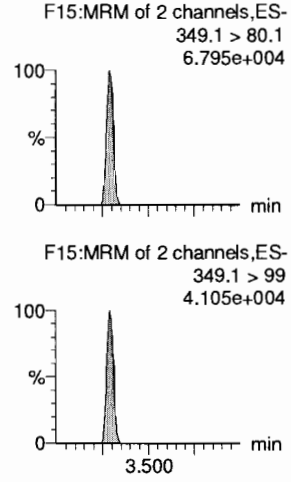
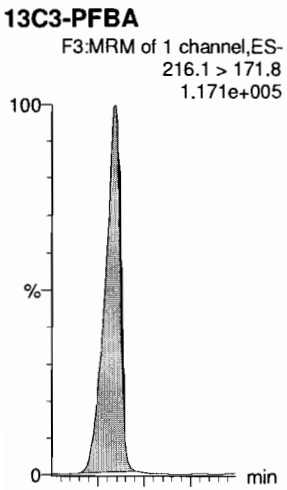


13C3-PFBA



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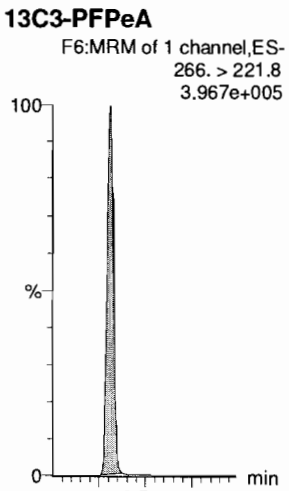

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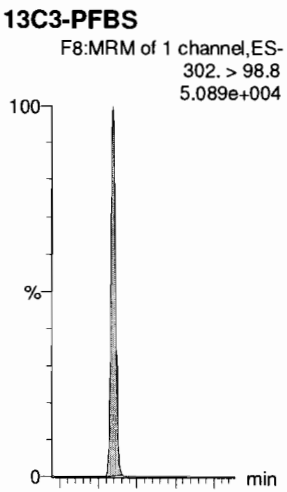
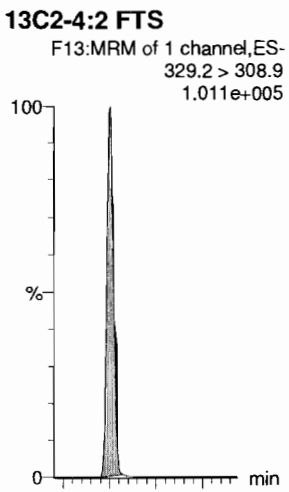


13C2-4:2 FTS



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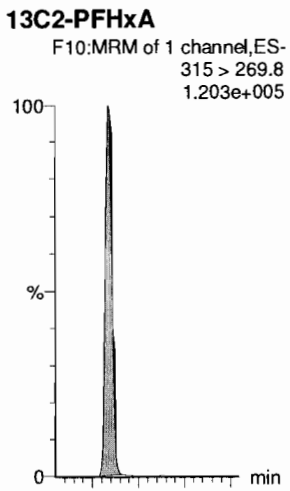

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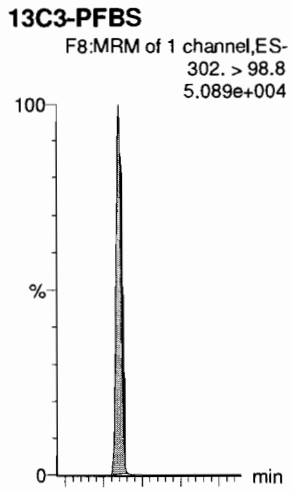

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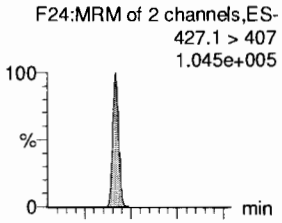
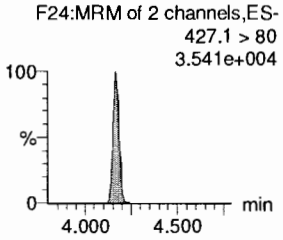
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

6:2 FTS





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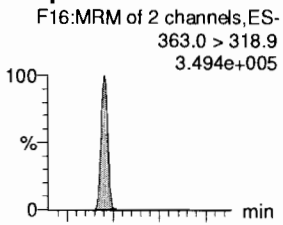

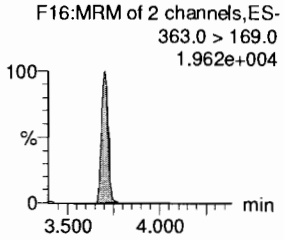

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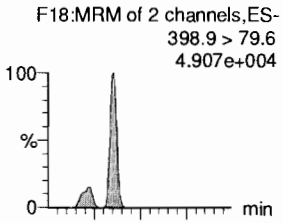

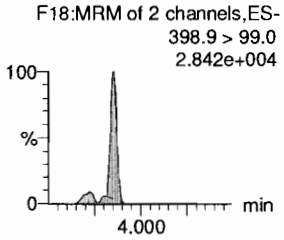

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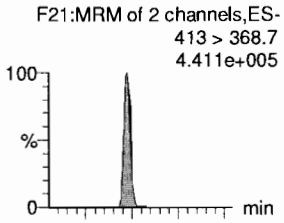

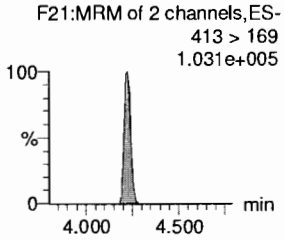

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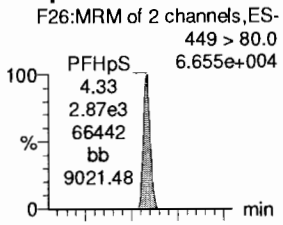

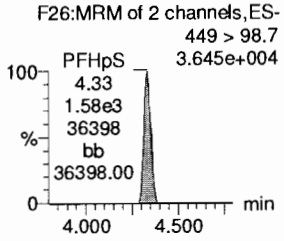

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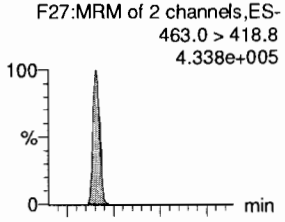
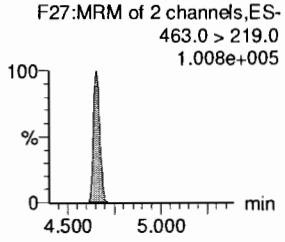
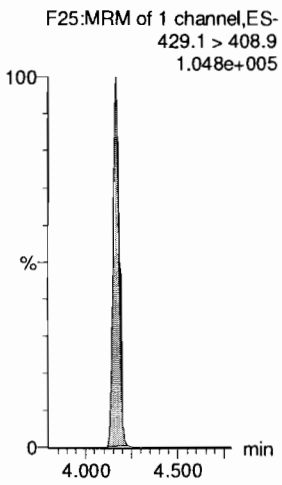
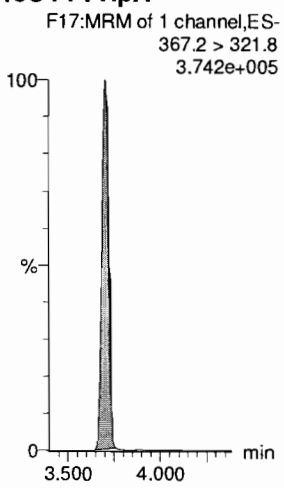




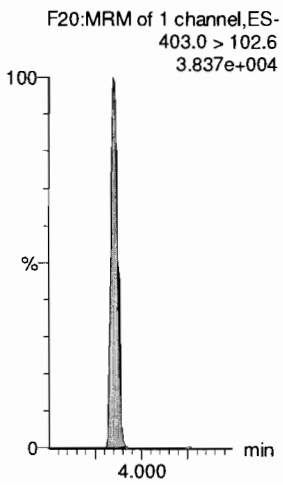
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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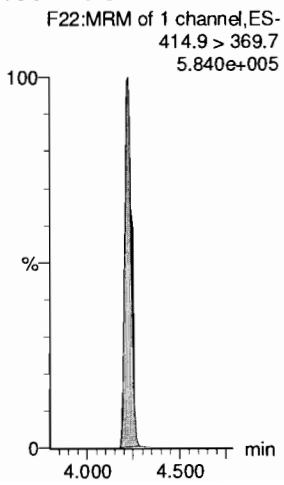

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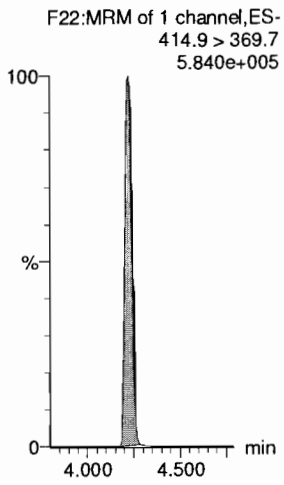

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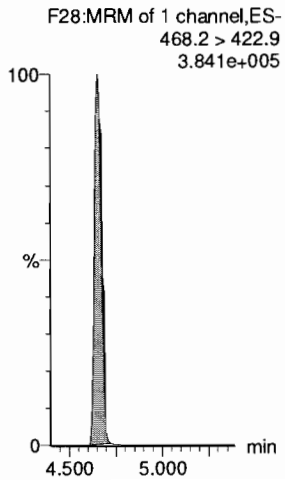

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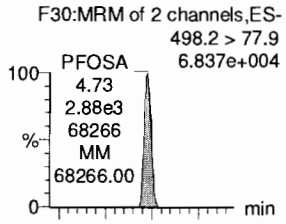
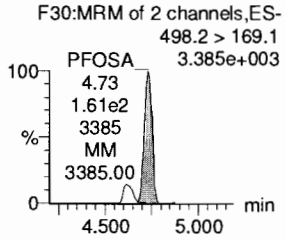
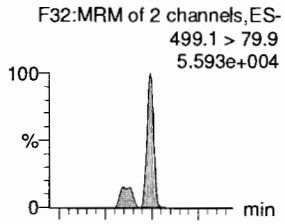
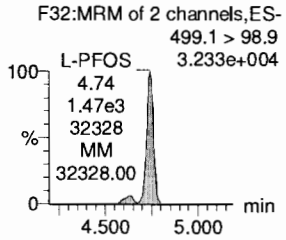




L-PFOS





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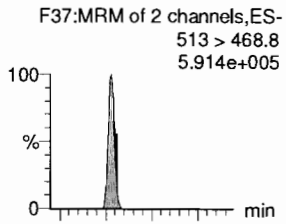
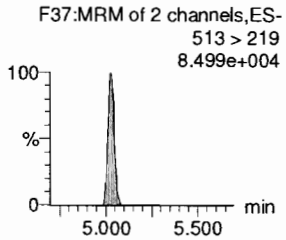
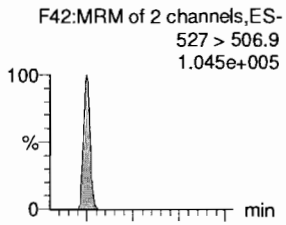
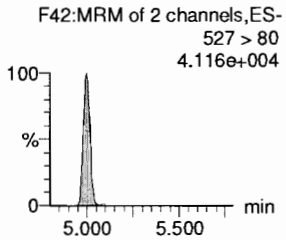




8:2 FTS





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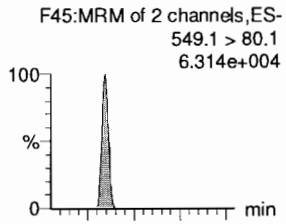

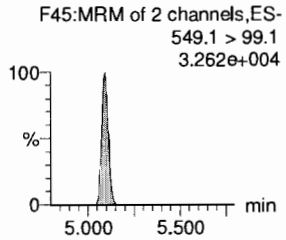

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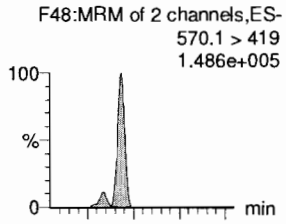

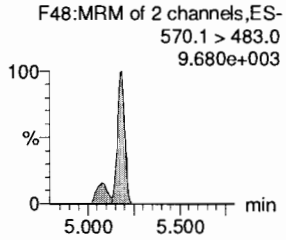

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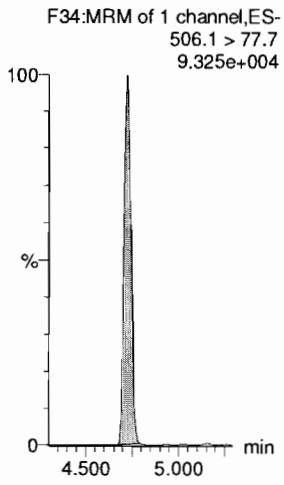

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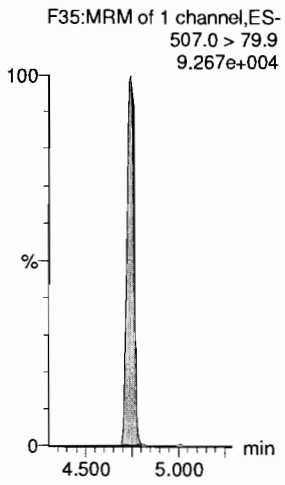

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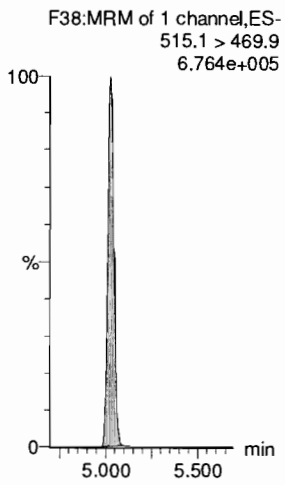
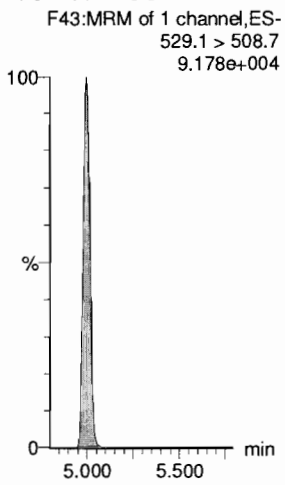


13C2-8:2 FTS



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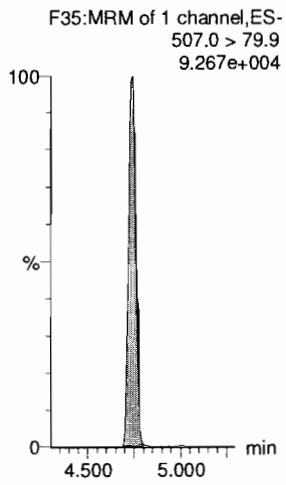

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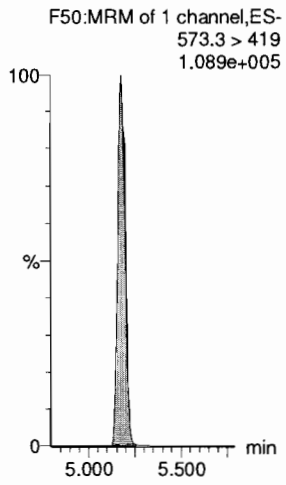

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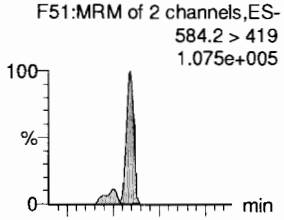
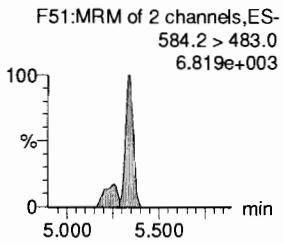
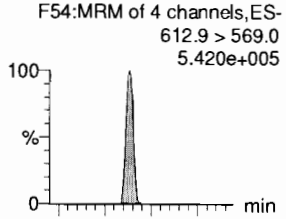
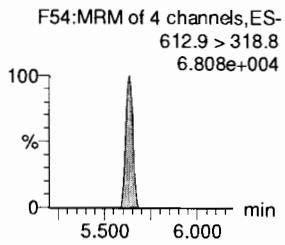
L-EtFOSAA





PFDoA





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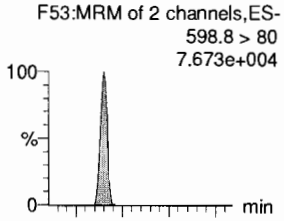

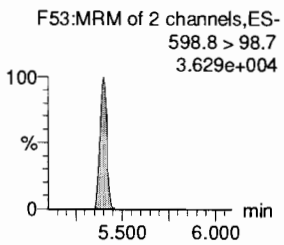

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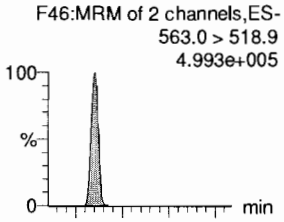
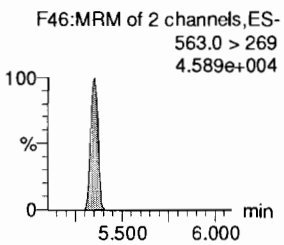
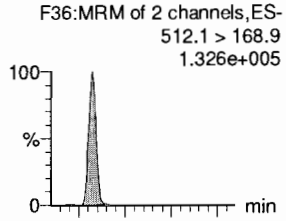
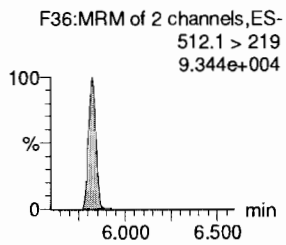




N-MeFOSA





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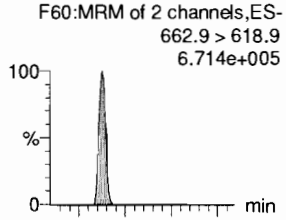
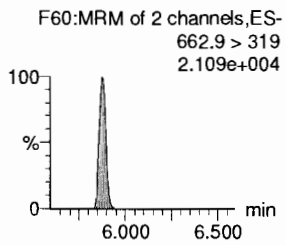
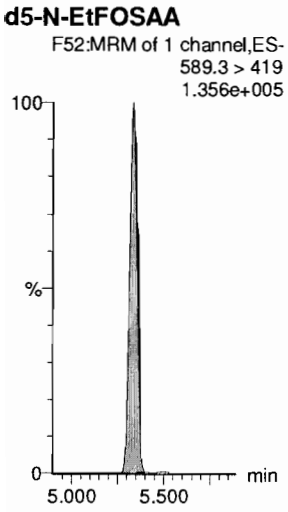




d5-N-EtFOSAA



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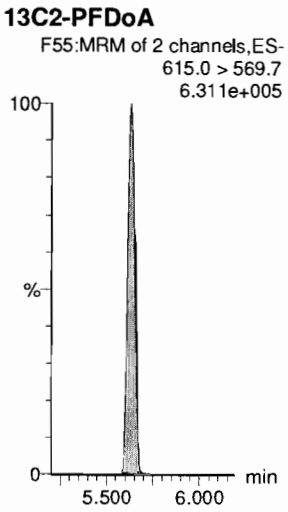
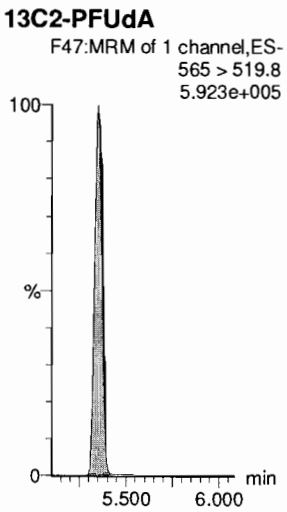


13C2-PFUdA



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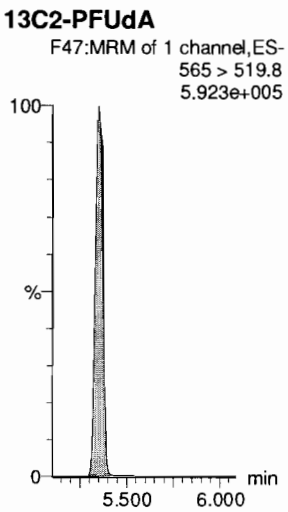
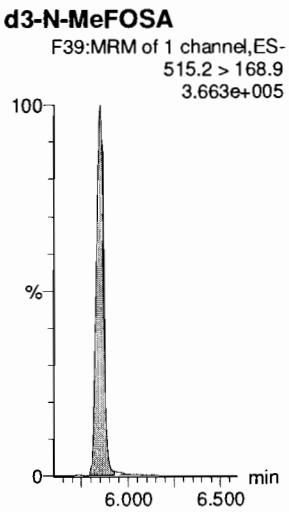


d3-N-MeFOSA



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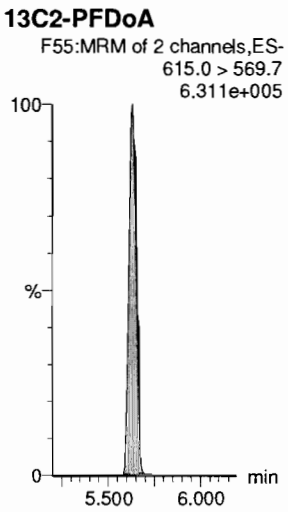

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

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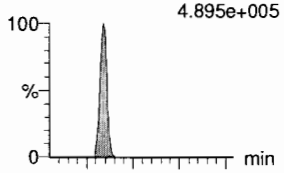
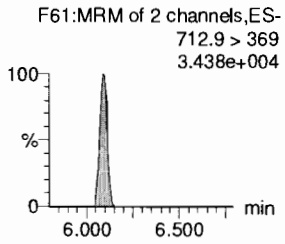
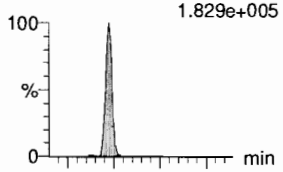
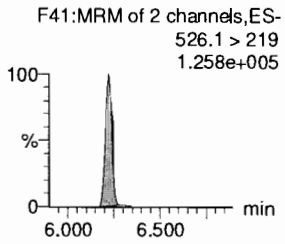


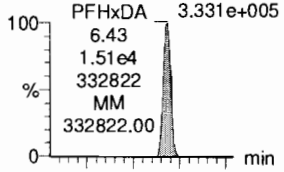


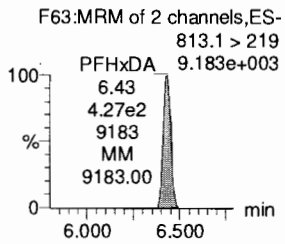
N-EtFOSA



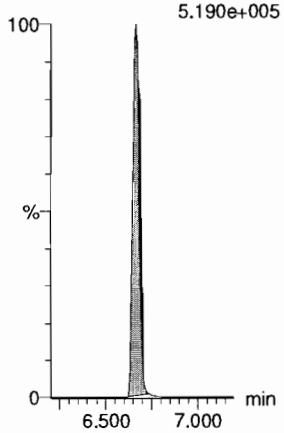


PFHxDA

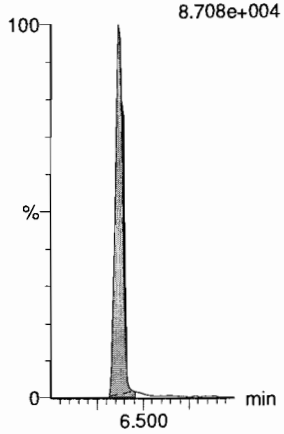




PFODA



N-MeFOSE



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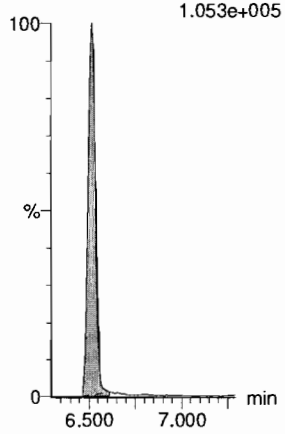
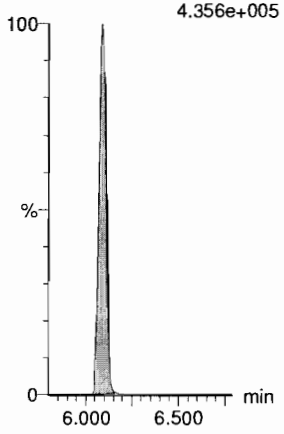
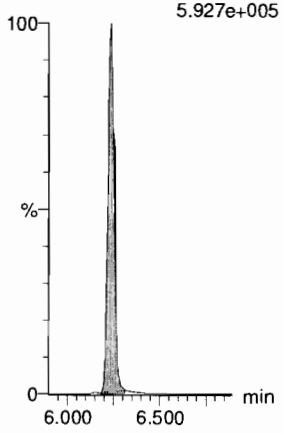


13C2-PFTeDA



d5-N-ETFOSA



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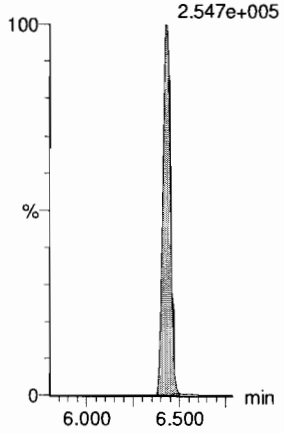

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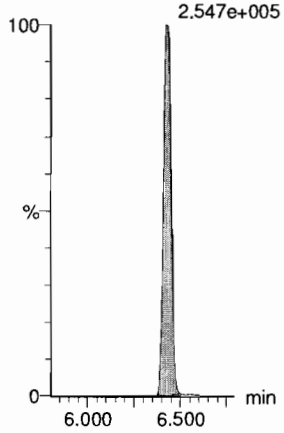
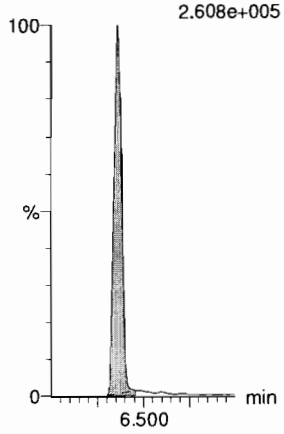
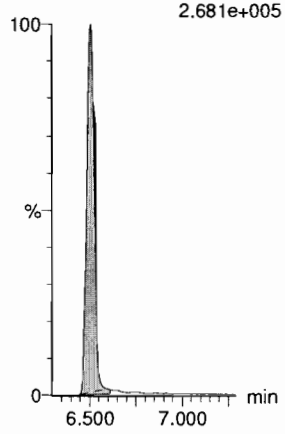


d7-N-MeFOSE



d9-N-EtFOSE



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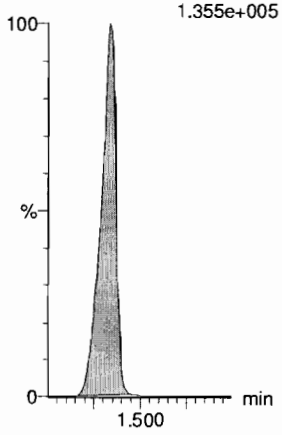
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_7, Date: 04-Jun-2018, Time: 20:04:03, ID: ST180604M2-6 PFC CS3 18E2907, Description: PFC CS3 18E2907

13C4-PFBA



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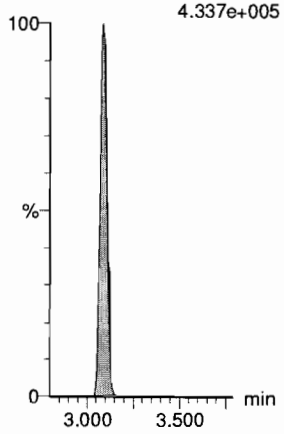
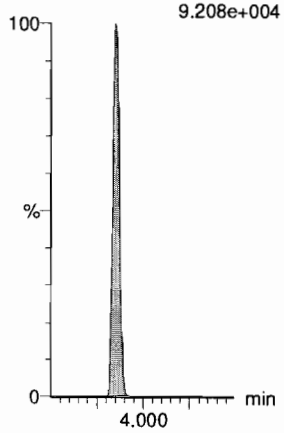


13C3-PFHxS



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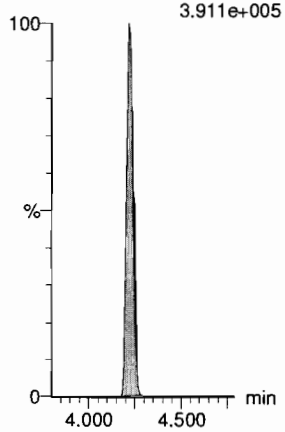

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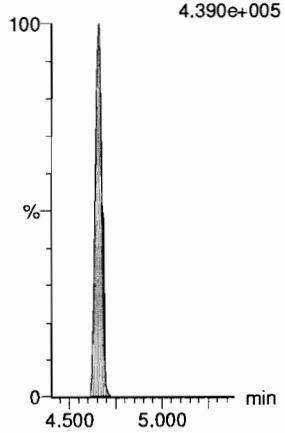
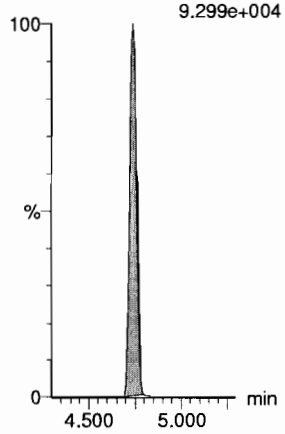


13C4-PFOS



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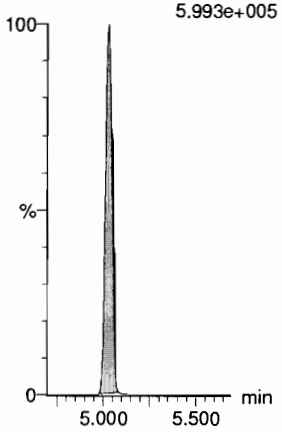
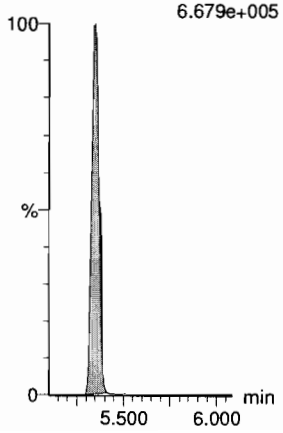


13C7-PFUdA

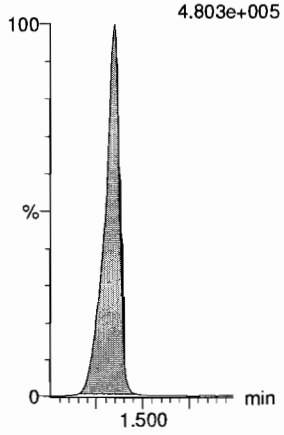


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

PFBA



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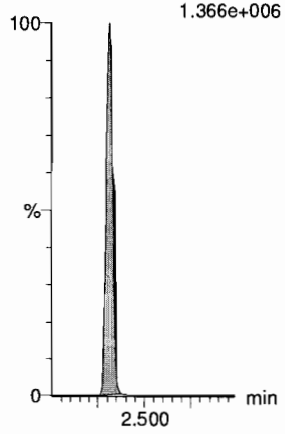
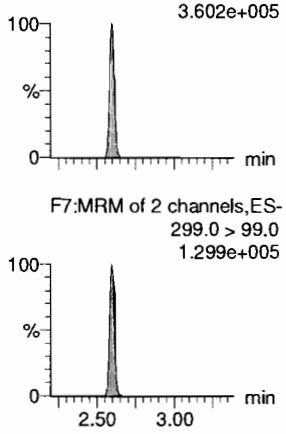
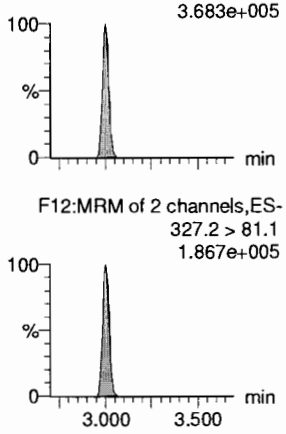


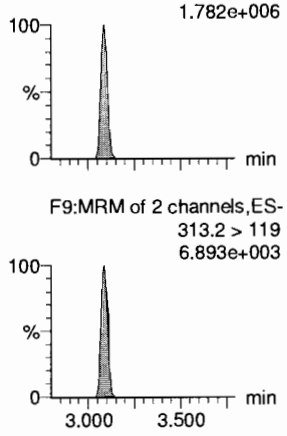
PFBS



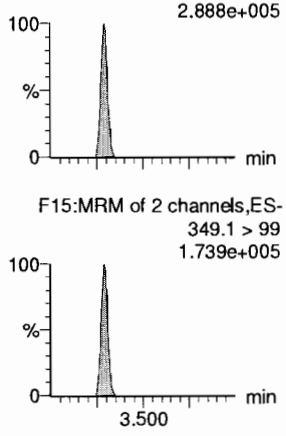
4:2 FTS



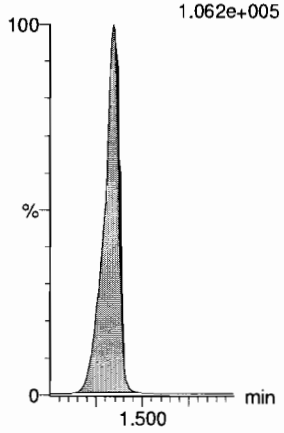
PFHxA



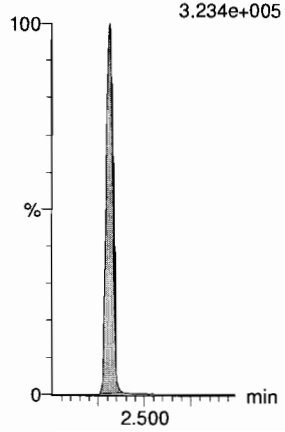
PFPeS



13C3-PFBA



13C3-PFPeA



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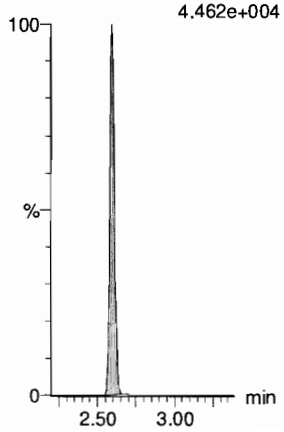
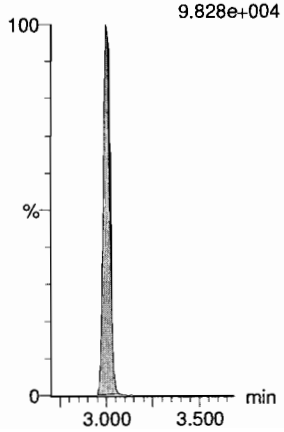
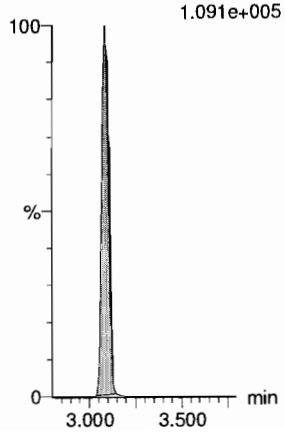


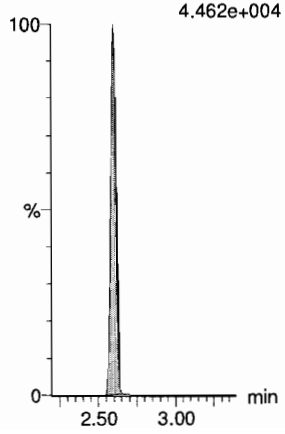
13C2-4:2 FTS



13C2-PFHxA



13C3-PFBS

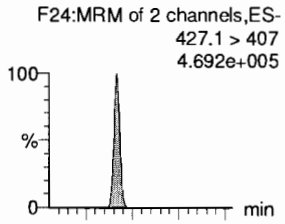


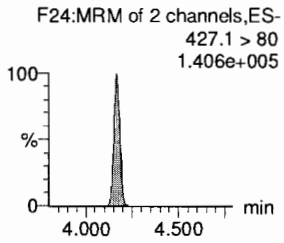
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

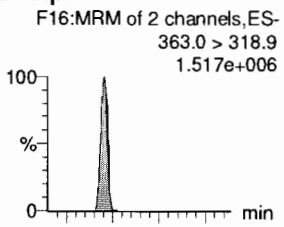
Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

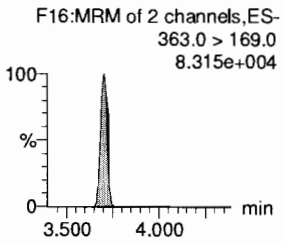
6:2 FTS



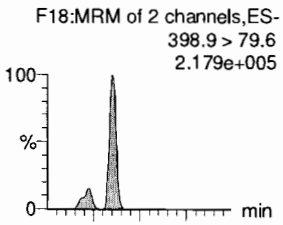


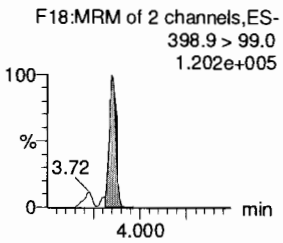
PFHpA





L-PFHxS





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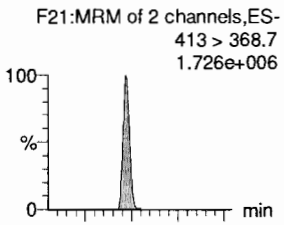
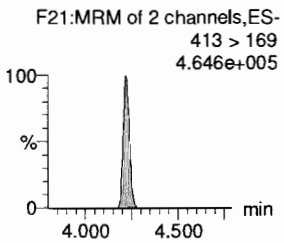
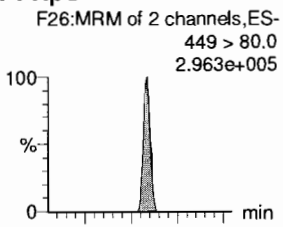
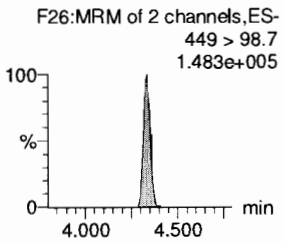




PFHpS





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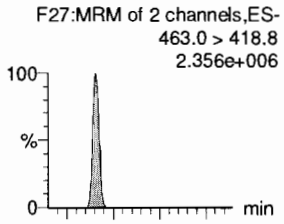
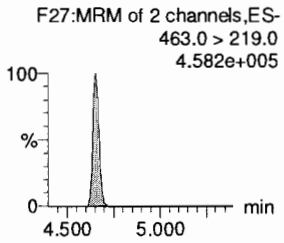
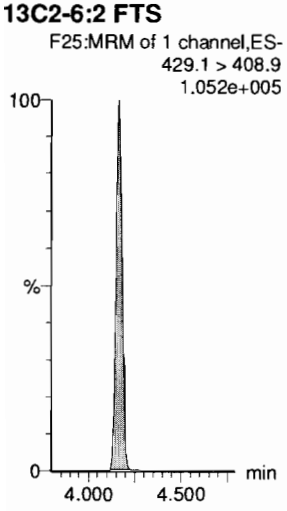
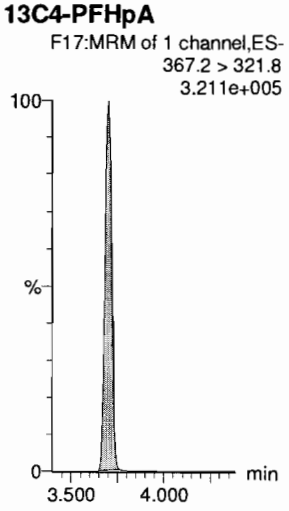




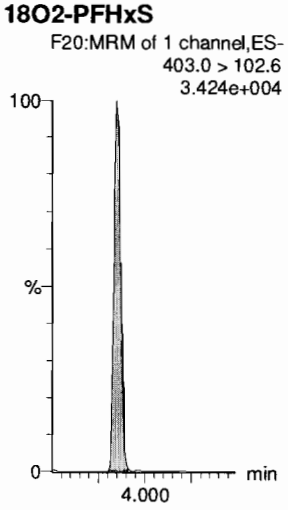
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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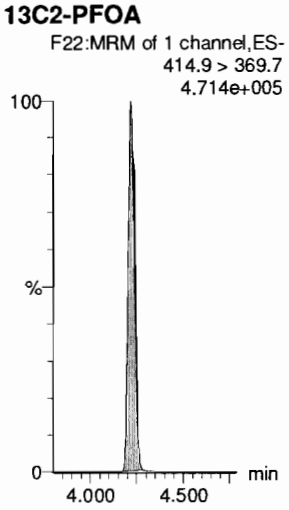

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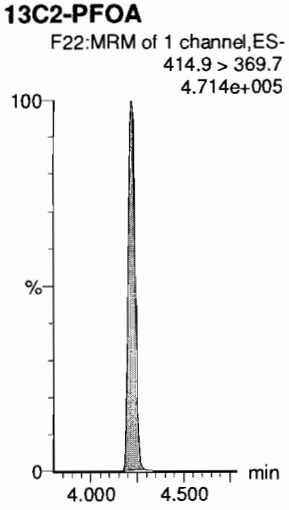

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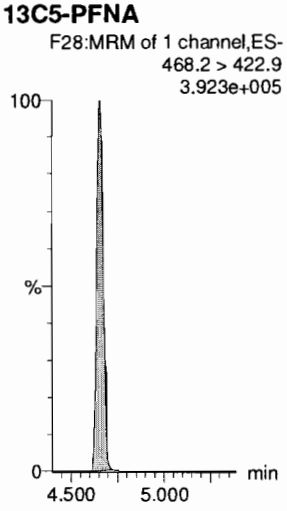

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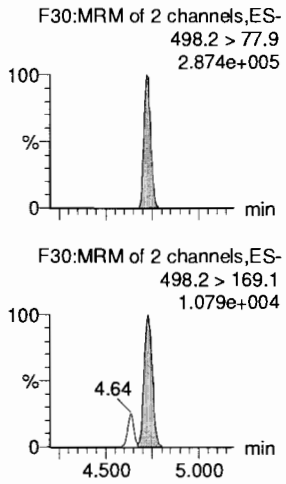
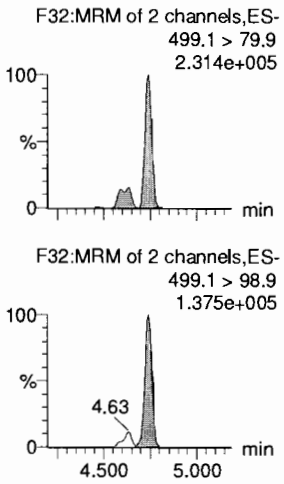
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

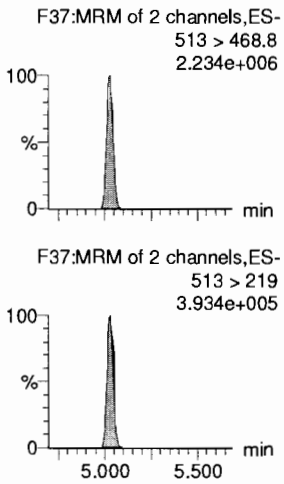
PFOSA



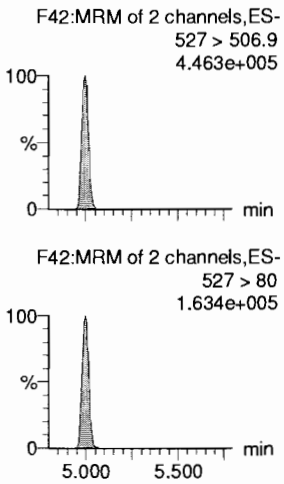
L-PFOS



PFDA



8:2 FTS



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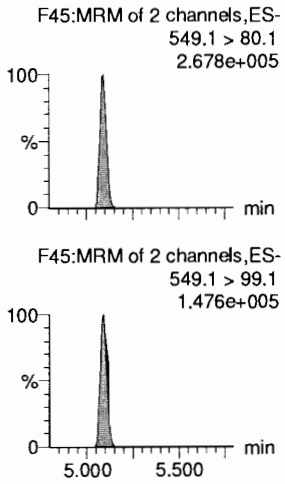
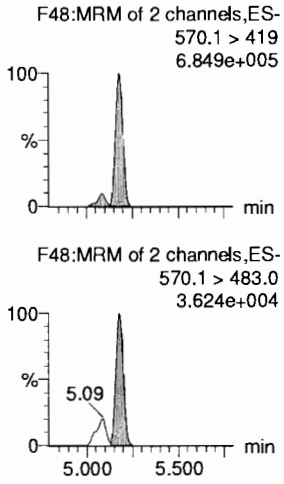
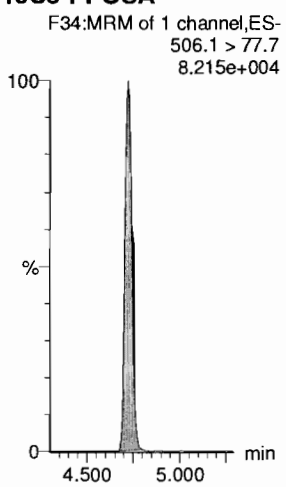


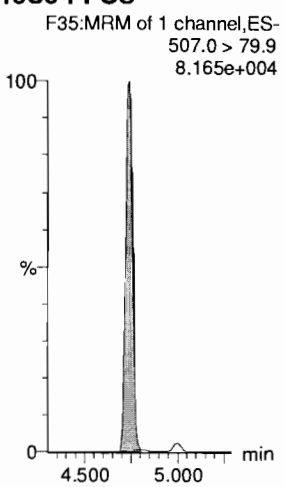
L-MeFOSAA



13C8-PFOSA



13C8-PFOS



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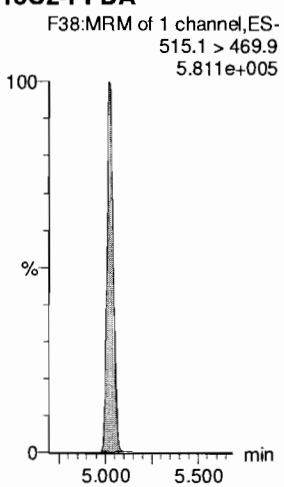
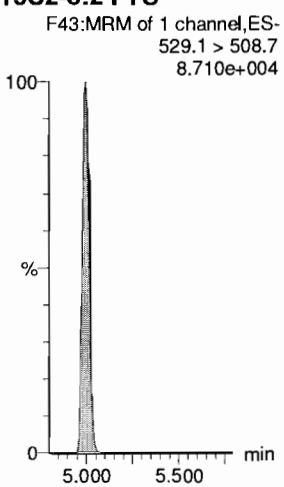


13C2-8:2 FTS



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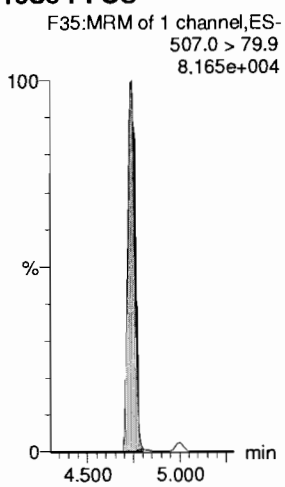
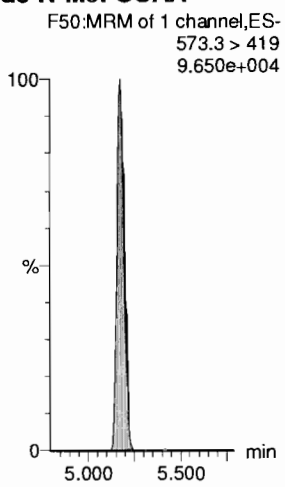


d3-N-MeFOSAA



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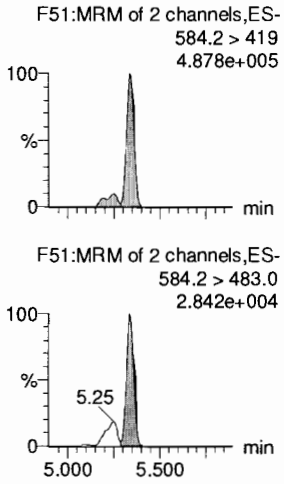
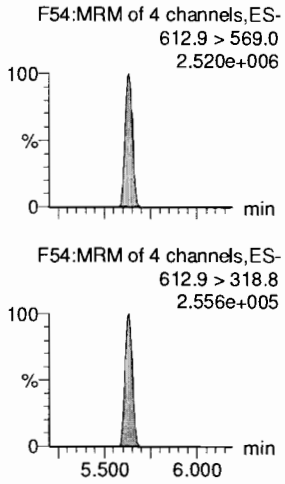
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

L-EtFOSAA



PFDoA



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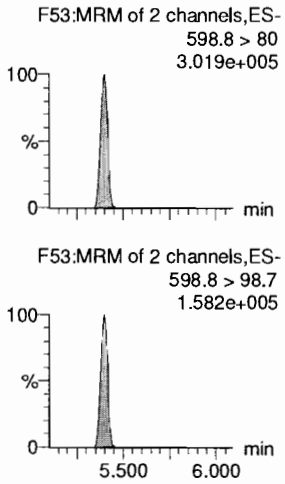

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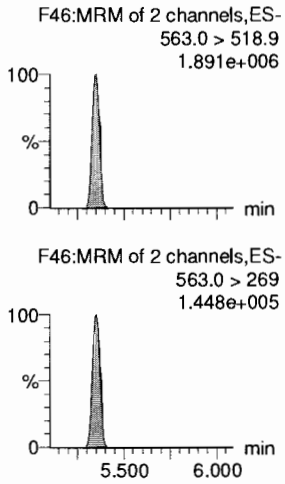

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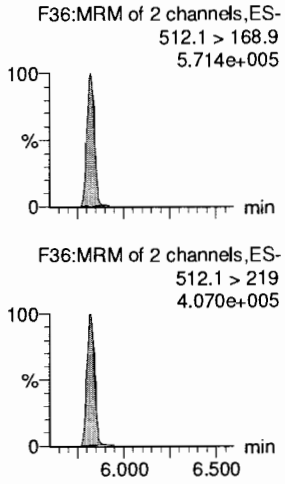

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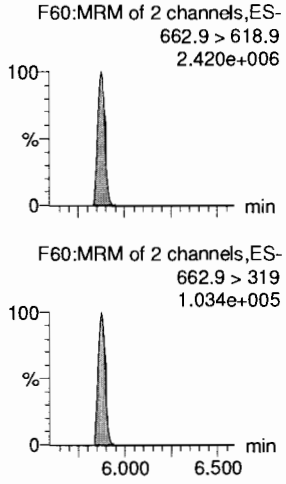
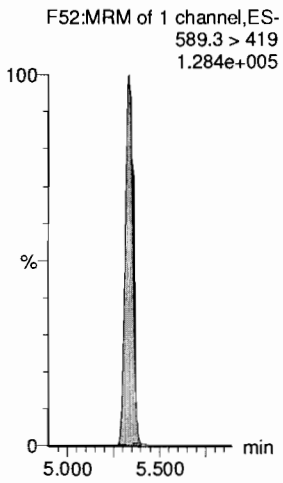
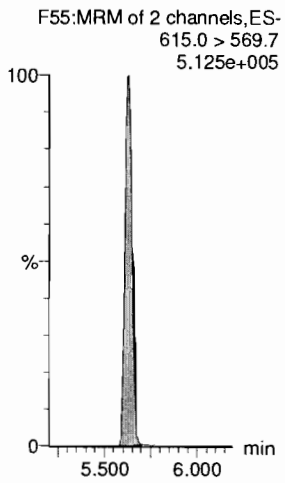


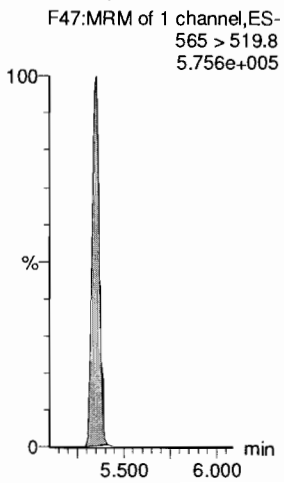
d5-N-EtFOSAA



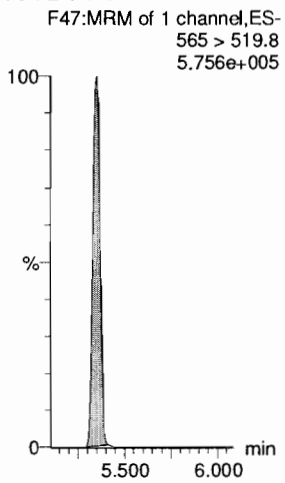
13C2-PFDoA



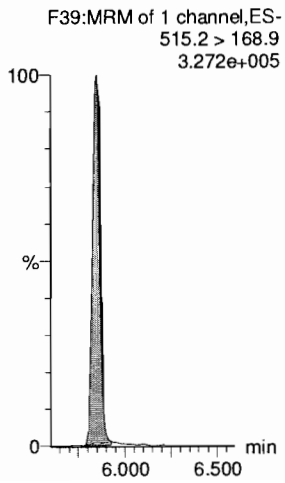
13C2-PFUdA



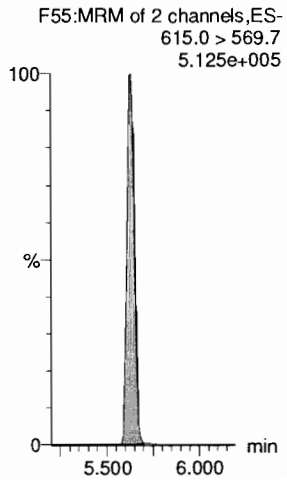
13C2-PFUdA



d3-N-MeFOSA



13C2-PFDoA



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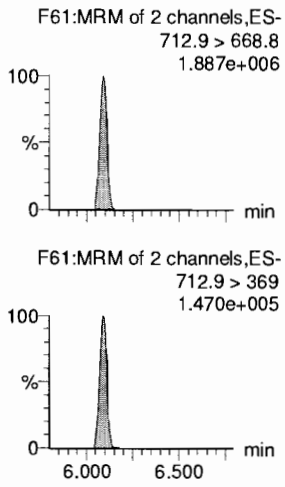
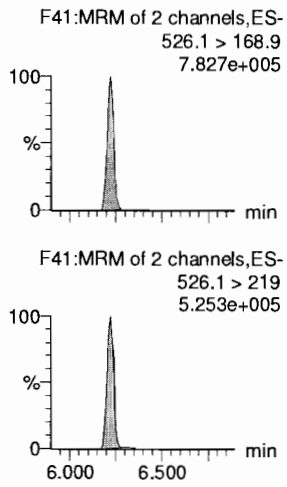
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

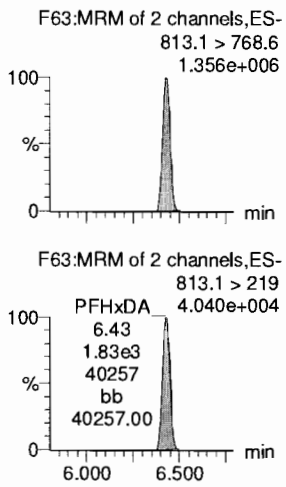
PFTeDA



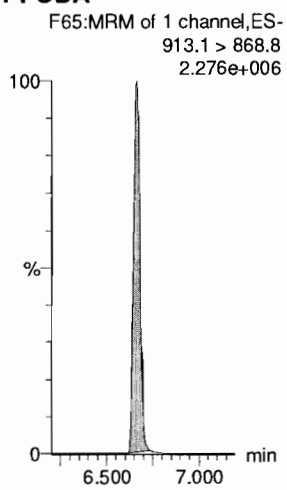
N-EtFOSA



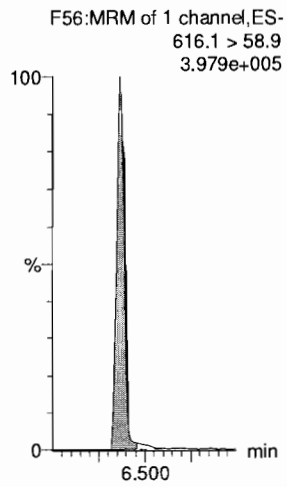
PFHxDA



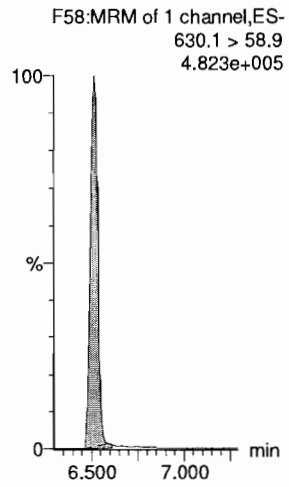
PFODA



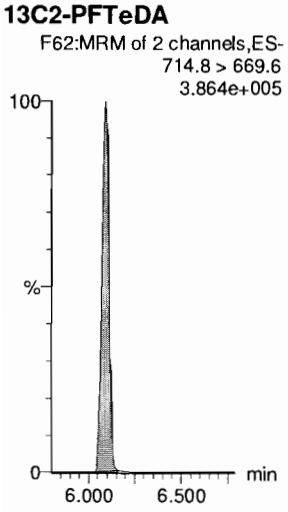
N-MeFOSE



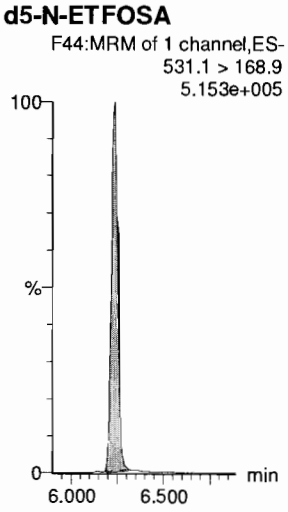
N-EtFOSE



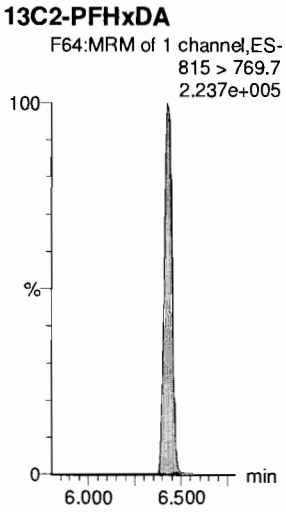
13C2-PFTeDA



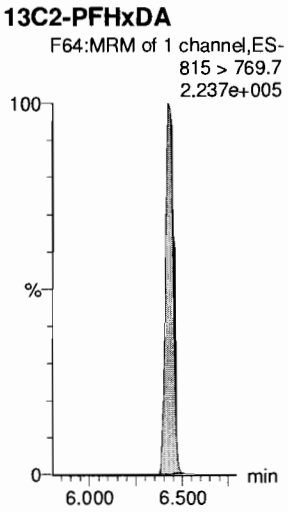
d5-N-ETFOSA



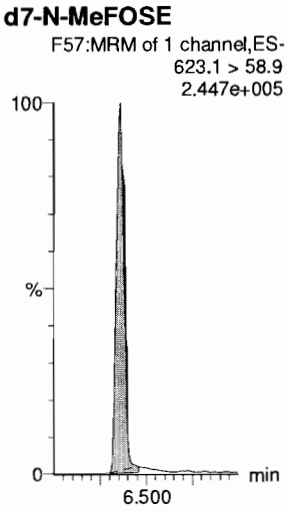
13C2-PFHxDA



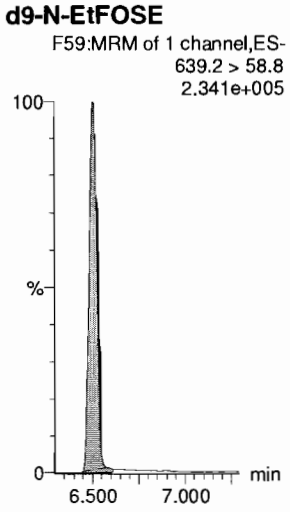
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE



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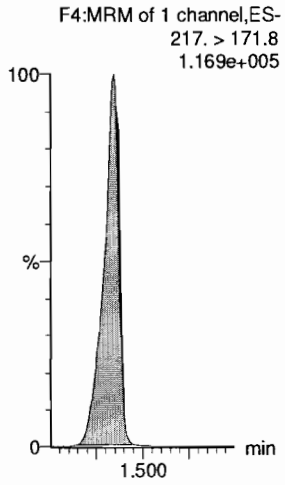
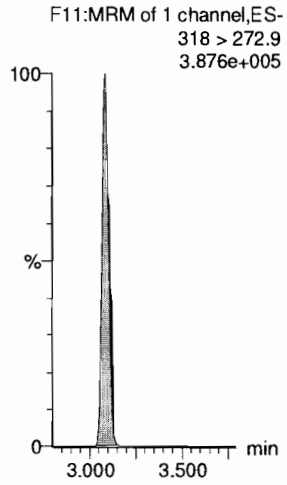
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_8, Date: 04-Jun-2018, Time: 20:14:33, ID: ST180604M2-7 PFC CS4 18E2908, Description: PFC CS4 18E2908

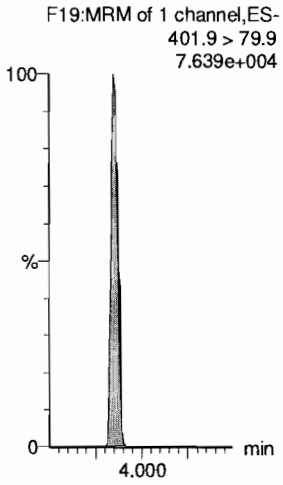
13C4-PFBA



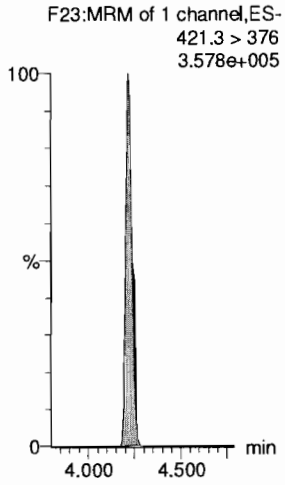
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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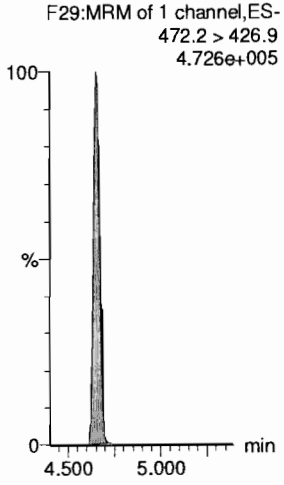

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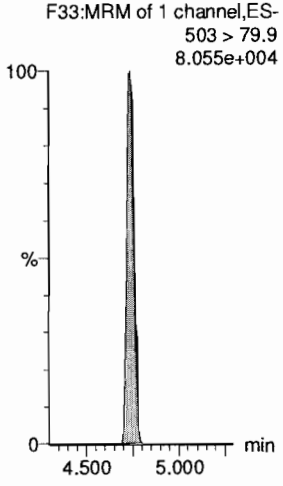

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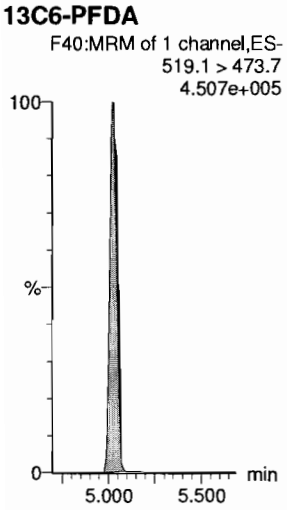

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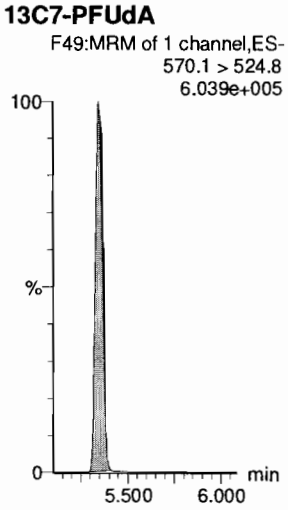

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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

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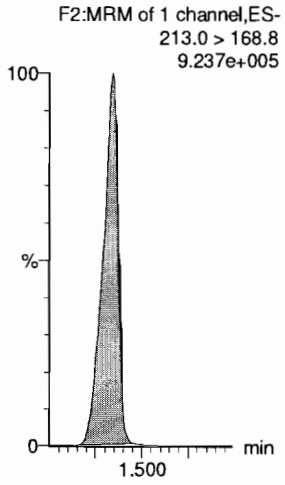

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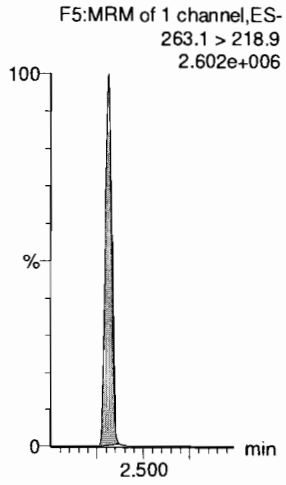

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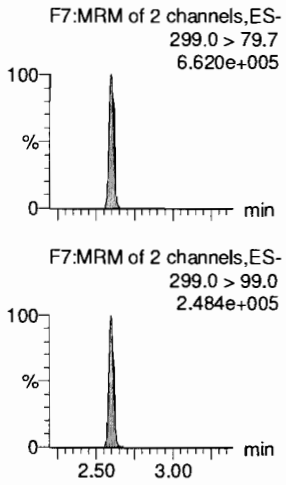

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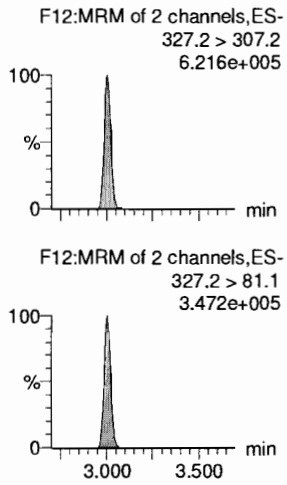

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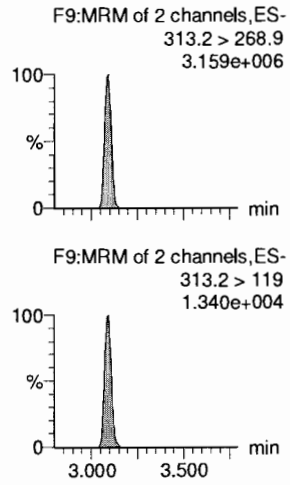

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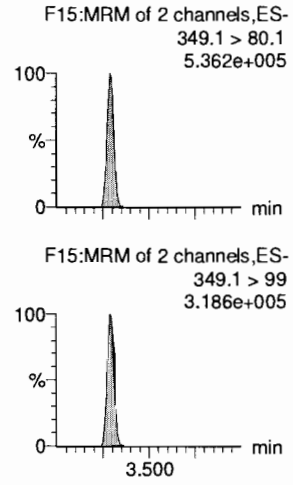

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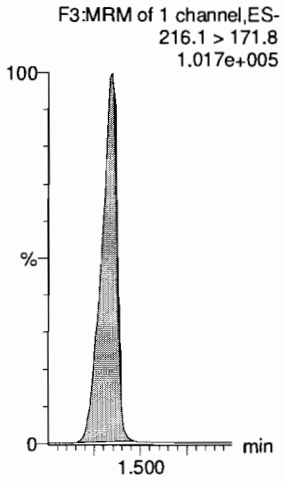

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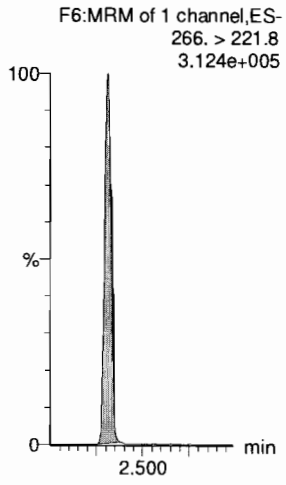

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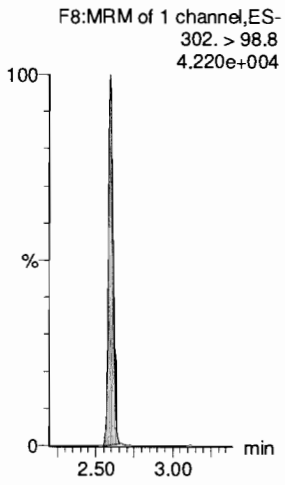

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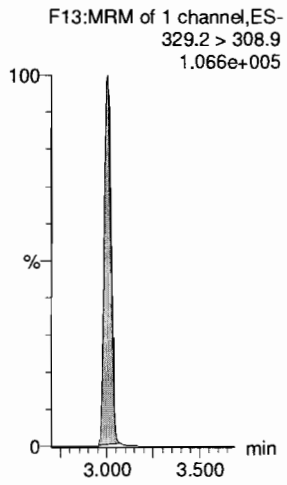

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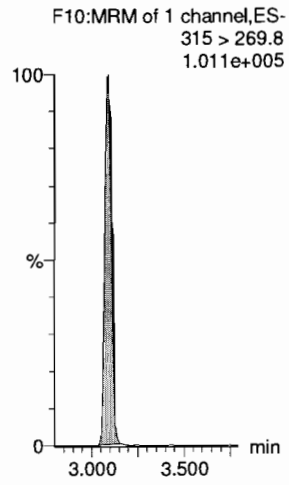

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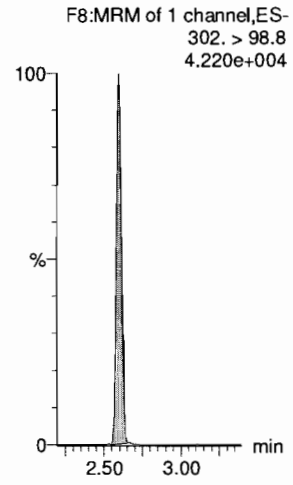

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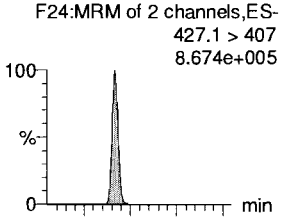
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

6:2 FTS



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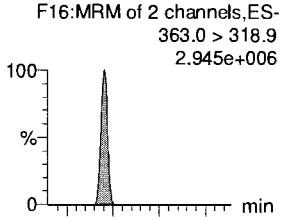

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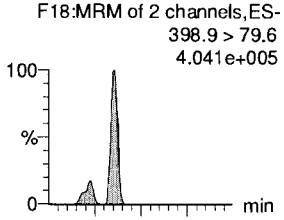
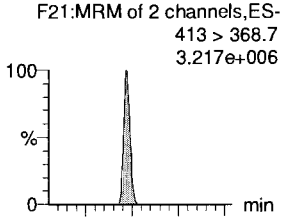


L-PFOA



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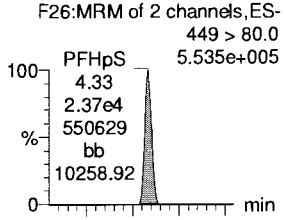

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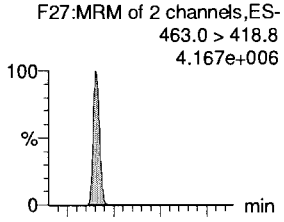

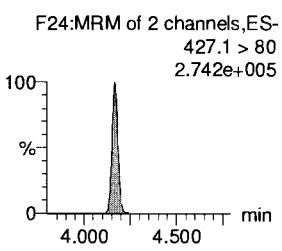

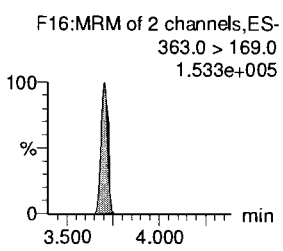

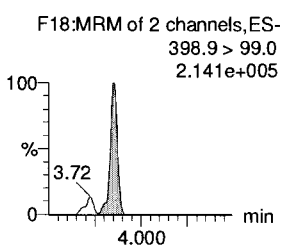

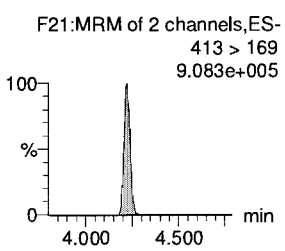

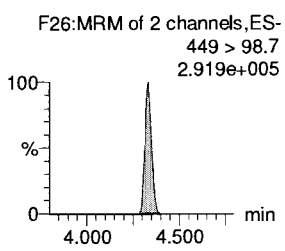

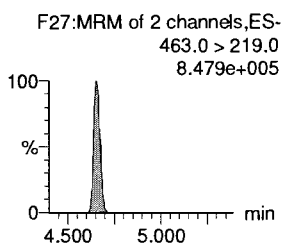

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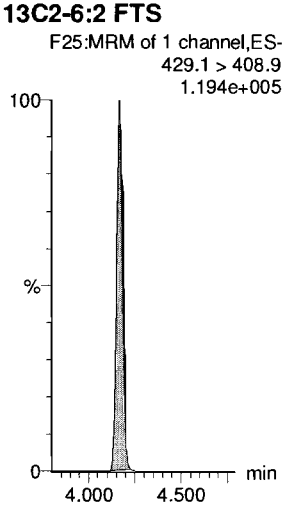

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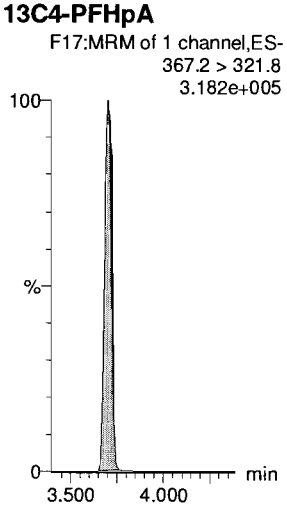
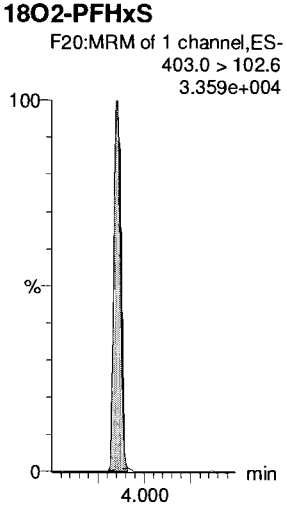


18O2-PFHxS



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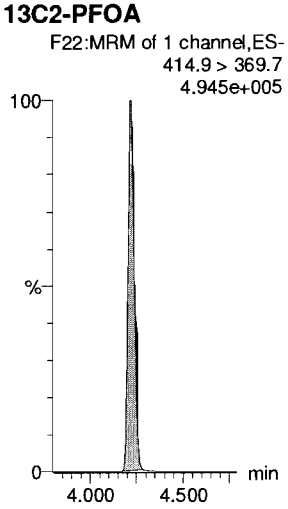

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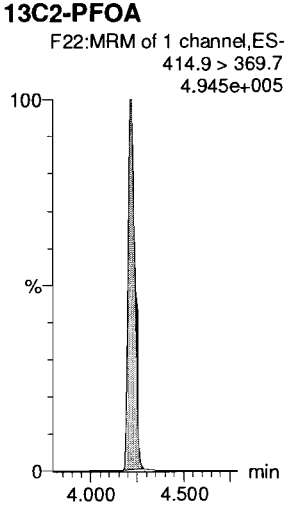

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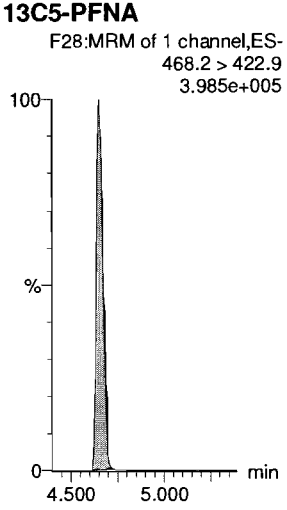

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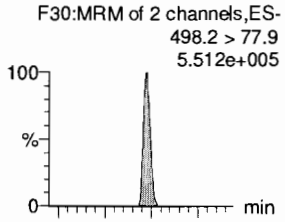
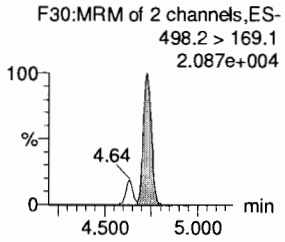
Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

PFOSA





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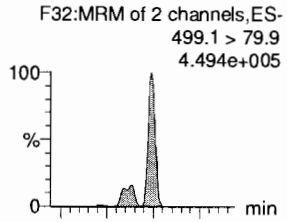

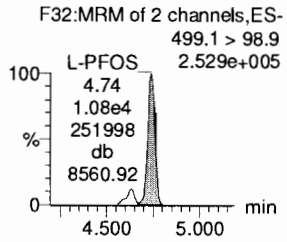

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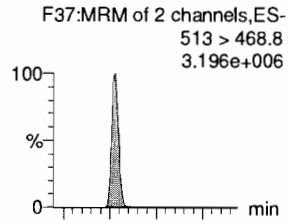
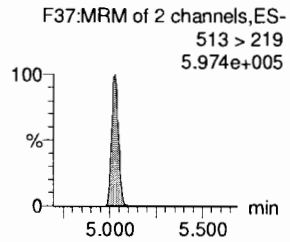
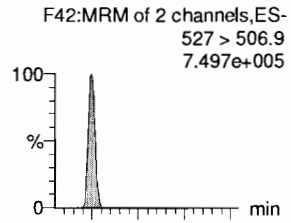
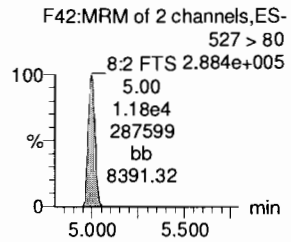




8:2 FTS





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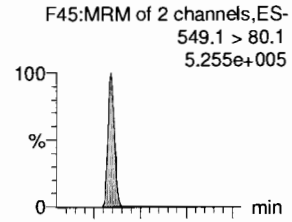

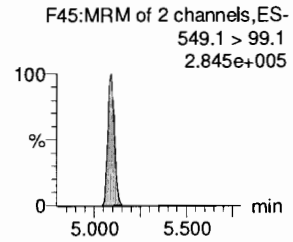

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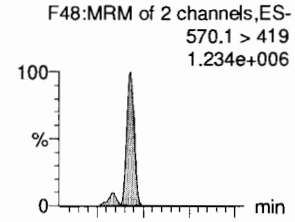

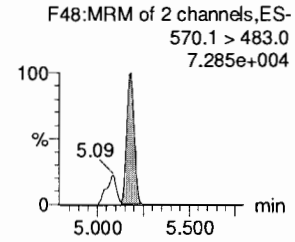

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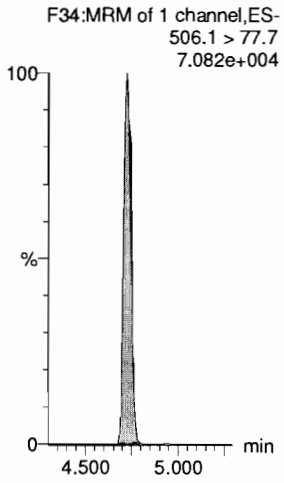

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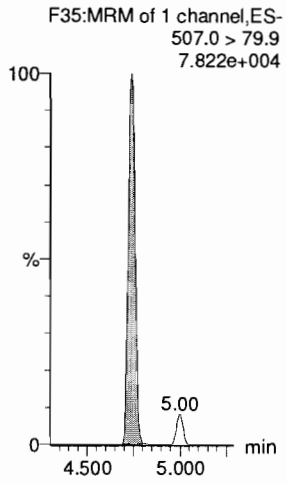

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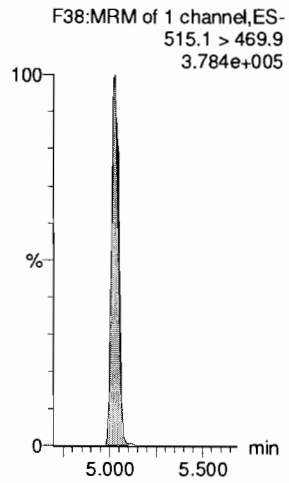
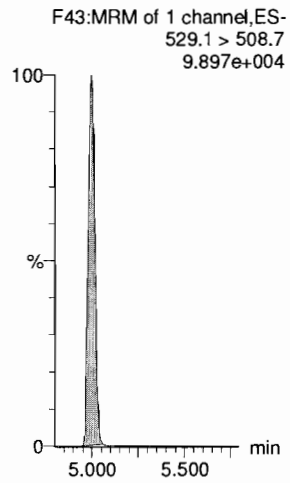


13C2-8:2 FTS



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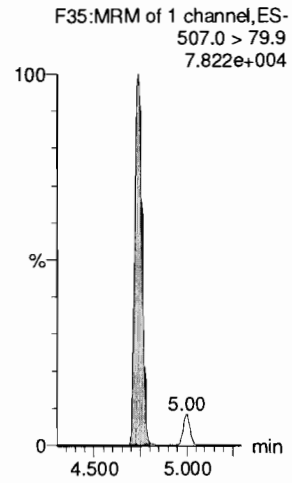
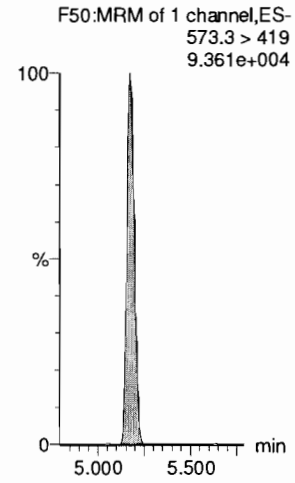


d3-N-MeFOSAA

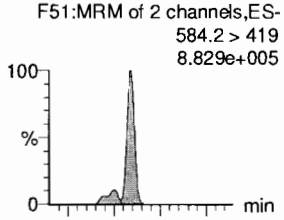


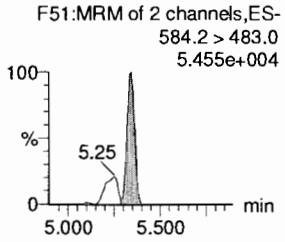
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

L-EtFOSAA





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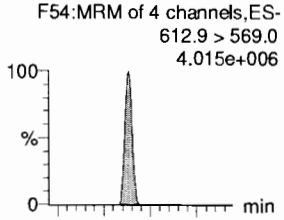

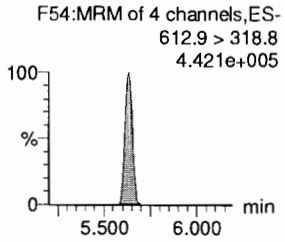

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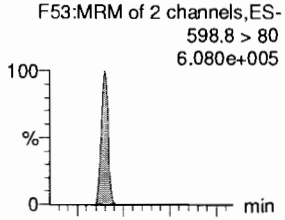

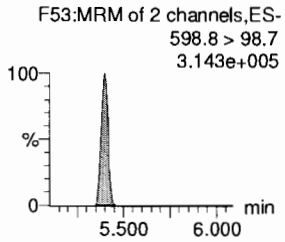

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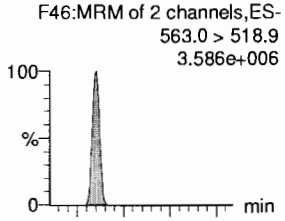

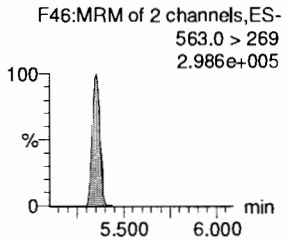

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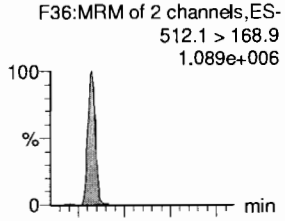

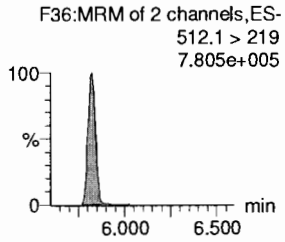

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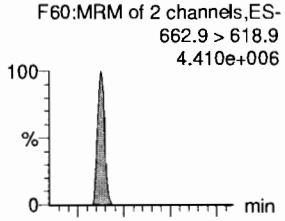
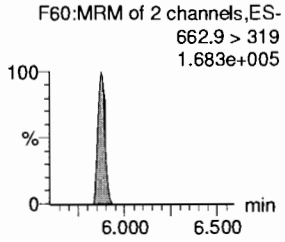
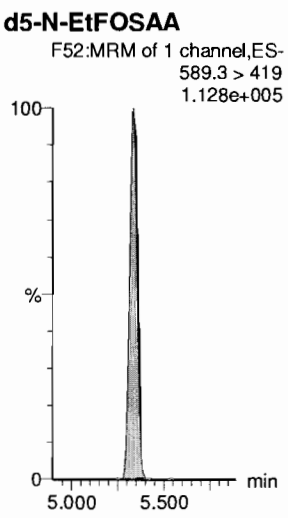




d5-N-EtFOSAA



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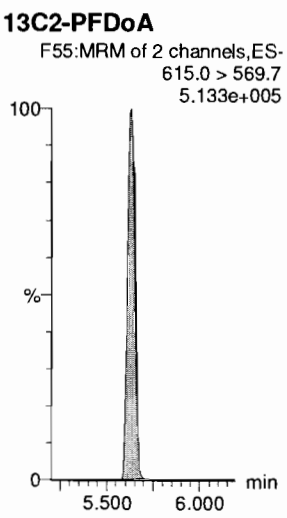

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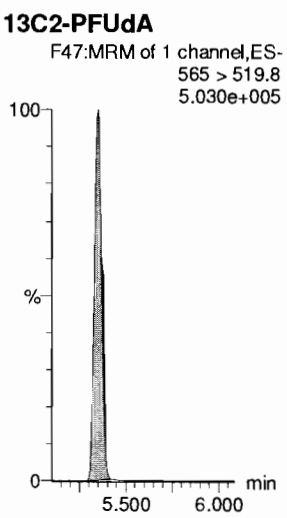

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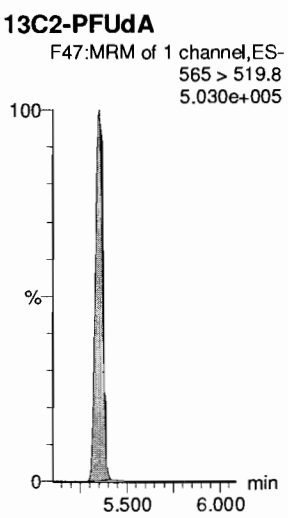

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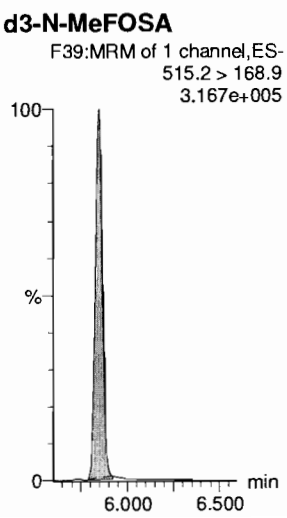

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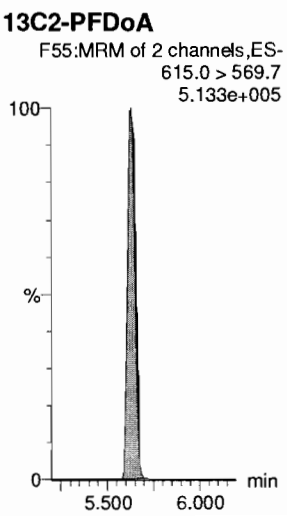

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Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

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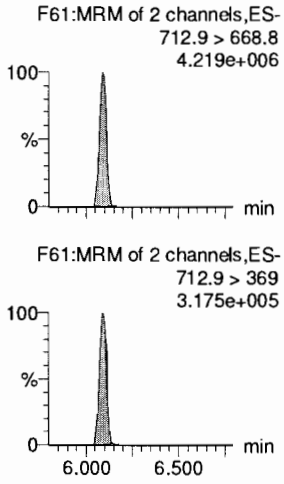

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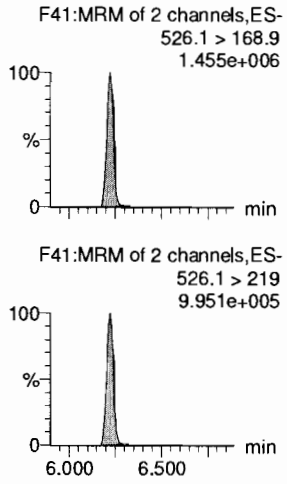
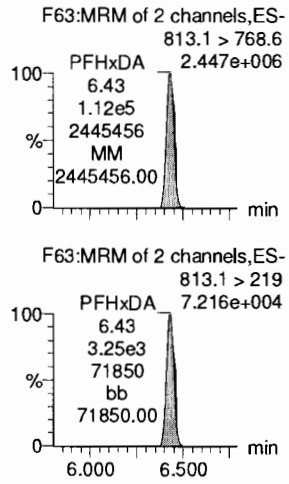


PFHxDA



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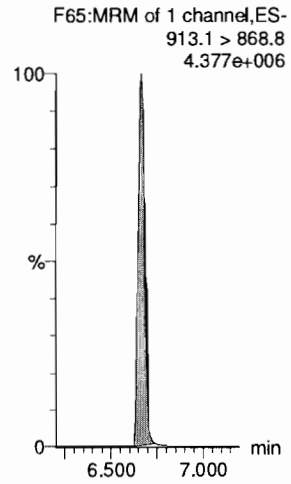

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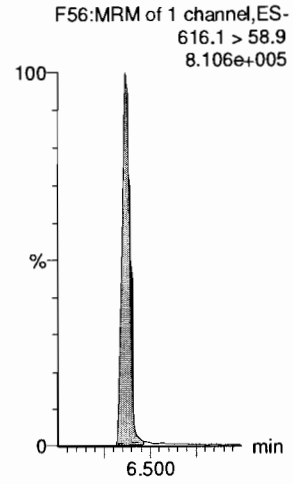

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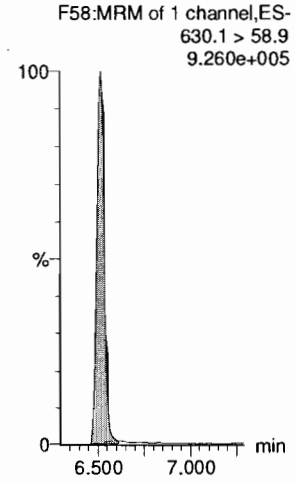

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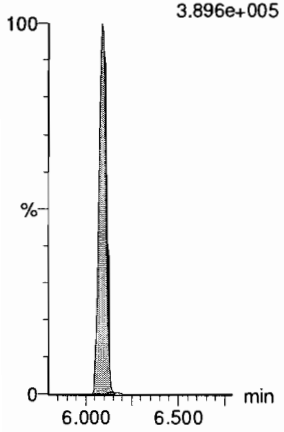

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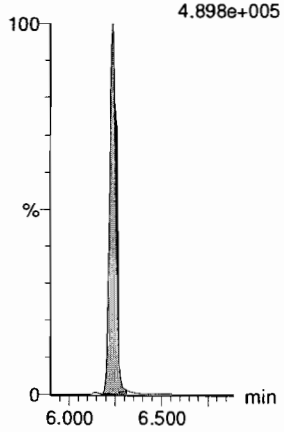

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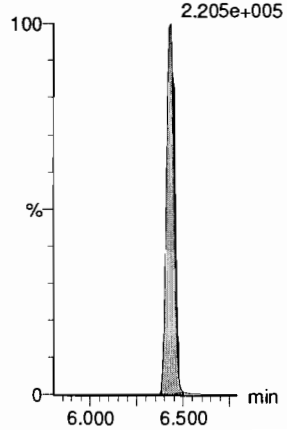

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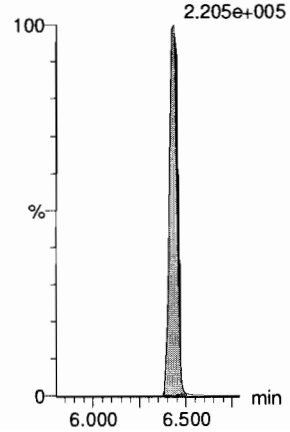

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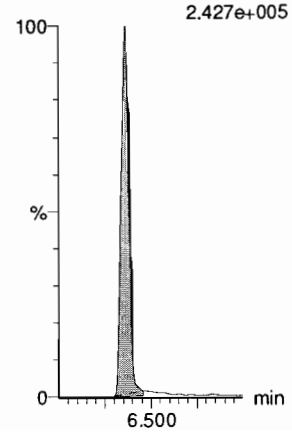
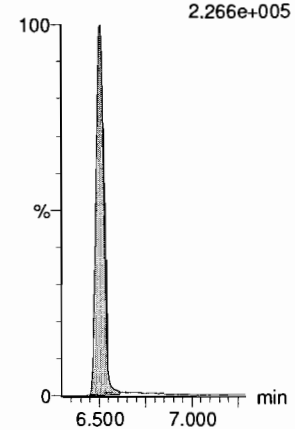


d9-N-EtFOSE



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Name: 180604M2_9, Date: 04-Jun-2018, Time: 20:24:59, ID: ST180604M2-8 PFC CS5 18E2909, Description: PFC CS5 18E2909

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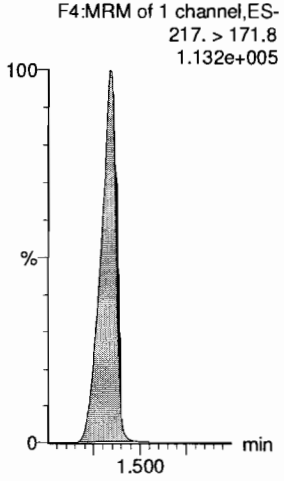
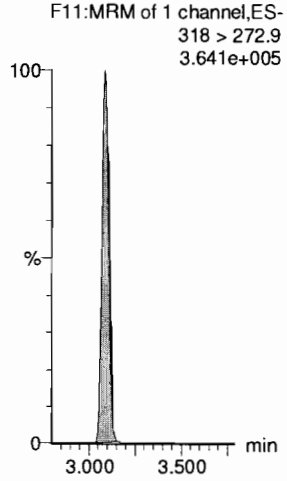


13C5-PFHxA



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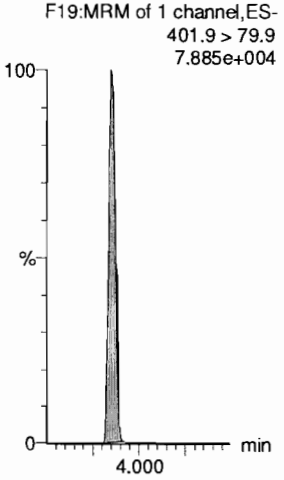
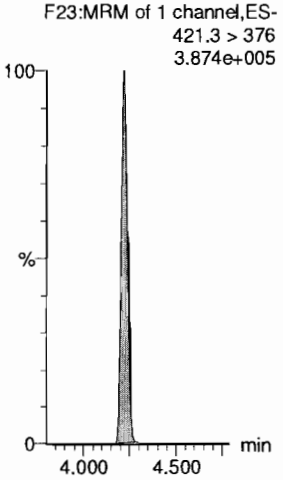


13C8-PFOA



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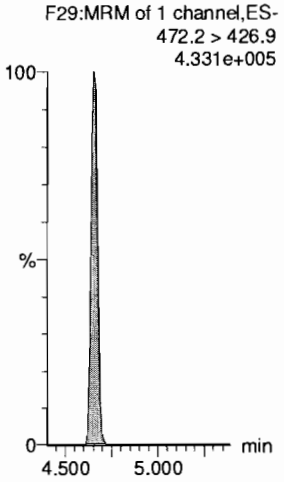
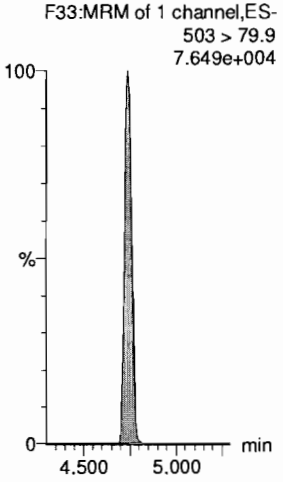


13C4-PFOS



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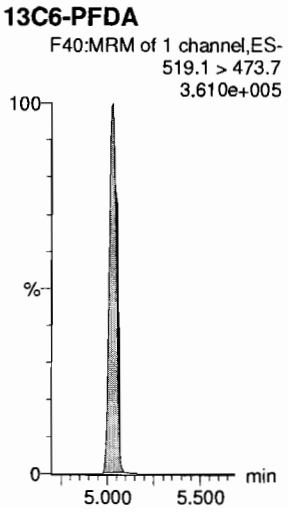
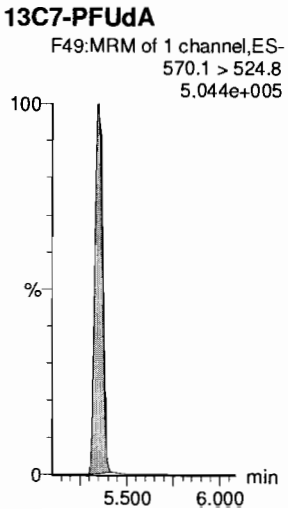


13C7-PFUdA



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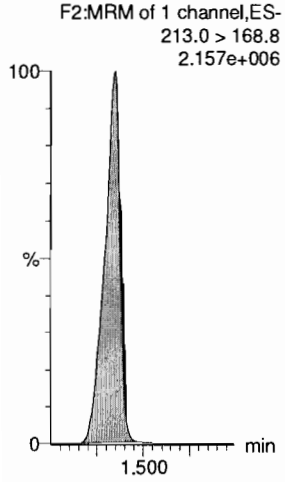
PFBA



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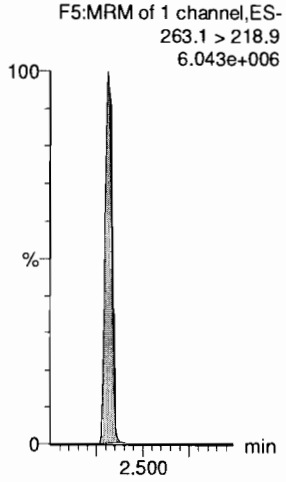

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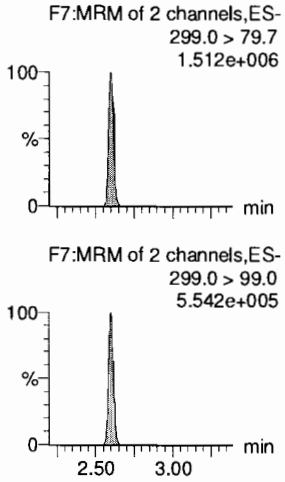
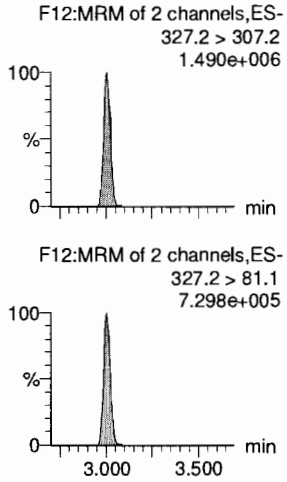
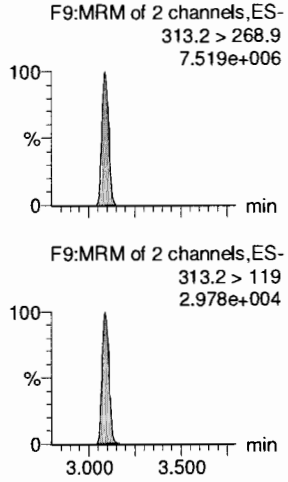


4:2 FTS



PFHxA



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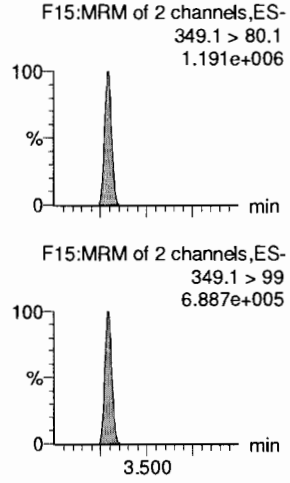

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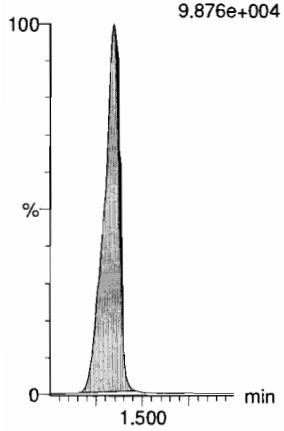

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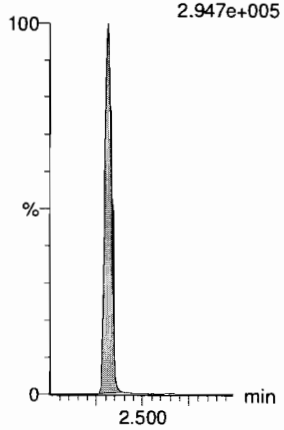

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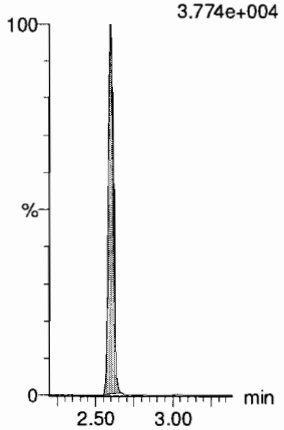
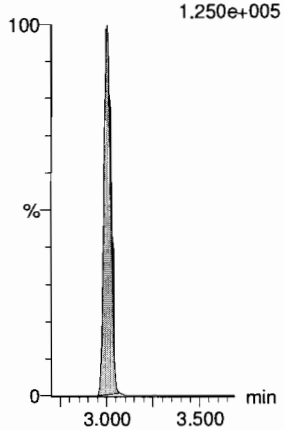


13C2-4:2 FTS



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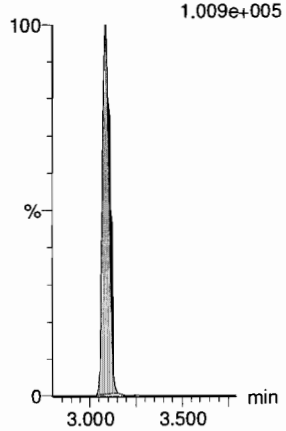

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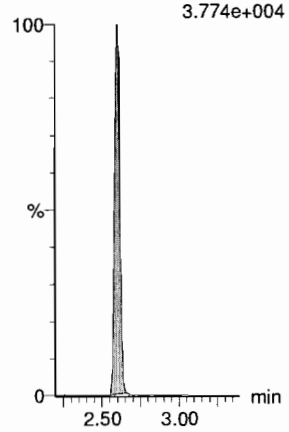

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

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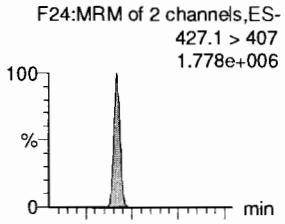
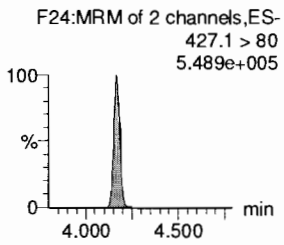
Name: 180604M2_10, Date: 04-Jun-2018, Time: 20:35:29, ID: ST180604M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

6:2 FTS





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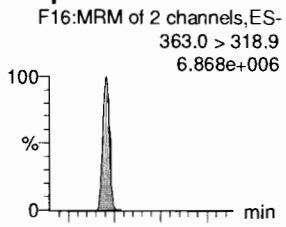

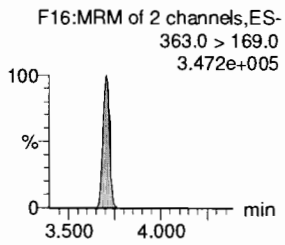

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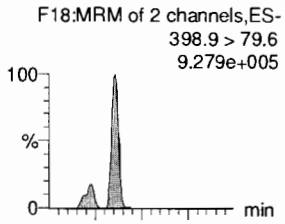

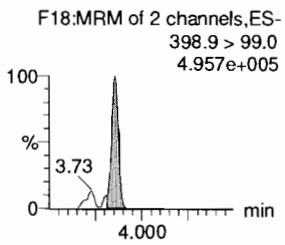

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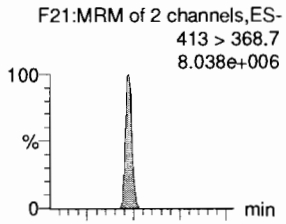

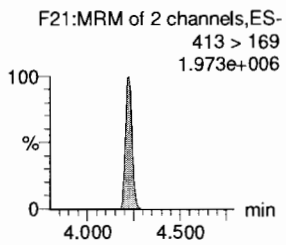

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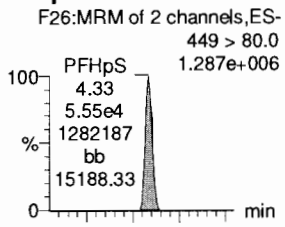

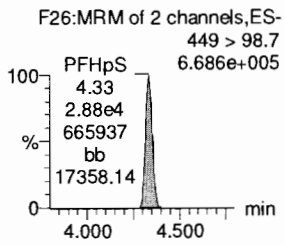

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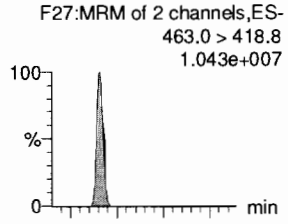
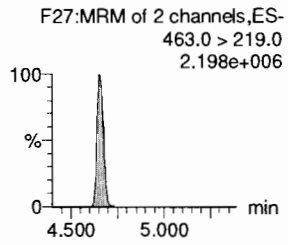
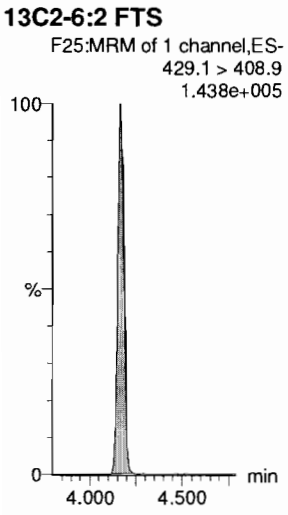
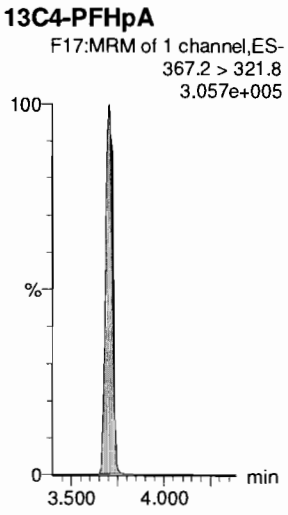




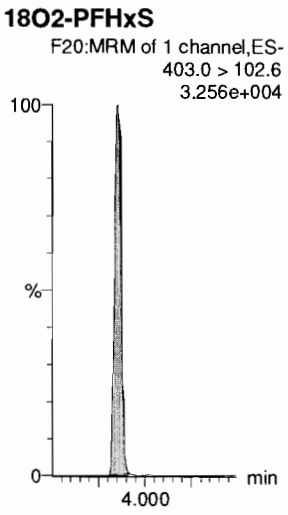
13C2-6:2 FTS



13C4-PFHpA



18O2-PFHxS



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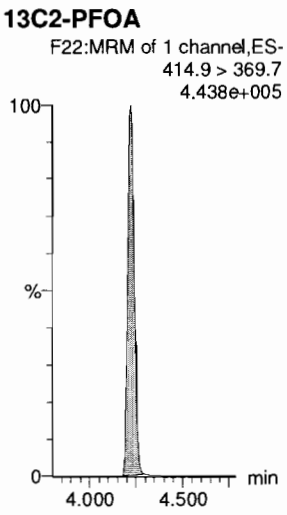

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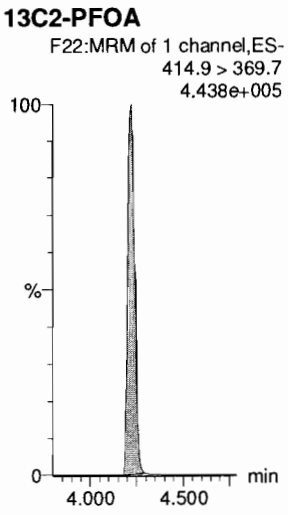

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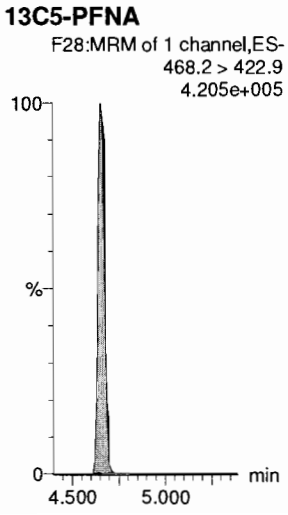

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Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

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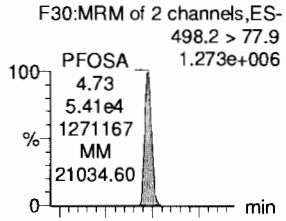

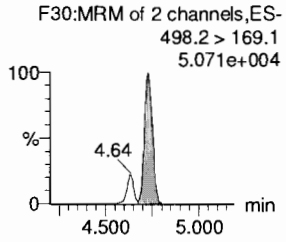

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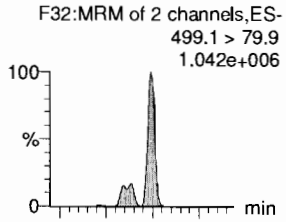

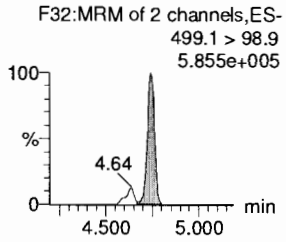

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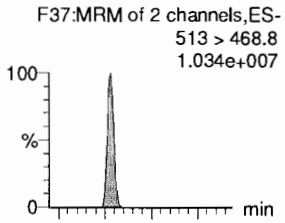

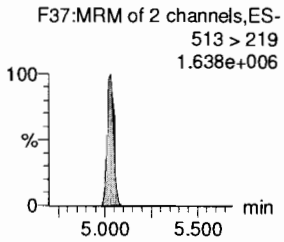

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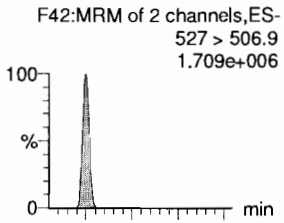

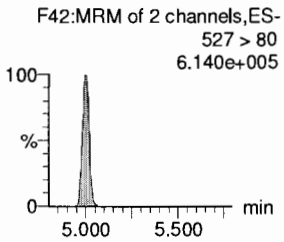

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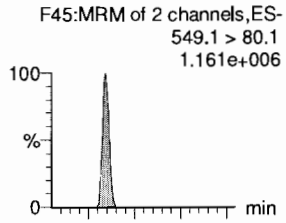

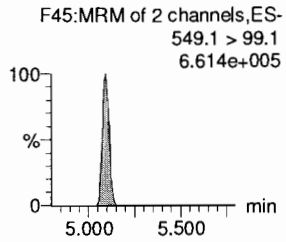

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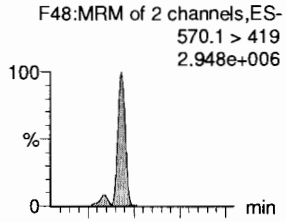

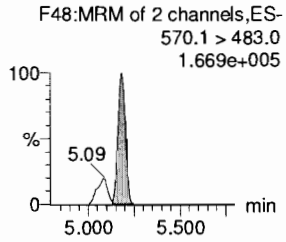

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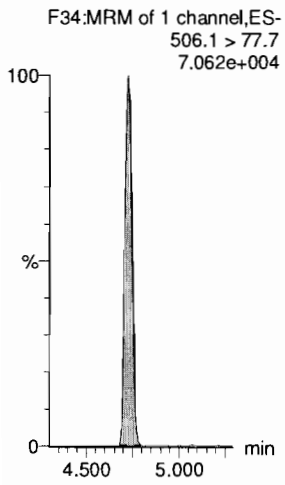

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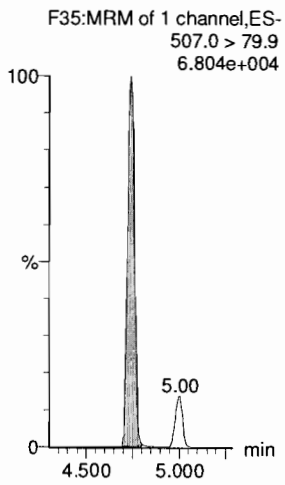

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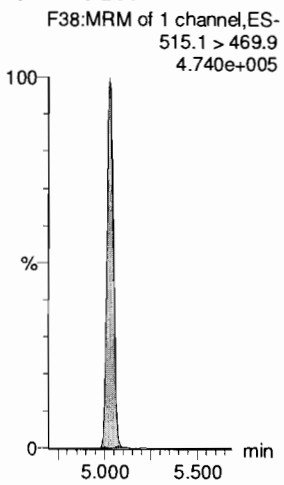
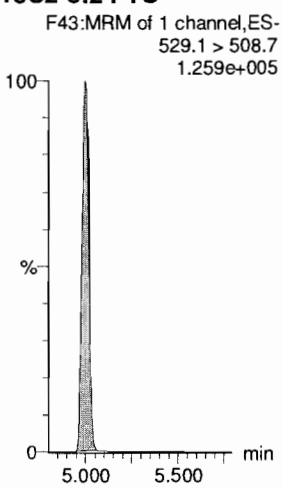


13C2-8:2 FTS



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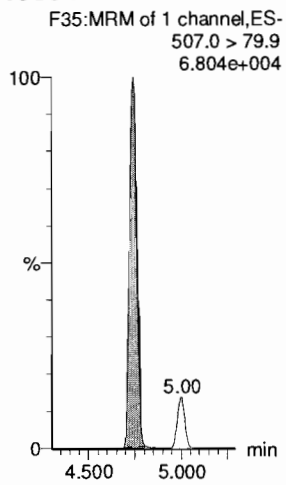

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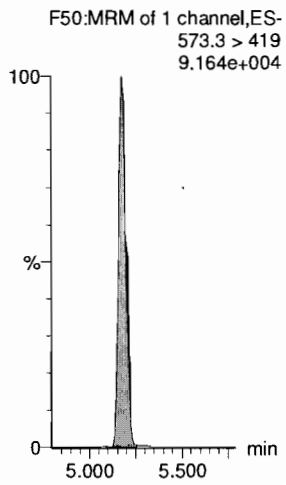

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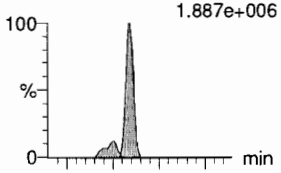
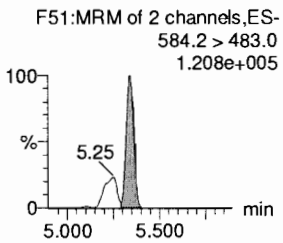
L-EtFOSAA





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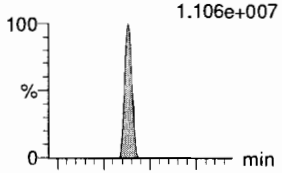

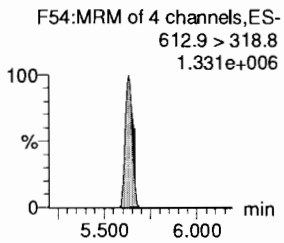

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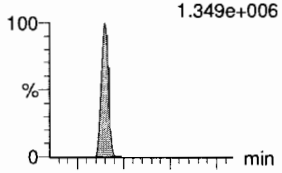

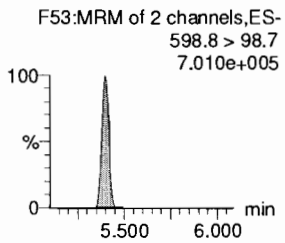

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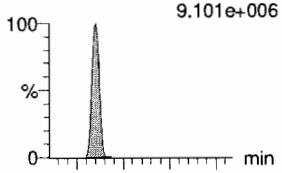

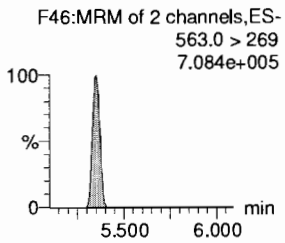

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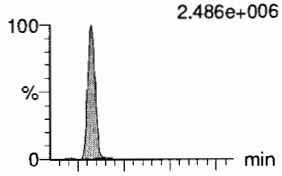

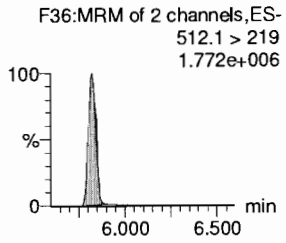

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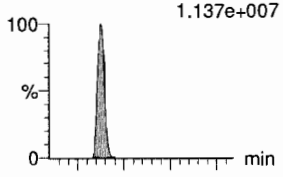

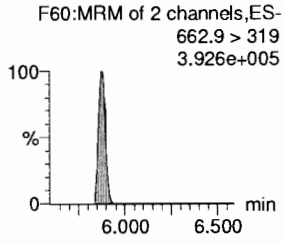

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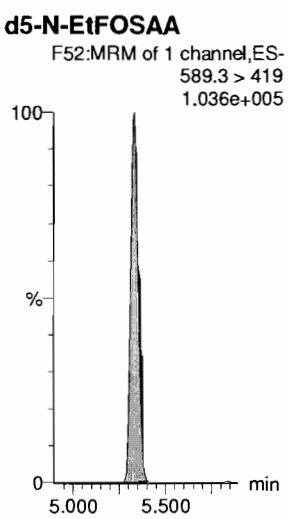

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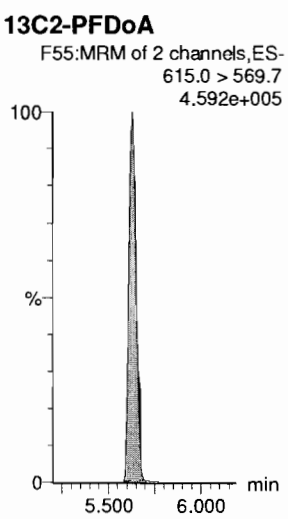

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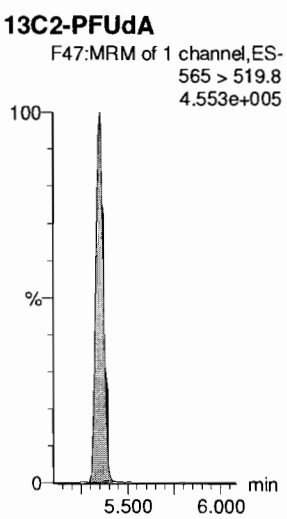

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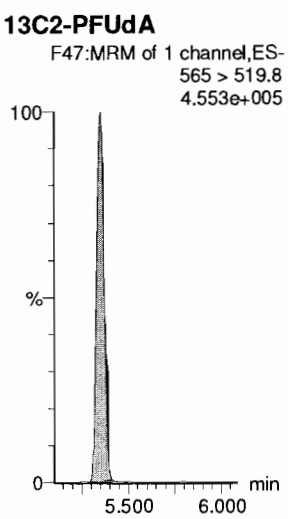

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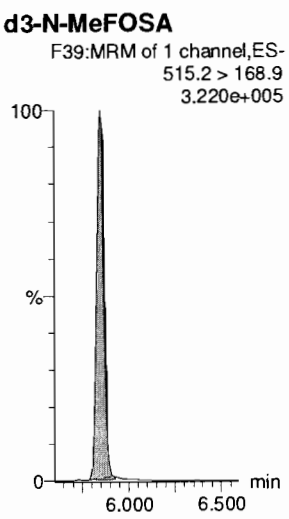

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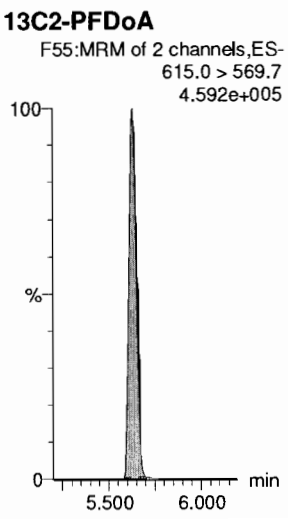

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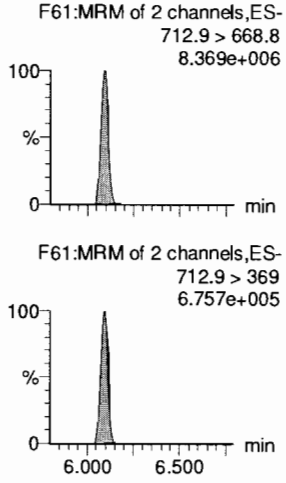
Name: 180604M2_10, Date: 04-Jun-2018, Time: 20:35:29, ID: ST180604M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

PFTeDA



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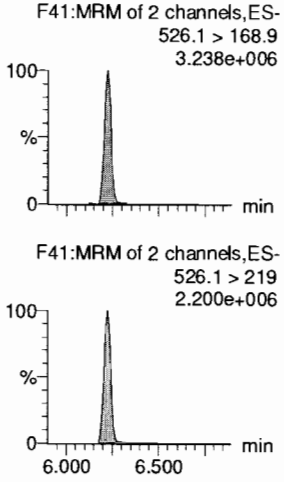

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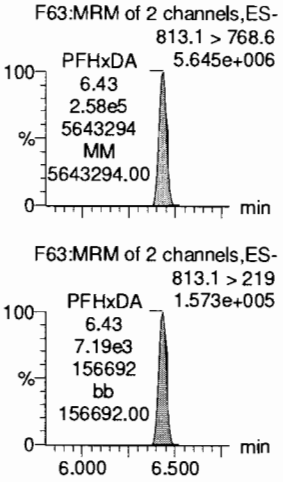

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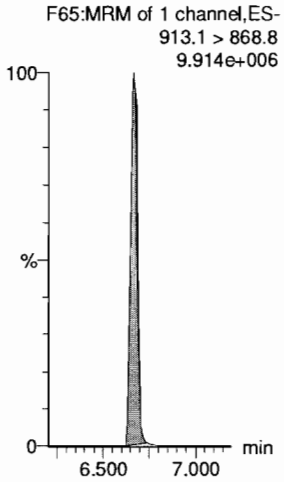
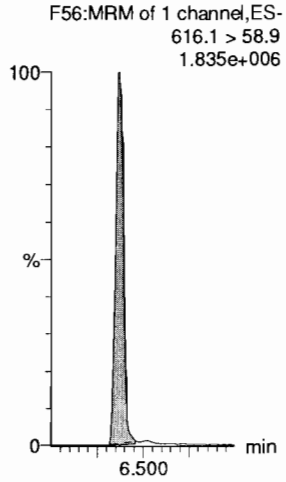


N-MeFOSE



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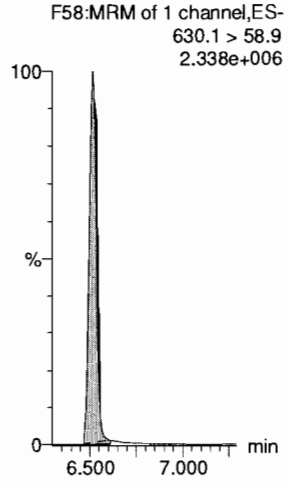
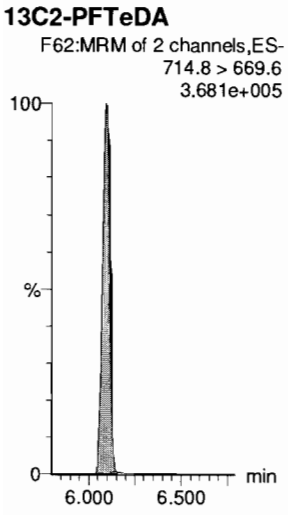
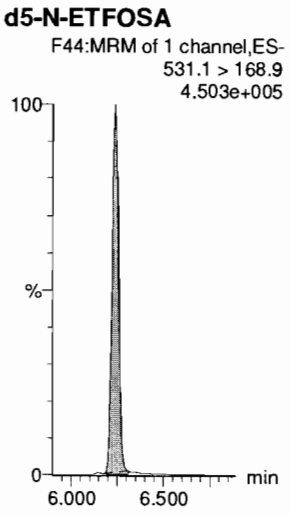


13C2-PFTeDA



d5-N-ETFOSA



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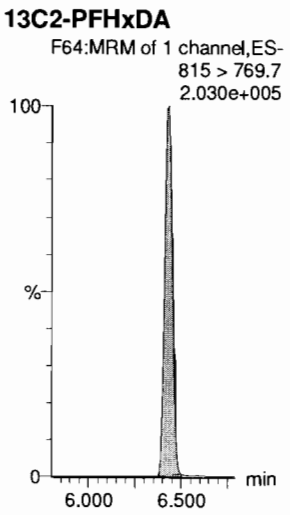

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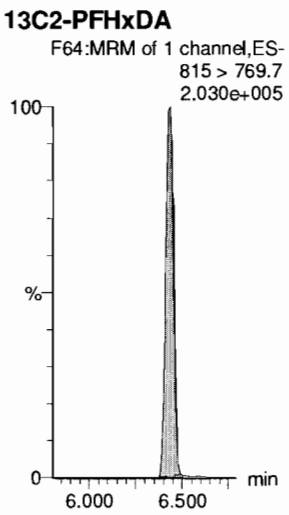

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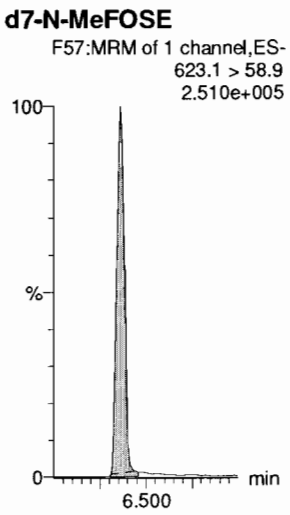
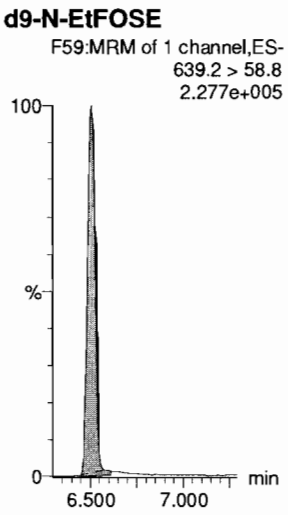


d9-N-EtFOSE



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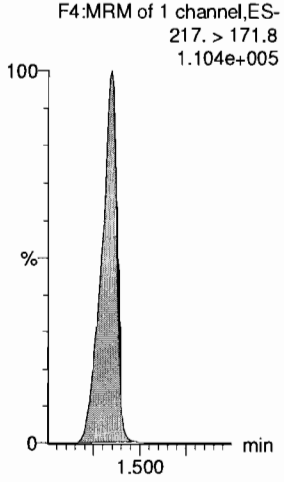
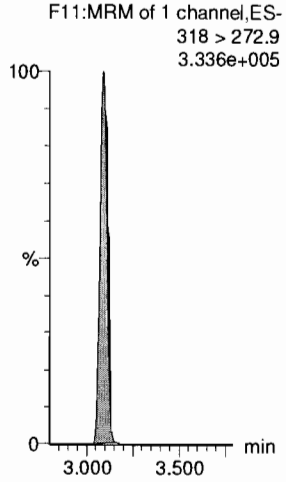
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_10, Date: 04-Jun-2018, Time: 20:35:29, ID: ST180604M2-9 PFC CS6 18E2910, Description: PFC CS6 18E2910

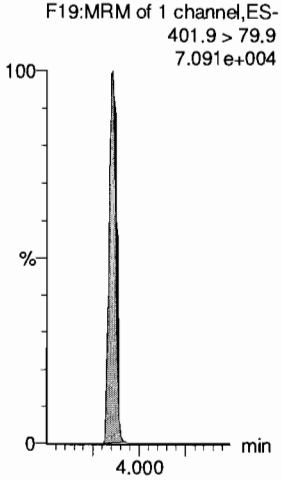
13C4-PFBA



13C5-PFHxA



13C3-PFHxS



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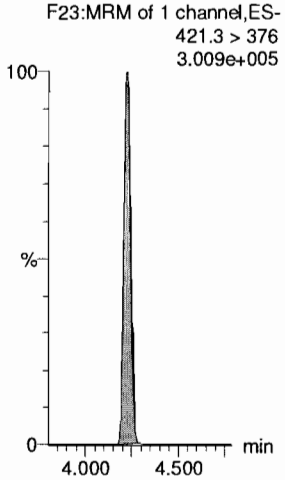

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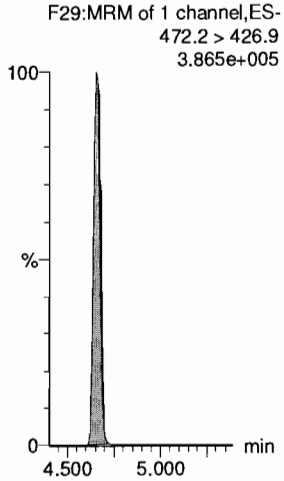
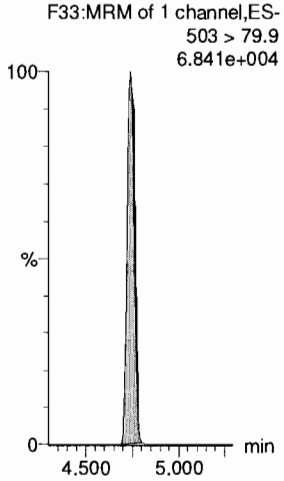


13C4-PFOS



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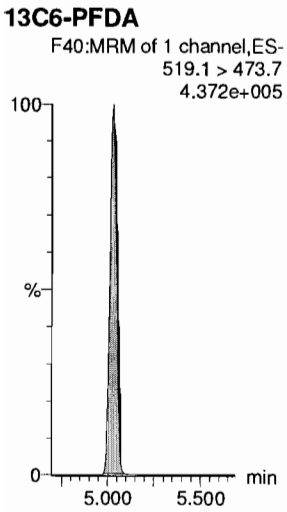

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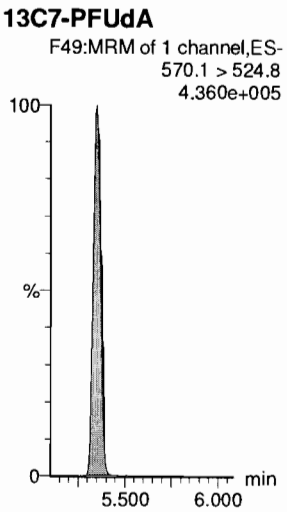

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Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
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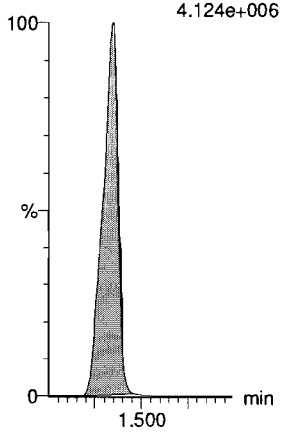
Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

PFBA



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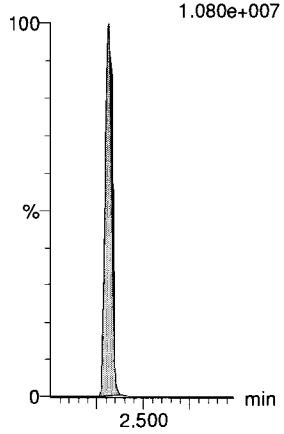

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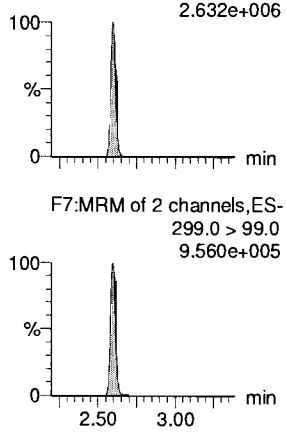
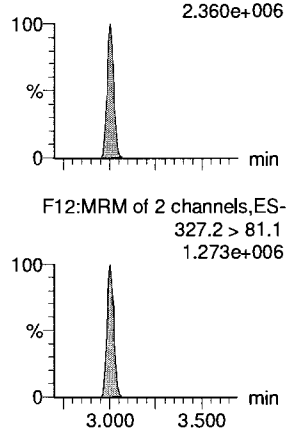


4:2 FTS



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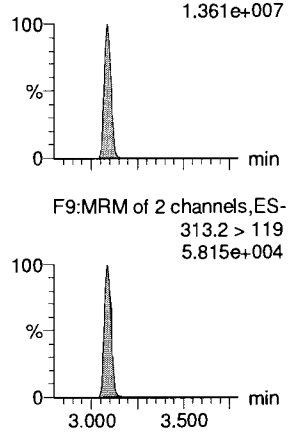
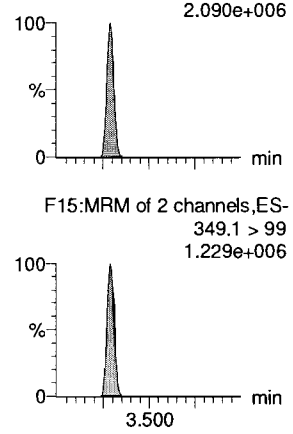
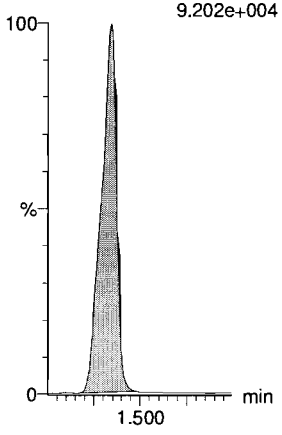


PFPeS



13C3-PFBA



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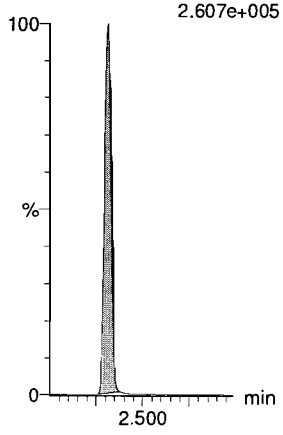

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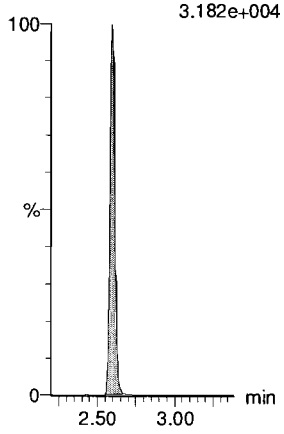
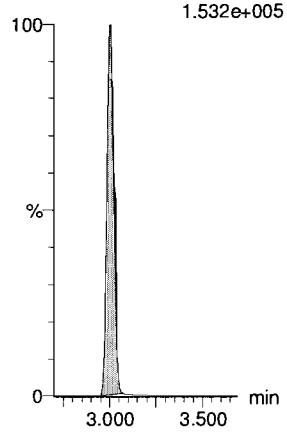


13C2-4:2 FTS



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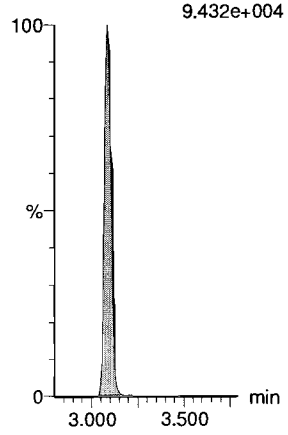

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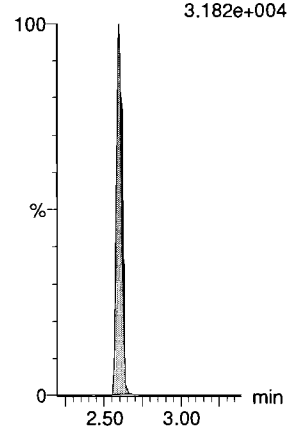

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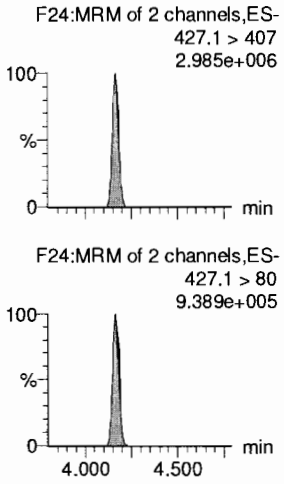
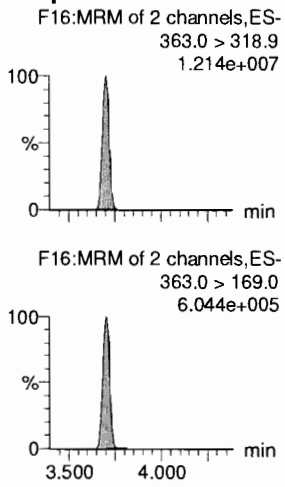
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

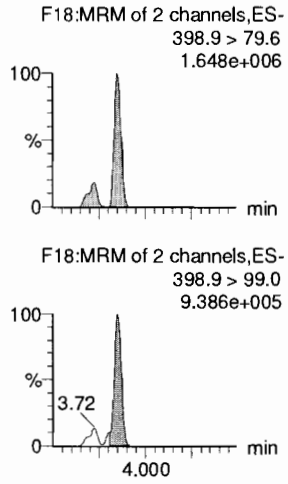
6:2 FTS



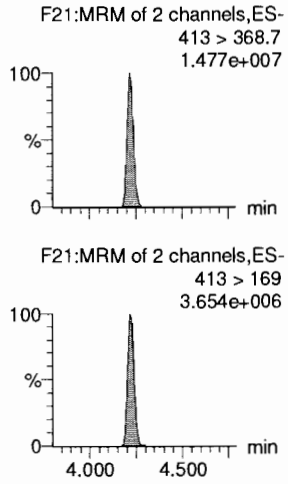
PFHpA



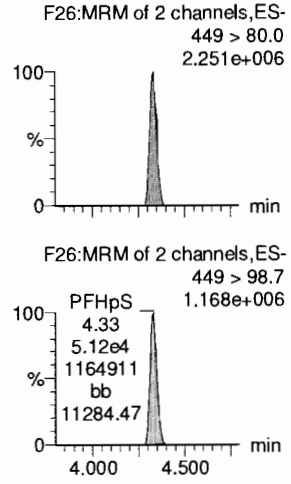
L-PFHxS



L-PFOA



PFHpS



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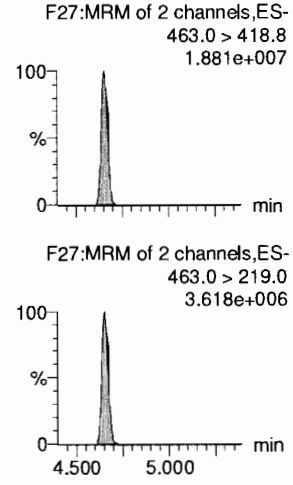

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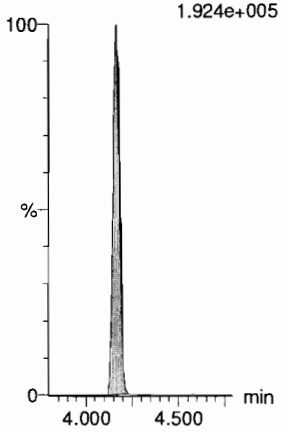
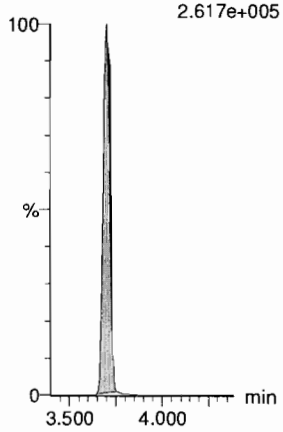
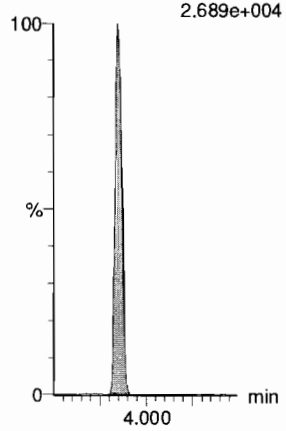


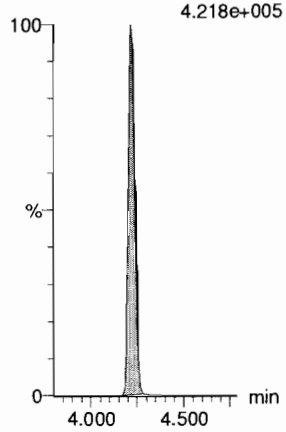
13C4-PFHpA



18O2-PFHxS



13C2-PFOA



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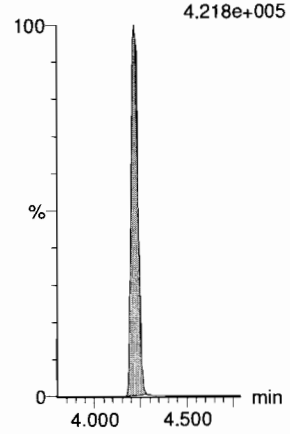
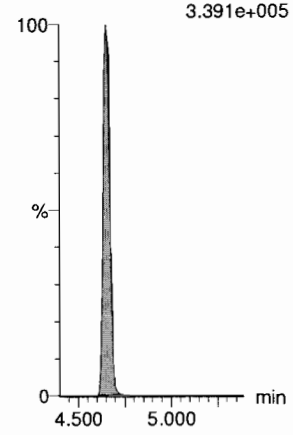


13C5-PFNA



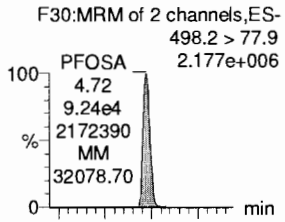
Vista Analytical Laboratory

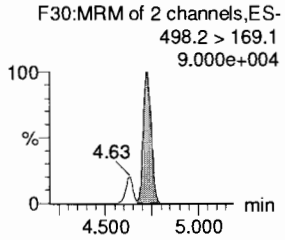
Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

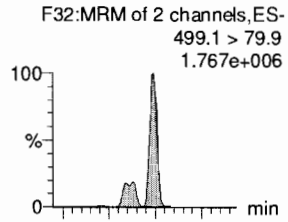
Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

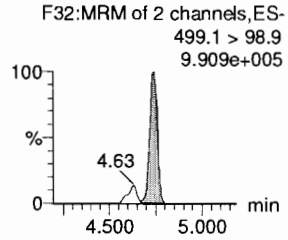
PFOSA



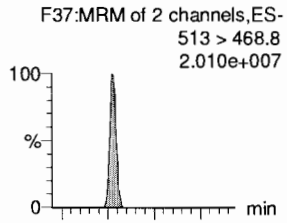


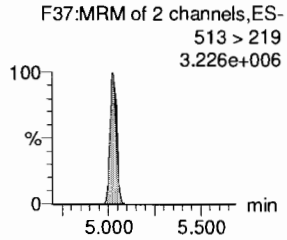
L-PFOS



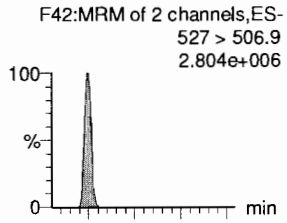


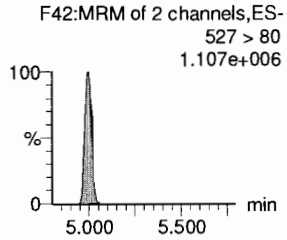
PFDA



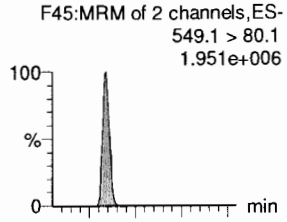


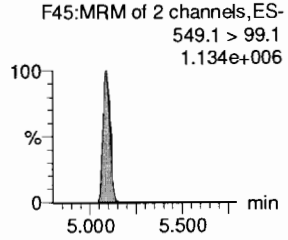
8:2 FTS



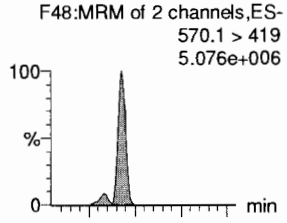


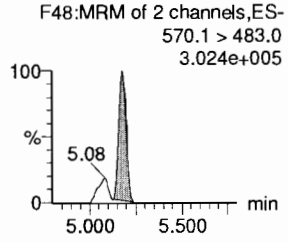
PFNS



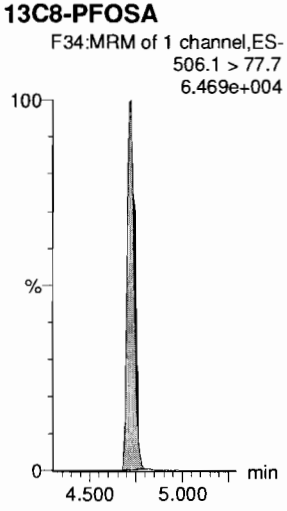


L-MeFOSAA

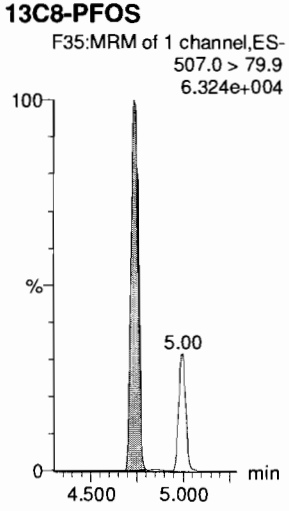




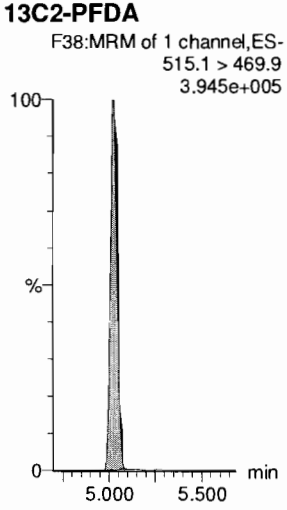
13C8-PFOSA



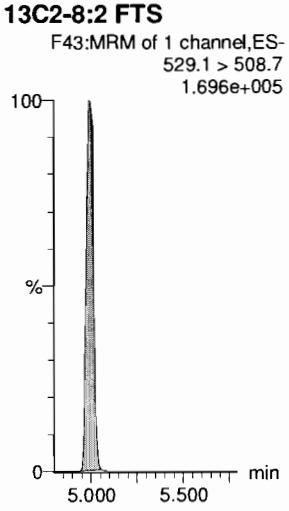
13C8-PFOS



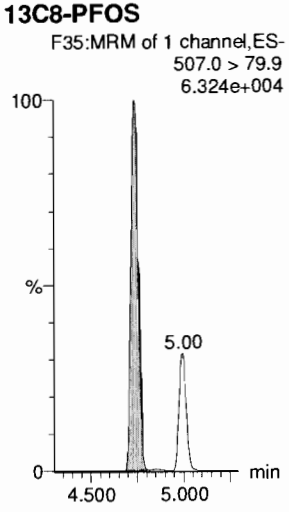
13C2-PFDA



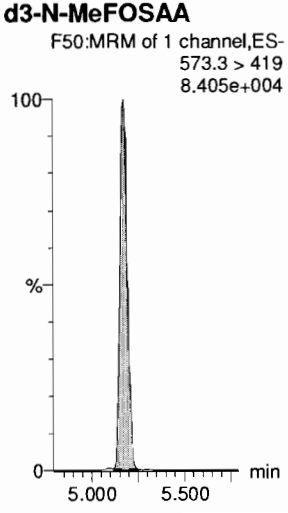
13C2-8:2 FTS



13C8-PFOS



d3-N-MeFOSAA



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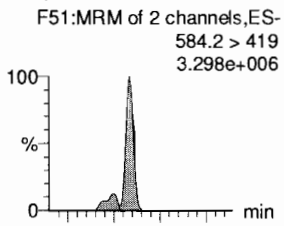
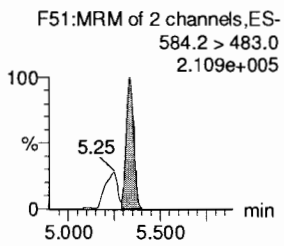
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

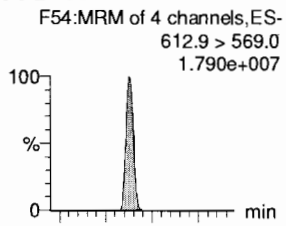
Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

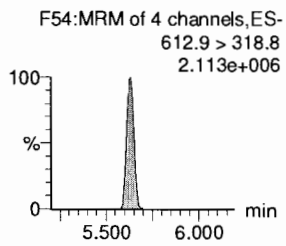
L-EtFOSAA





PFDoA





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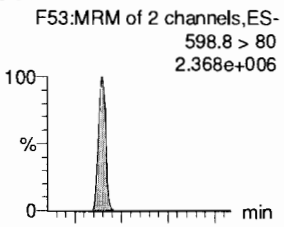
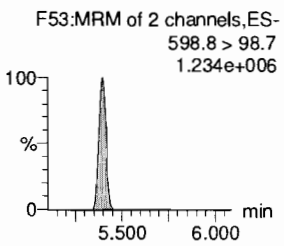
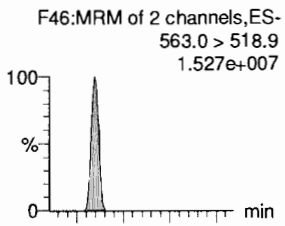
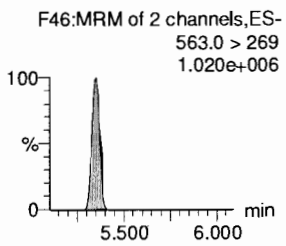


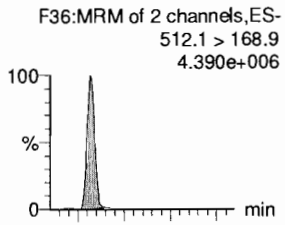


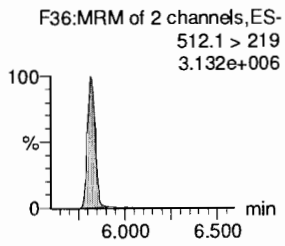
PFUdA



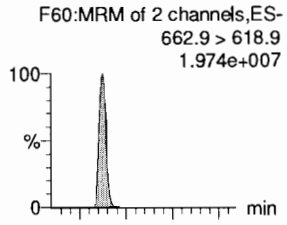


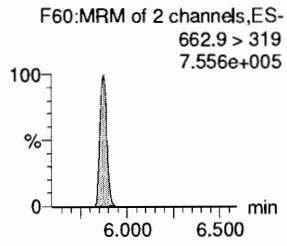
N-MeFOSA



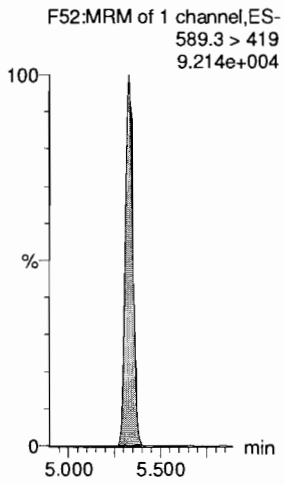


PFTrDA

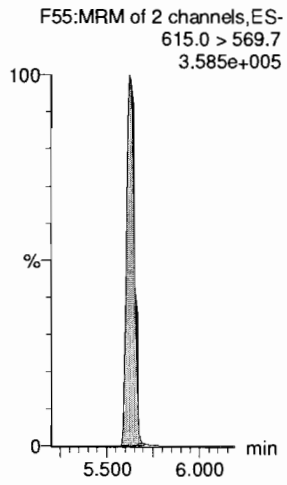




d5-N-EtFOSAA



13C2-PFDoA



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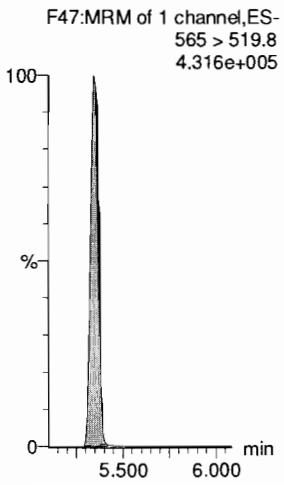
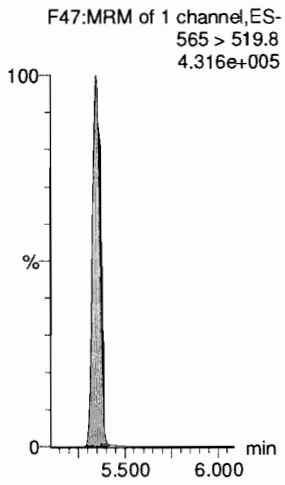


13C2-PFUdA



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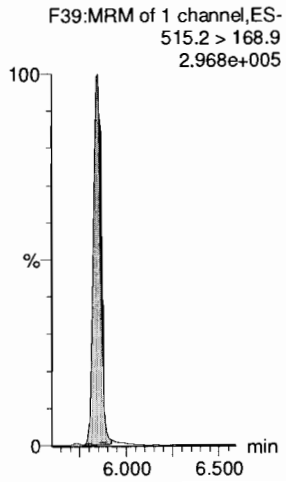

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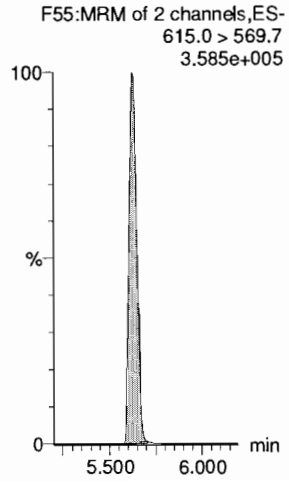

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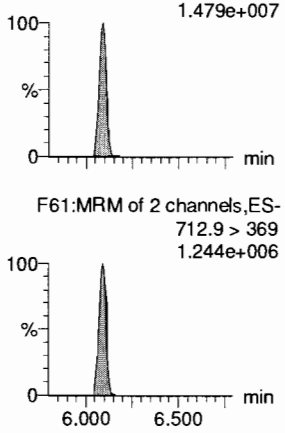
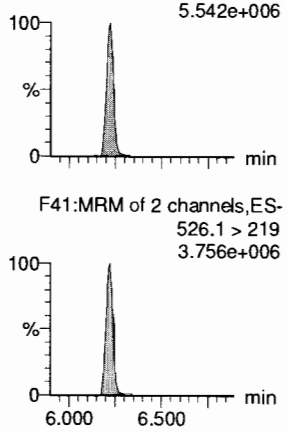
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

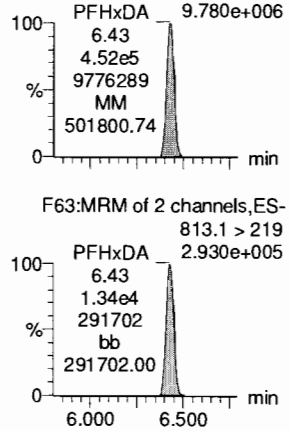
PFTeDA



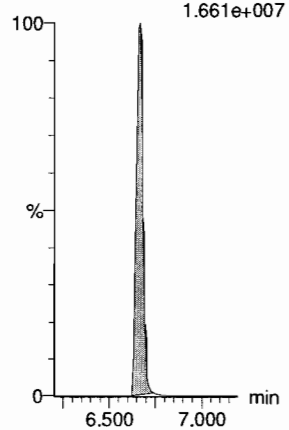
N-EtFOSA



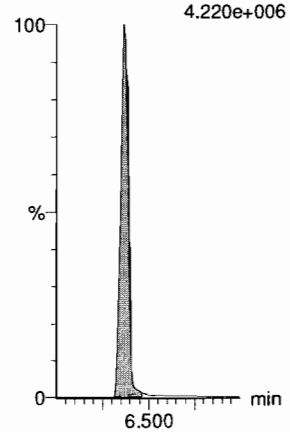
PFHxDA



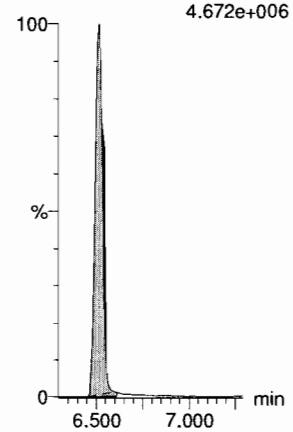
PFODA



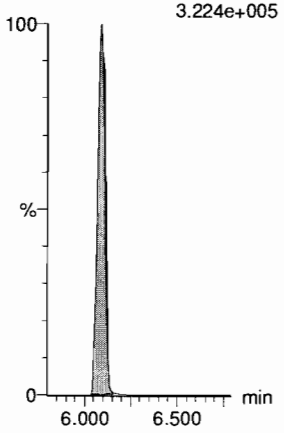
N-MeFOSE



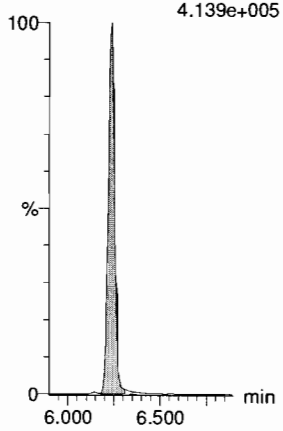
N-EtFOSE



13C2-PFTeDA



d5-N-ETFOSA



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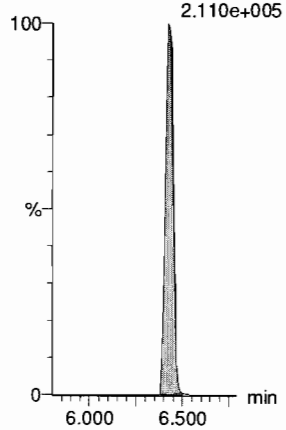
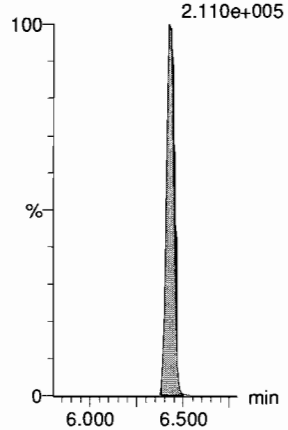
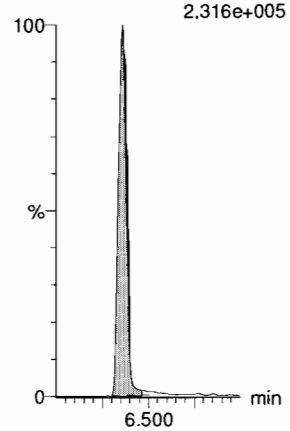


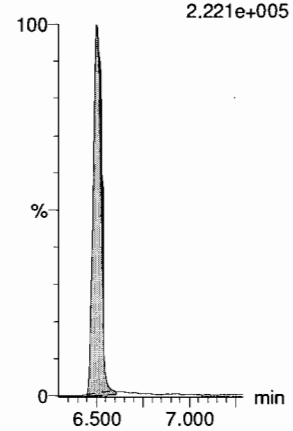
13C2-PFHxDA



d7-N-MeFOSE



d9-N-EtFOSE

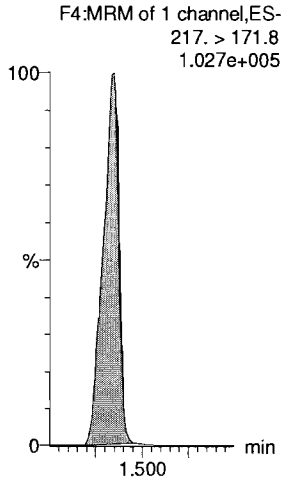


Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-CRV.qld

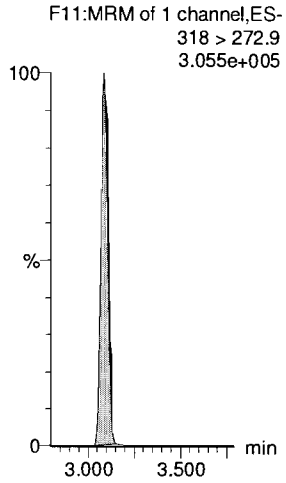
Last Altered: Tuesday, June 05, 2018 10:50:38 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 10:51:02 Pacific Daylight Time

Name: 180604M2_11, Date: 04-Jun-2018, Time: 20:45:54, ID: ST180604M2-10 PFC CS7 18E2911, Description: PFC CS7 18E2911

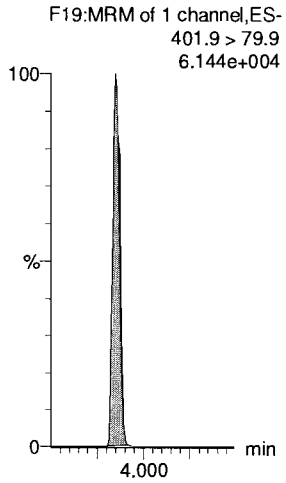
13C4-PFBA



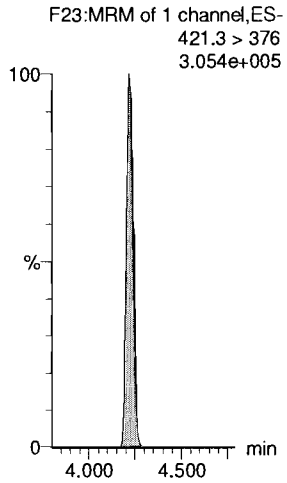
13C5-PFHxA



13C3-PFHxS



13C8-PFOA



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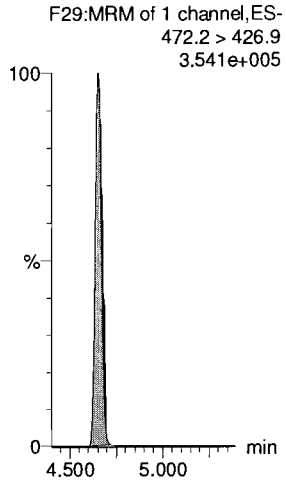
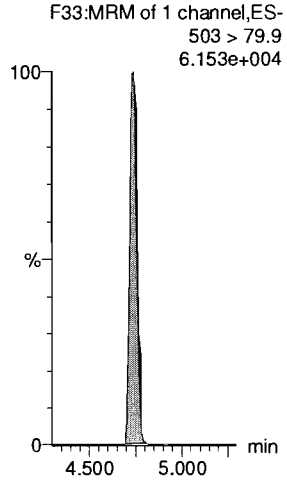


13C4-PFOS



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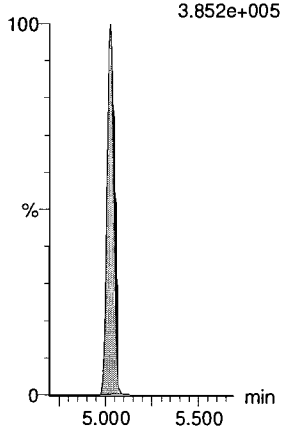
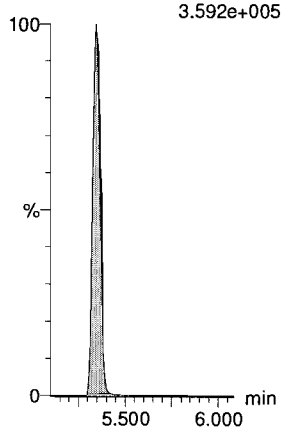


13C7-PFUdA



Vista Analytical Laboratory

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-ICV.qld

Last Altered: Tuesday, June 05, 2018 11:27:26 Pacific Daylight Time
Printed: Tuesday, June 05, 2018 11:28:17 Pacific Daylight Time

JAM 6/5/18

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	1	PFBA	213.0 > 16...	7.94e3	9.15e3		1.33	1.34	10.9	9.77	97.7	NO		
2	2	PFPeA	263.1 > 21...	9.41e3	1.25e4		2.31	2.31	9.40	9.14	91.4	NO		
3	3	PFBS	299.0 > 79.7	2.13e3	1.56e3		2.59	2.60	17.1	8.59	85.9	NO	2.666	NO
4	4	4:2 FTS	327.2>307.2	2.67e3	3.36e3		3.00	3.00	9.94	9.20	92.0	NO	1.868	NO
5	5	PFHxA	313.2 > 26...	1.38e4	4.49e3		3.09	3.09	15.4	9.63	96.3	NO	304.989	NO
6	6	PFPeS	349.1>80.1	1.99e3	1.56e3		3.28	3.29	15.9	8.81	88.1	NO	1.664	NO
7	7	PFHpA	363.0 > 31...	1.10e4	1.23e4		3.70	3.71	11.3	9.64	96.4	NO	18.569	NO
8	8	L-PFHxS	398.9 > 79.6	1.74e3	1.39e3		3.85	3.86	15.7	8.17	81.7	NO	1.772	NO
9	10	6:2 FTS	427.1 > 407	3.20e3	3.80e3		4.17	4.17	10.5	8.48	84.8	NO	3.138	NO
10	11	L-PFOA	413 > 368.7	1.38e4	1.77e4		4.25	4.22	9.78	10.8	108.4	NO	4.032	NO
11	13	PFHpS	449 > 80.0	2.22e3	1.77e4		4.33	4.33	1.57	9.96	99.6	NO	1.861	NO
12	14	PFNA	463.0 > 41...	1.70e4	1.70e4		4.66	4.66	12.4	9.72	97.2	NO	4.808	NO
13	15	PFOSA	498.2 > 77.9	2.24e3	3.29e3		4.73	4.72	8.53	8.98	89.8	NO	21.032	NO
14	16	L-PFOS	499.1 > 79.9	2.12e3	3.16e3		4.74	4.74	8.39	9.04	90.4	NO	2.004	NO
15	18	PFDA	513 > 468.8	1.83e4	2.36e4		5.03	5.03	9.73	9.44	94.4	NO	6.697	NO
16	19	8:2 FTS	527 > 506.9	3.17e3	3.13e3		5.00	5.00	12.7	8.80	88.0	NO	2.405	NO
17	20	PFNS	549.1>80.1	1.96e3	3.16e3		5.09	5.09	7.77	9.31	93.1	NO	1.772	NO
18	21	L-MeFOSAA	570.1 > 419	7.33e3	4.38e3		5.18	5.18	20.9	11.0	110.2	NO	18.683	YES

AL 6/5/18

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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-ICV.qld

Last Altered: Tuesday, June 05, 2018 11:27:26 Pacific Daylight Time
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(A) NOT IN ICV

Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

AN 6/5/18

Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
1	23	L-EtFOSAA	584.2 > 419	5.58e3	5.43e3		5.37	5.34	12.8	11.2	112.5	NO	14.744	NO
2	25	PFUdA	563.0 > 51...	1.78e4	1.99e4		5.35	5.35	11.2	11.5	115.4	NO	12.555	NO
3	26	PFDS	598.8 > 80	2.49e3	1.99e4		5.40	5.40	1.56	10.8	108.1	NO	2.023	NO
4	27	PFDoA	612.9 > 56...	2.17e4	1.99e4		5.63	5.63	13.7	12.3	122.7	NO	9.431	NO
5	28	N-MeFOSA	512.1 > 16...		1.39e4		5.82					NO	(A)	
6	29	PFTrDA	662.9 > 61...	2.24e4	1.99e4		5.88	5.88	14.1	13.0	129.9	NO	35.084	NO
7	30	PFTeDA	712.9 > 66...	1.73e4	1.75e4		6.10	6.09	12.3	9.49	94.9	NO	12.015	NO
8	31	N-EtFOSA	526.1 > 16...		2.06e4		6.23					NO	(A)	
9	32	PFHxDA	813.1 > 76...		1.08e4		6.43					NO		
10	33	PFODA	913.1 > 86...		1.08e4		6.67					NO		
11	34	N-MeFOSE	616.1 > 58.9		1.11e4		6.37					NO		
12	35	N-EtFOSE	630.1 > 58.9		1.05e4		6.52					NO		
13	36	13C3-PFBA	216.1 > 17...	9.15e3	1.04e4	0.885	1.34	1.34	11.0	12.4	99.6	NO		
14	37	13C3-PFPeA	266. > 221.8	1.25e4	1.50e4	0.849	2.31	2.31	10.4	12.2	98.0	NO		
15	38	13C3-PFBS	302. > 98.8	1.56e3	1.50e4	0.104	2.60	2.60	1.30	12.5	99.8	NO		
16	39	13C2-4:2 FTS	329.2>308.9	3.36e3	1.50e4	0.248	3.01	3.00	2.79	11.3	90.2	NO		
17	40	13C2-PFHxA	315 > 269.8	4.49e3	1.50e4	0.729	3.09	3.09	3.73	5.11	102.3	NO		
18	41	13C4-PFHpA	367.2 > 32...	1.23e4	1.50e4	0.836	3.71	3.70	10.2	12.2	97.5	NO		
19	42	18O2-PFHxS	403.0 > 10...	1.39e3	3.08e3	0.443	3.86	3.85	5.62	12.7	101.6	NO		
20	43	13C2-6:2 FTS	429.1 > 40...	3.80e3	1.53e4	0.249	4.17	4.17	3.11	12.5	99.8	NO		
21	44	13C2-PFOA	414.9 > 36...	1.77e4	1.53e4	1.332	4.23	4.22	14.4	10.8	86.7	NO		
22	45	13C5-PFNA	468.2 > 42...	1.70e4	1.67e4	0.951	4.66	4.66	12.8	13.4	107.3	NO		
23	46	13C8-PFOSA	506.1 > 77.7	3.29e3	2.36e4	0.140	4.73	4.72	1.74	12.5	99.8	NO		
24	47	13C8-PFOS	507.0 > 79.9	3.16e3	3.23e3	1.060	4.74	4.74	12.2	11.5	92.2	NO		
25	48	13C2-PFDA	515.1 > 46...	2.36e4	1.90e4	1.130	5.03	5.03	15.5	13.7	110.0	NO		
26	49	13C2-8:2 FTS	529.1 > 50...	3.13e3	1.50e4	0.217	5.00	5.00	2.60	12.0	95.7	NO		
27	50	d3-N-MeFOSAA	573.3 > 419	4.38e3	2.36e4	0.184	5.18	5.18	2.32	12.6	101.1	NO		
28	51	d5-N-EtFOSAA	589.3 > 419	5.43e3	2.36e4	0.223	5.34	5.34	2.87	12.9	102.9	NO		
29	52	13C2-PFUdA	565 > 519.8	1.99e4	2.36e4	0.936	5.35	5.35	10.5	11.3	90.1	NO		
30	53	13C2-PFDoA	615.0 > 56...	1.99e4	1.90e4	1.168	5.63	5.63	13.1	11.2	89.6	NO		
31	54	d3-N-MeFOSA	515.2 > 16...	1.39e4	2.36e4	0.051	5.85	5.85	7.33	143	95.4	NO		
32	55	13C2-PFTeDA	714.8 > 66...	1.75e4	2.36e4	0.706	6.09	6.09	9.27	13.1	105.0	NO		

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Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-ICV.qld

Last Altered: Tuesday, June 05, 2018 11:27:26 Pacific Daylight Time
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Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

	#	Name	Trace	Area	IS Area	RRF	Pred.RT	RT	y Axis Resp.	Conc.	%Rec	Recovery Out	Ion Ratio	Ratio out?
33	56	d5-N-ETFOSA	531.1 > 16...	2.06e4	2.36e4	0.071	6.24	6.24	10.9	153	101.7	NO		
34	57	13C2-PFHxDA	815 > 769.7	1.08e4	2.36e4	1.079	6.43	6.43	5.71	5.29	105.9	NO		
35	58	d7-N-MeFOSE	623.1 > 58.9	1.11e4	2.36e4	0.041	6.37	6.36	5.87	142	95.0	NO		
36	59	d9-N-EtFOSE	639.2 > 58.8	1.05e4	2.36e4	0.038	6.51	6.51	5.55	145	96.5	NO		
37	60	13C4-PFBA	217. > 171.8	1.04e4	1.04e4	1.000	1.35	1.34	12.5	12.5	100.0	NO		
38	61	13C5-PFHxA	318 > 272.9	1.50e4	1.50e4	1.000	3.09	3.09	12.5	12.5	100.0	NO		
39	62	13C3-PFHxS	401.9 > 79.9	3.08e3	3.08e3	1.000	3.86	3.85	12.5	12.5	100.0	NO		
40	63	13C8-PFOA	421.3 > 376	1.53e4	1.53e4	1.000	4.23	4.22	12.5	12.5	100.0	NO		
41	64	13C9-PFNA	472.2 > 42...	1.67e4	1.67e4	1.000	4.66	4.66	12.5	12.5	100.0	NO		
42	65	13C4-PFOS	503 > 79.9	3.23e3	3.23e3	1.000	4.74	4.74	12.5	12.5	100.0	NO		
43	66	13C6-PFDA	519.1 > 47...	1.90e4	1.90e4	1.000	5.03	5.03	12.5	12.5	100.0	NO		
44	67	13C7-PFUdA	570.1 > 52...	2.36e4	2.36e4	1.000	5.35	5.35	12.5	12.5	100.0	NO		

Vista Analytical Laboratory

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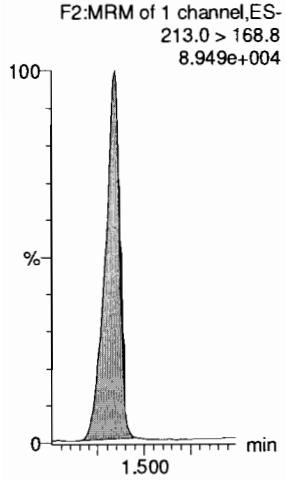
Method: F:\Projects\PFAS.PRO\MethDB\PFAS_FULL_80C_060418.mdb 05 Jun 2018 10:44:45
Calibration: F:\Projects\PFAS.PRO\CurveDB\C18_VAL-PFAS_Q4_06-04-18.cdb 05 Jun 2018 10:43:30

Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

PFBA



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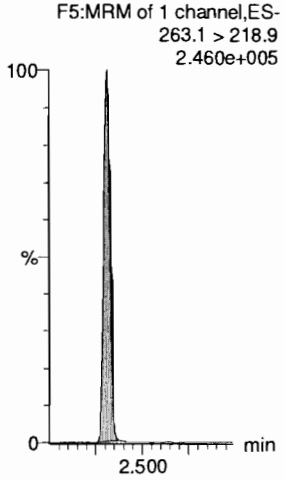

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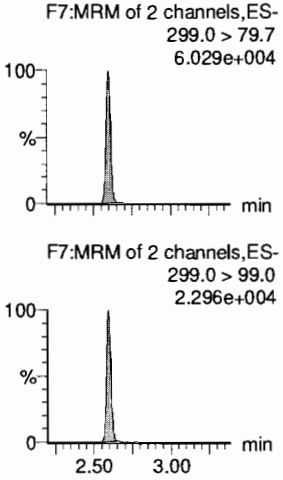
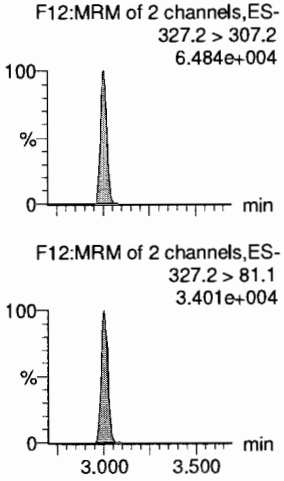
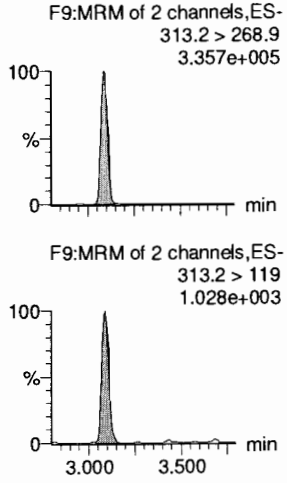


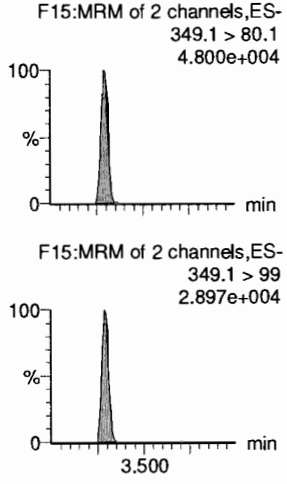
4:2 FTS



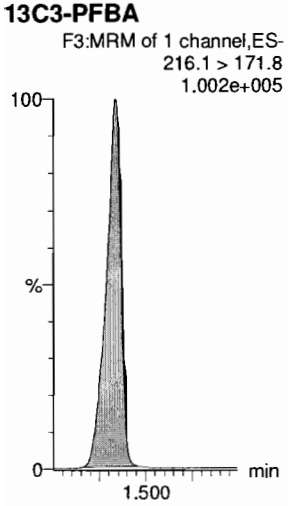
PFHxA



PFPeS



13C3-PFBA



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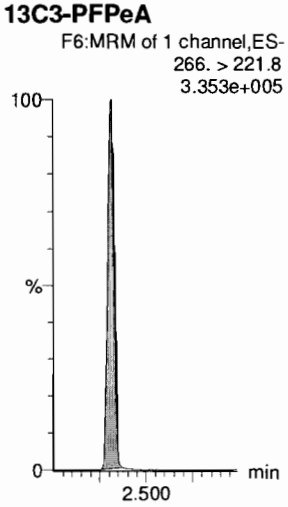

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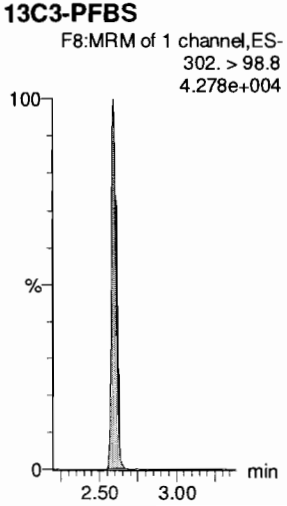

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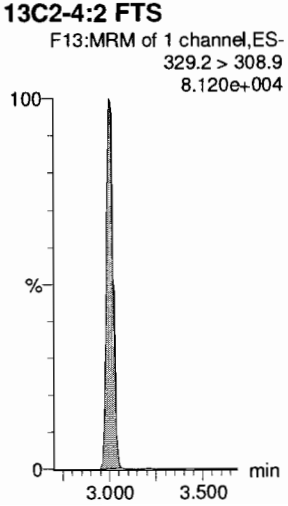

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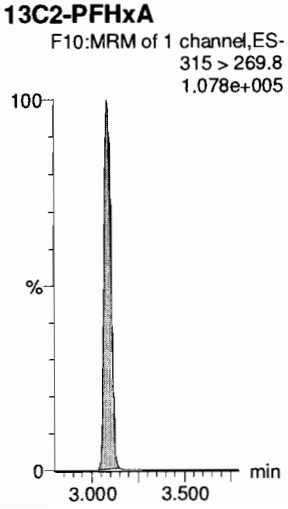

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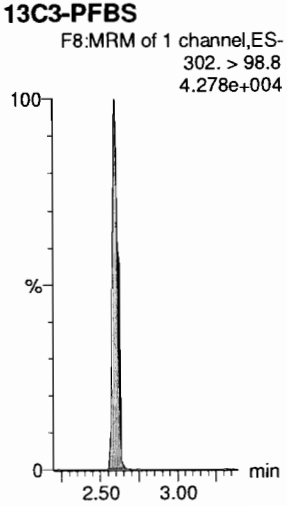

Dataset: F:\Projects\PFAS.PRO\Results\180604M2\180604M2-ICV.qld

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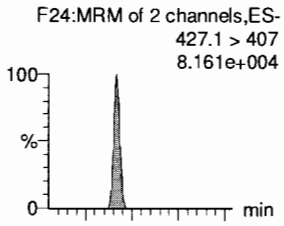
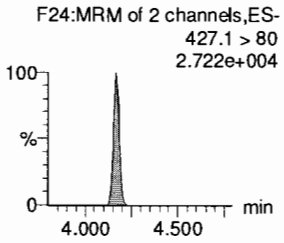
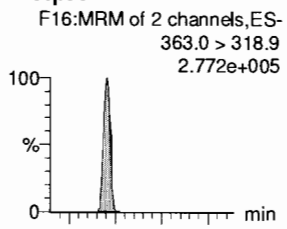
Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

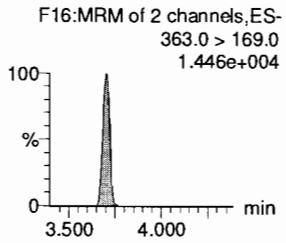
6:2 FTS



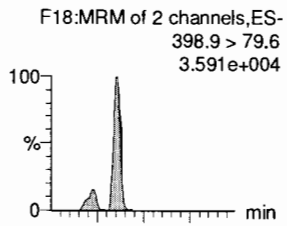


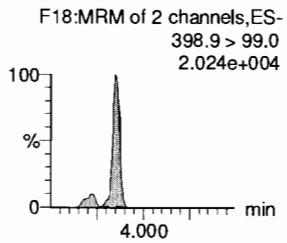
PFHpA



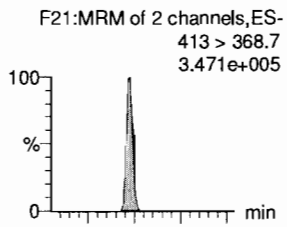


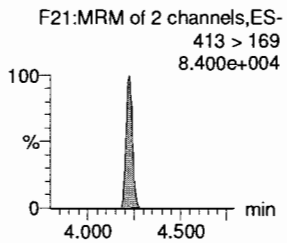
L-PFHxS





L-PFOA





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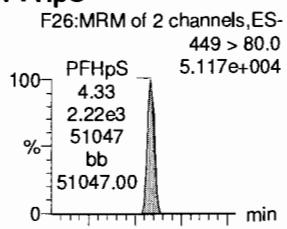
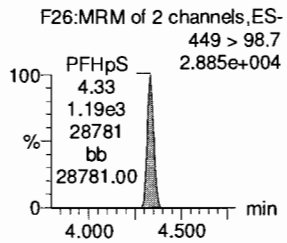
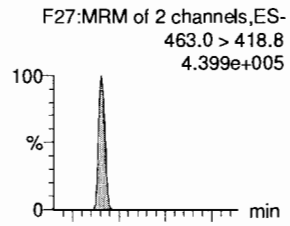
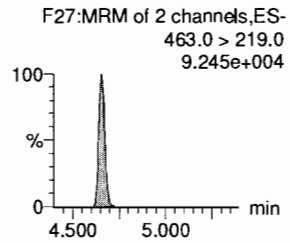




PFNA





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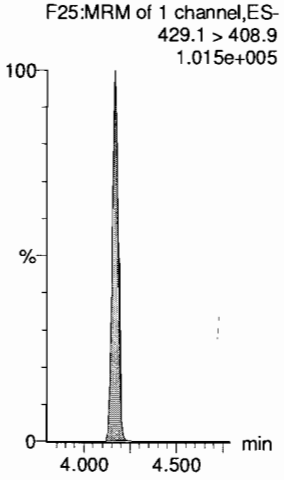
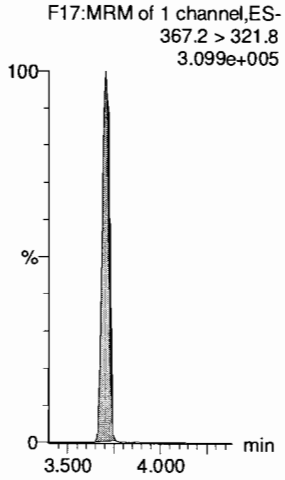
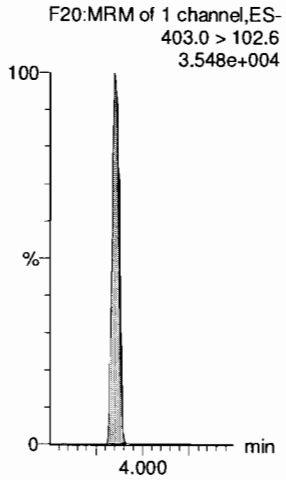


13C4-PFHpA



18O2-PFHxS



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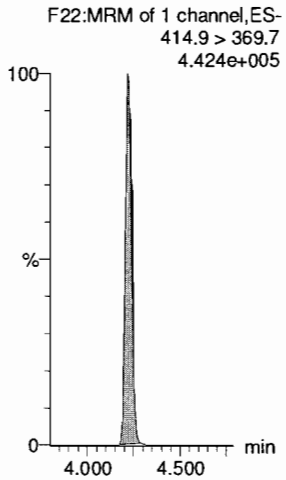
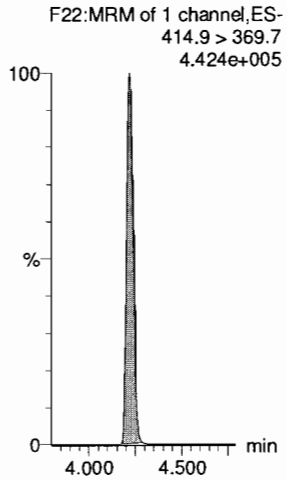
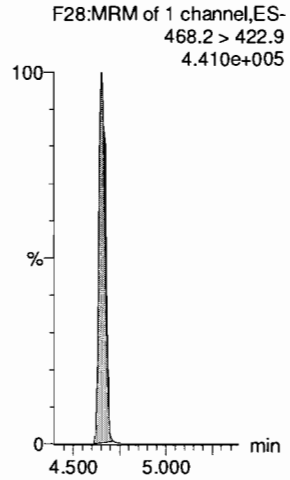


13C2-PFOA



13C5-PFNA



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Printed: Tuesday, June 05, 2018 11:28:30 Pacific Daylight Time

Name: 180604M2_13, Date: 04-Jun-2018, Time: 21:06:49, ID: ICV180604M2-1 PFC 537 ICV 18E2901, Description: PFC ICV 18E2901

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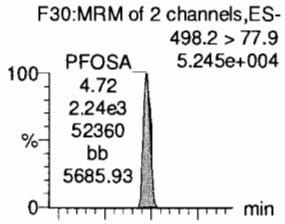

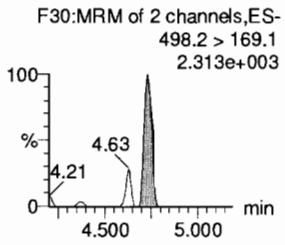

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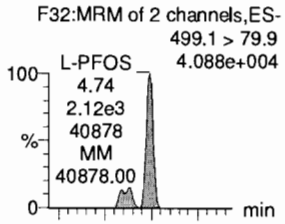

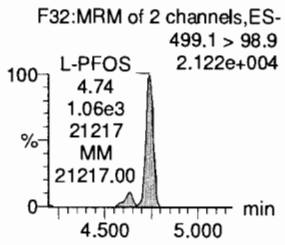

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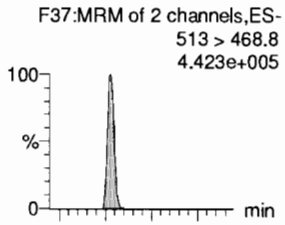

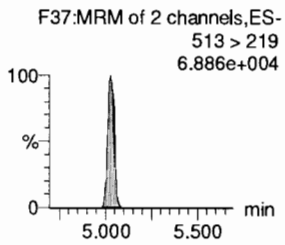

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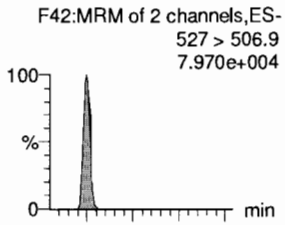

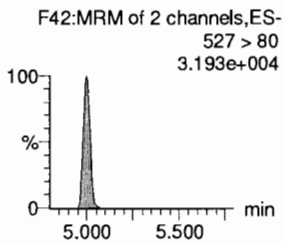

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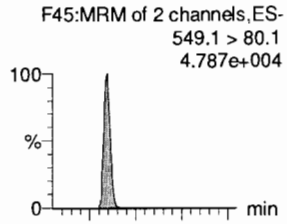

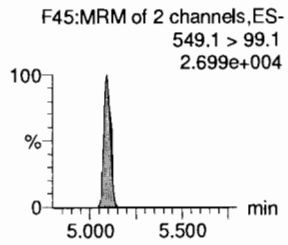

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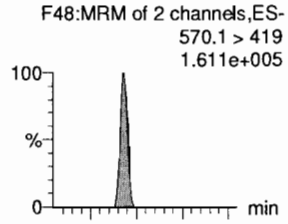

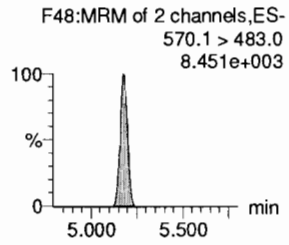

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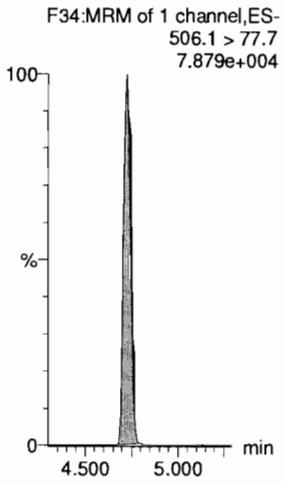

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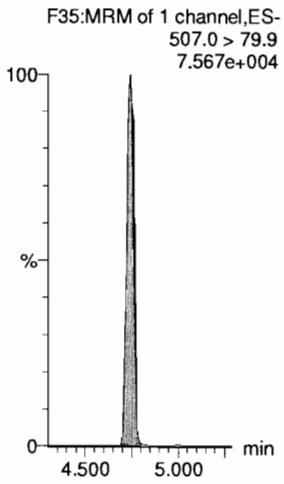

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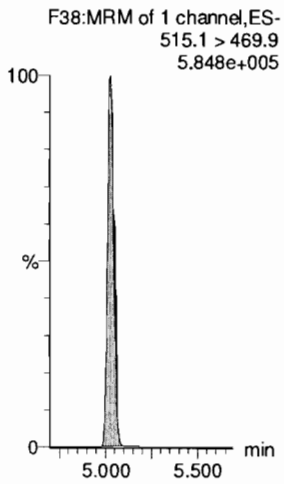

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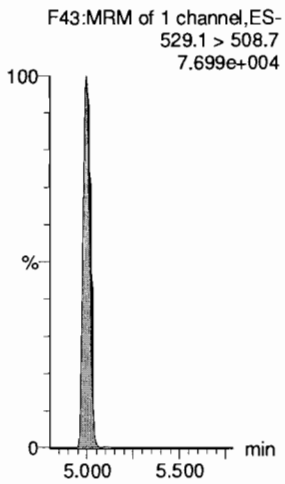

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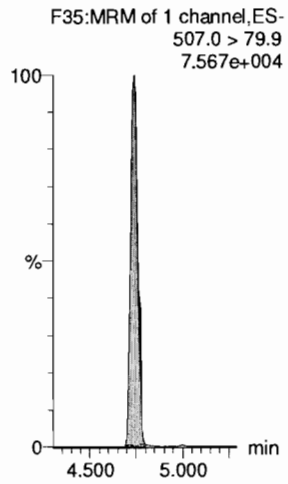

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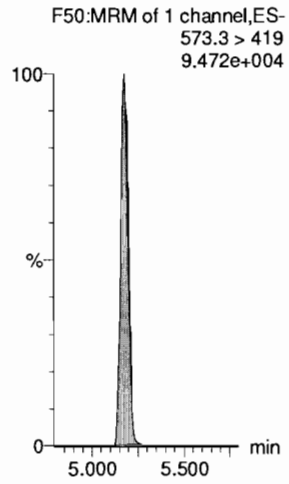

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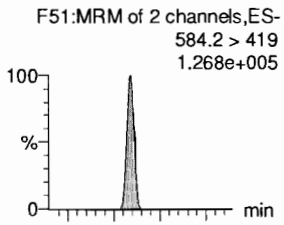

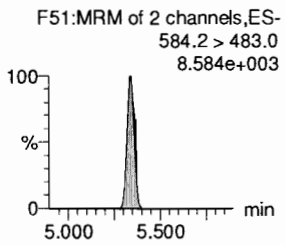

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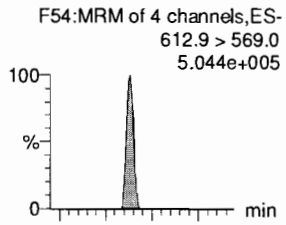

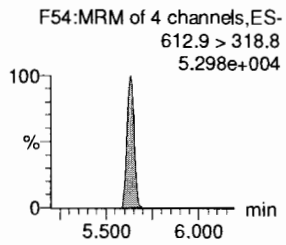

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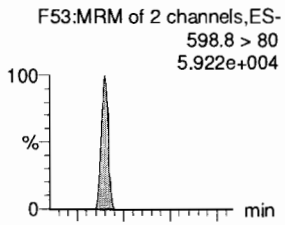

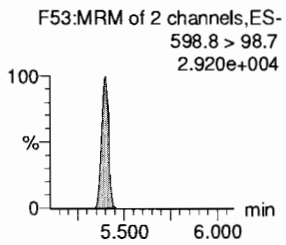

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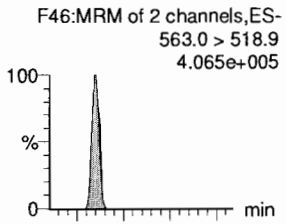

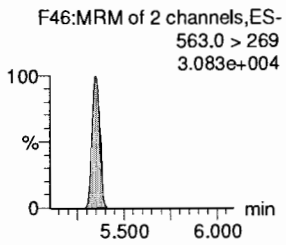

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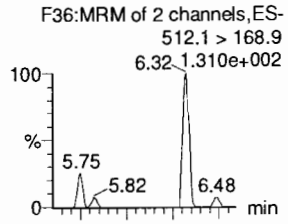

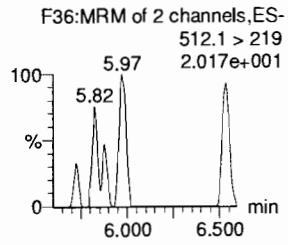

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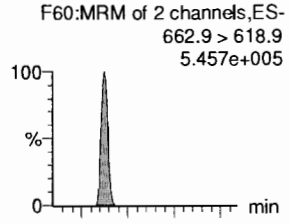
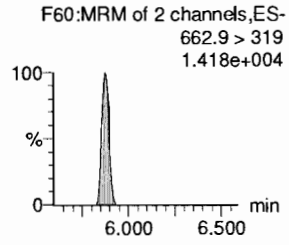
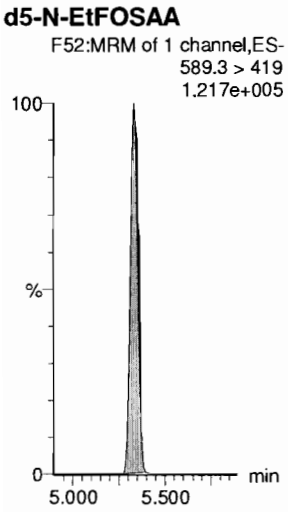




d5-N-EtFOSAA



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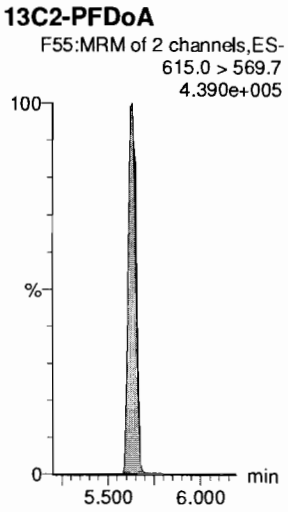

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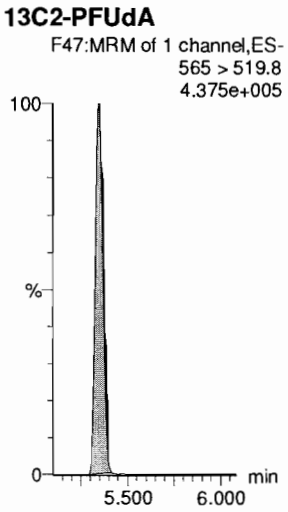

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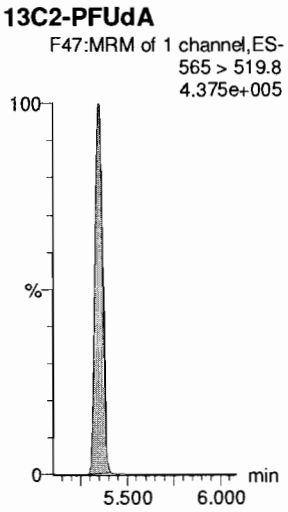

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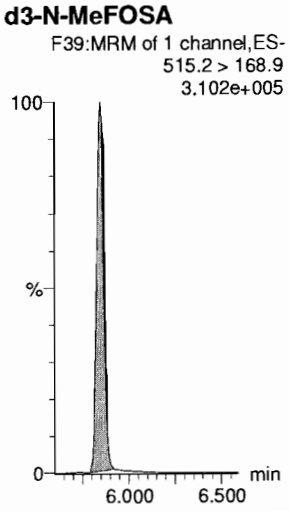

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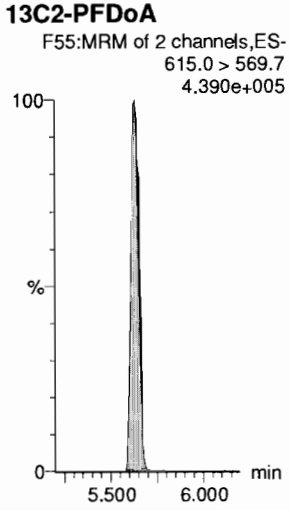

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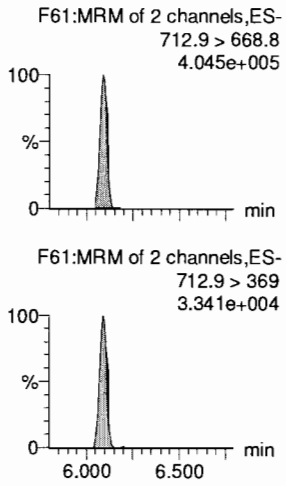

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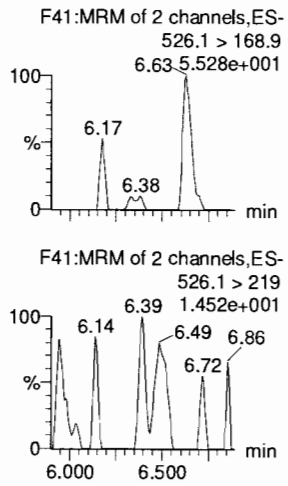

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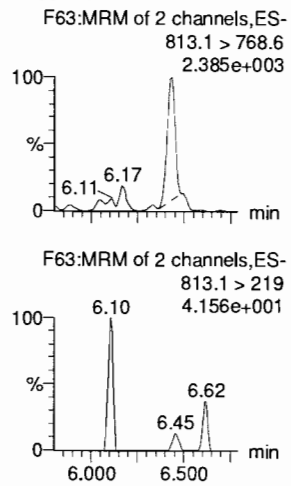

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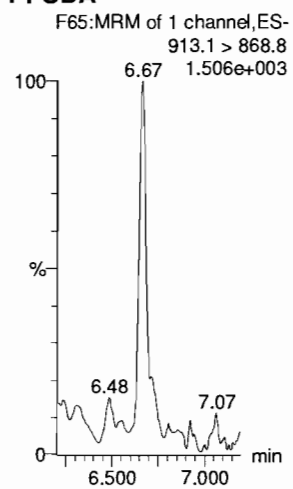

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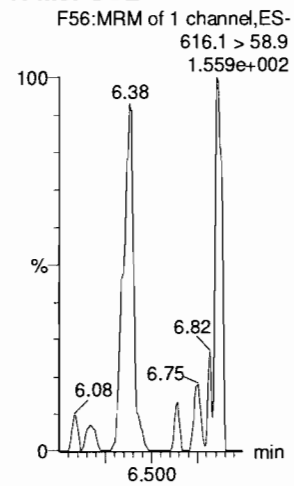

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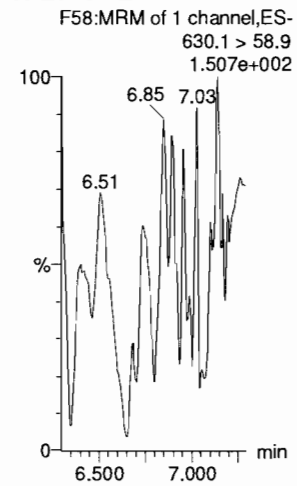

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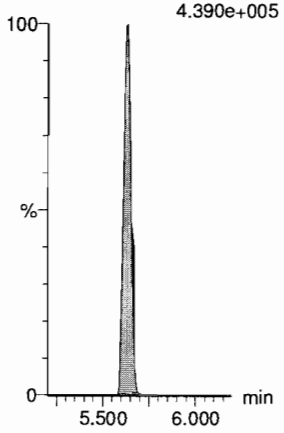
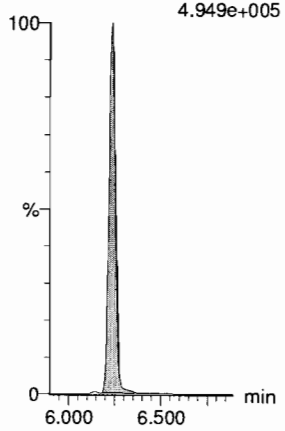


d5-N-ETFOSA



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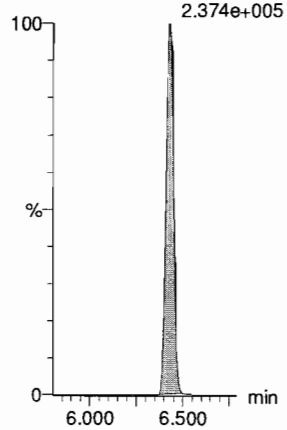

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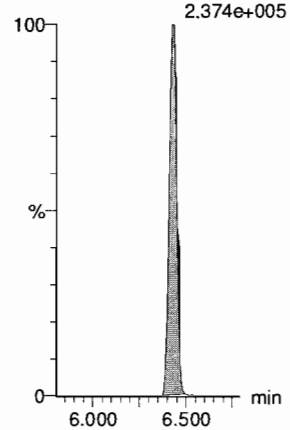

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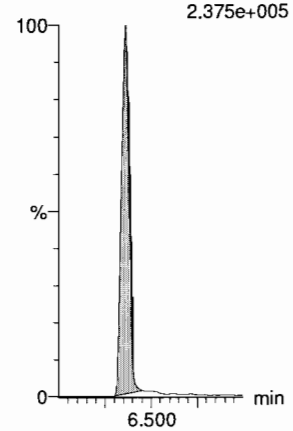

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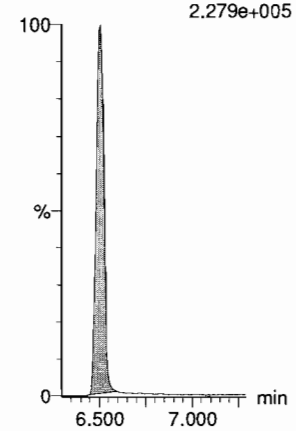

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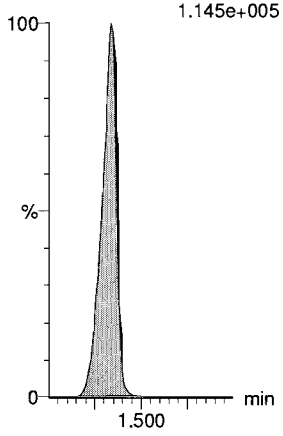

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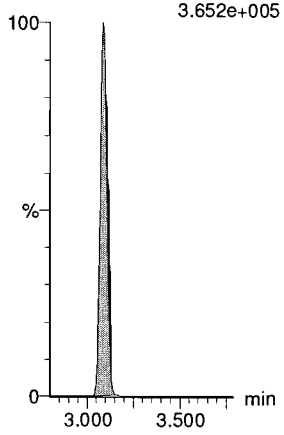
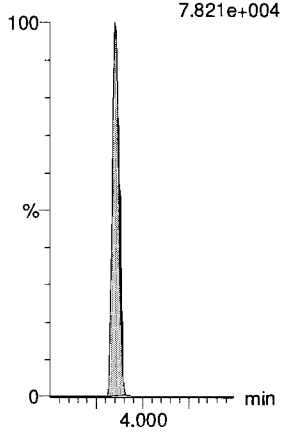
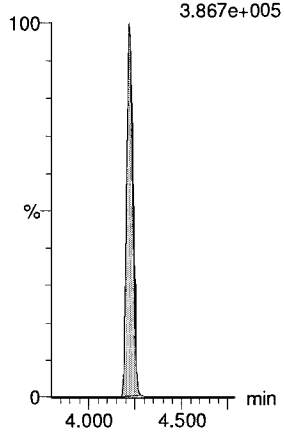


13C3-PFHxS



13C8-PFOA



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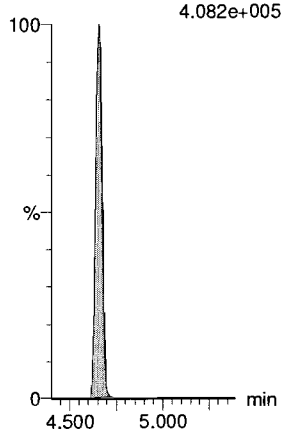

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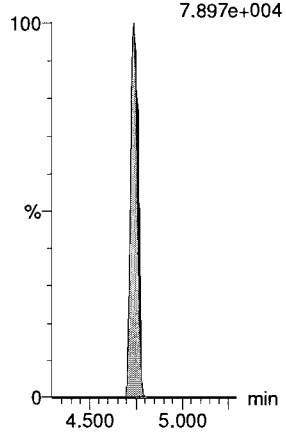

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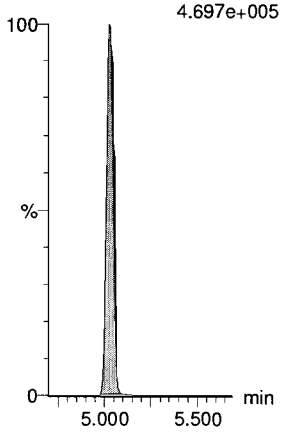

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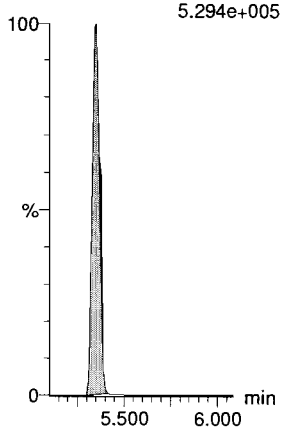

Vista Analytical Laboratory

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Printed: Tuesday, June 05, 2018 11:17:53 Pacific Daylight Time

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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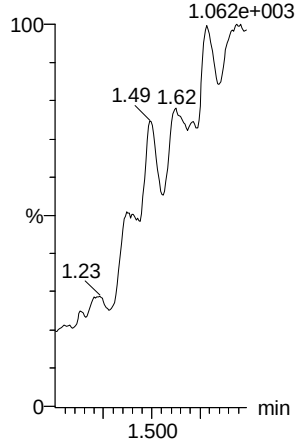

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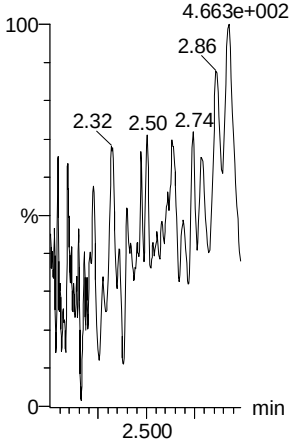

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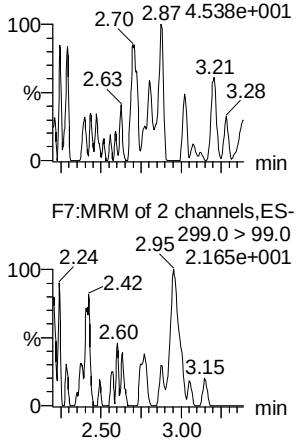

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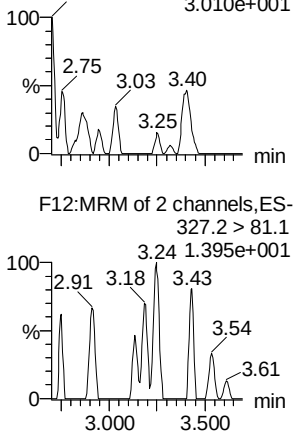

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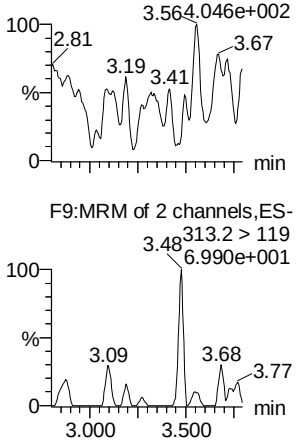

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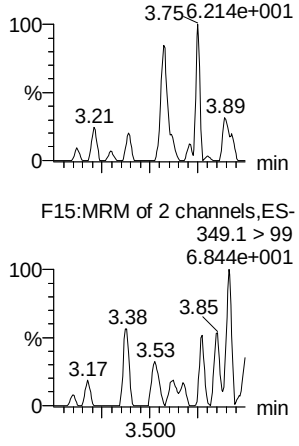

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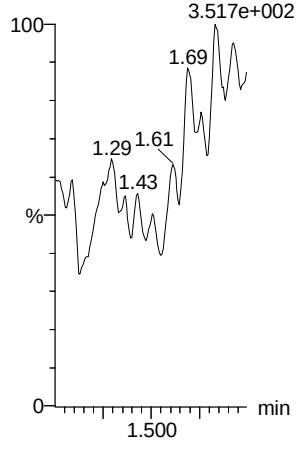

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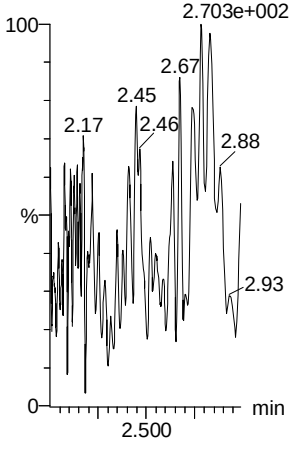

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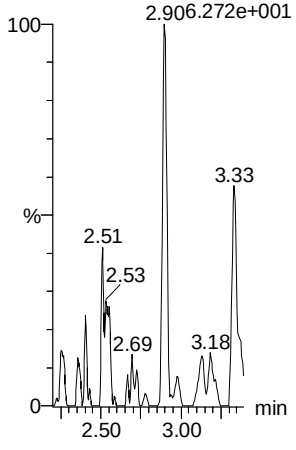

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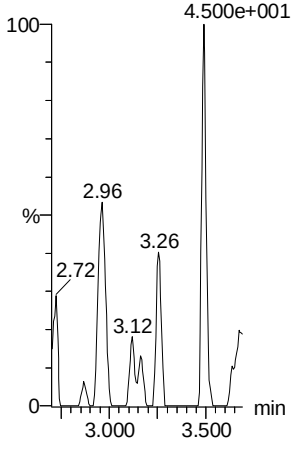

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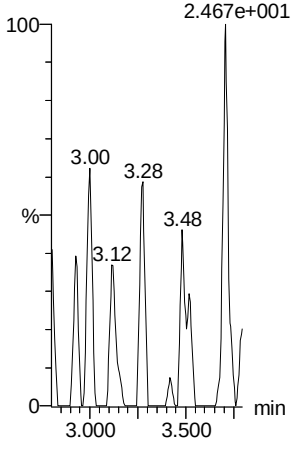

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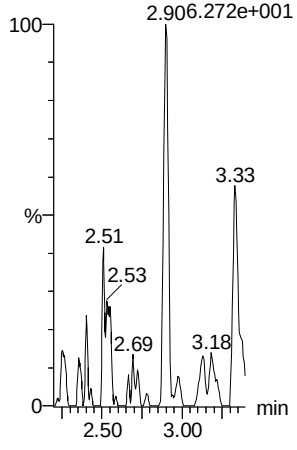

Vista Analytical Laboratory

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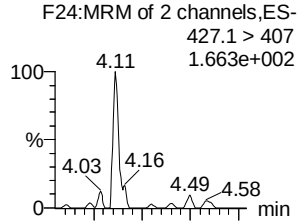
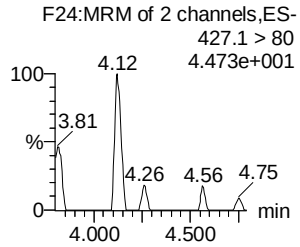
Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

6:2 FTS





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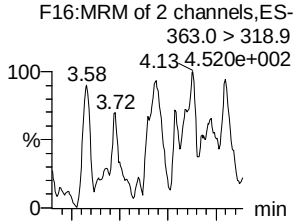

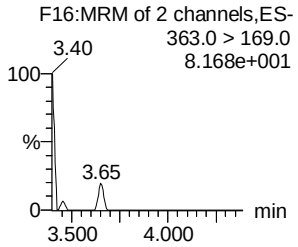

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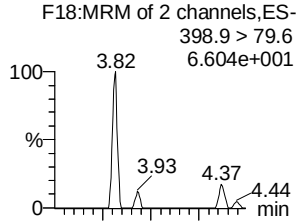

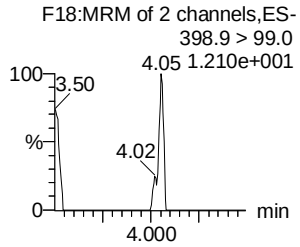

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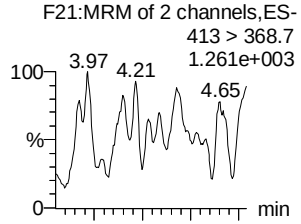

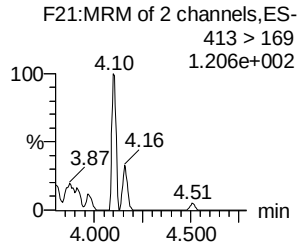

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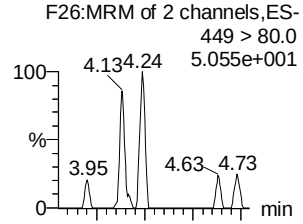

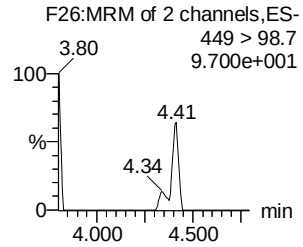

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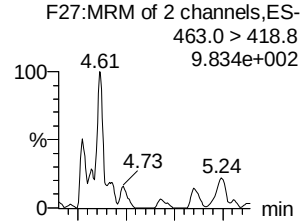

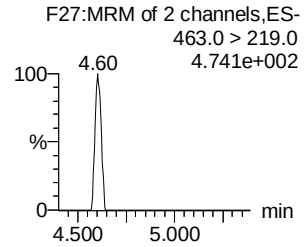

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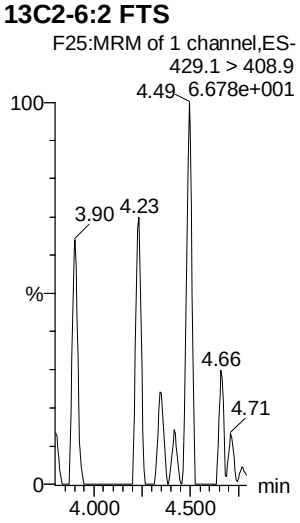

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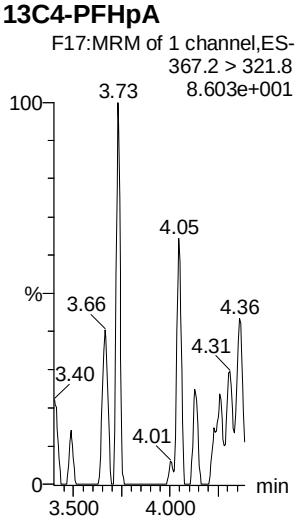
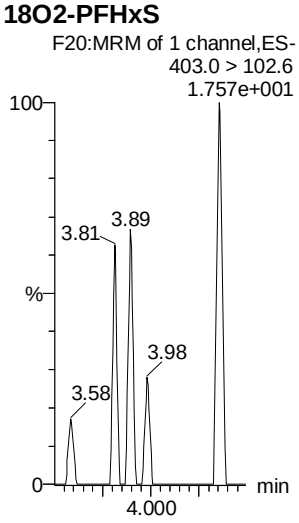


18O2-PFHxS



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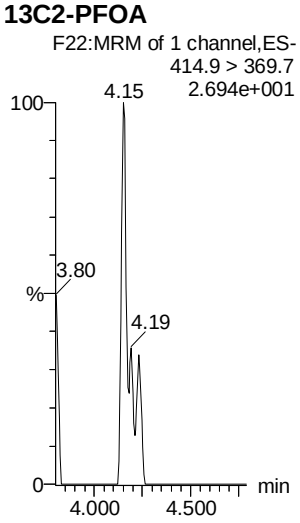

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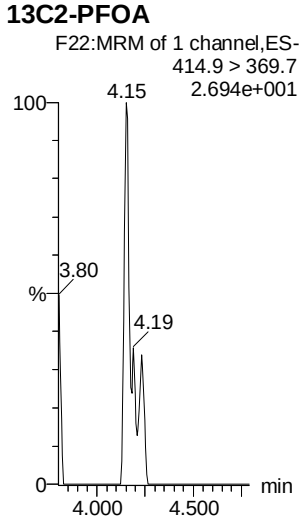

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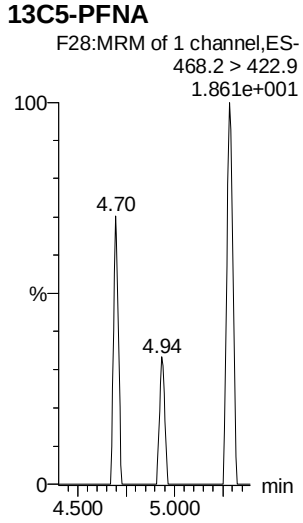

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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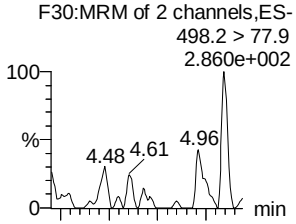

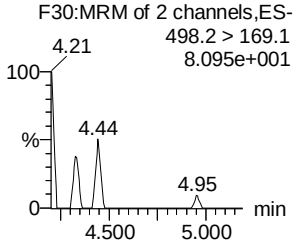

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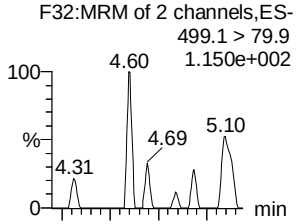

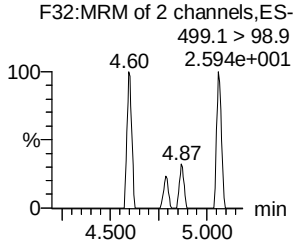

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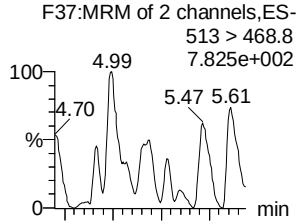

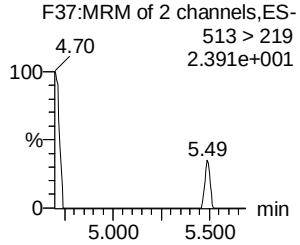

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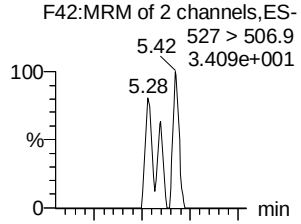

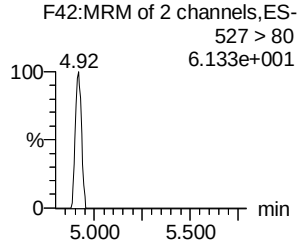

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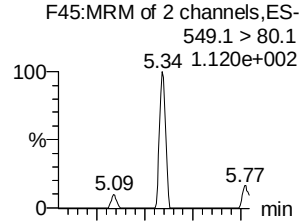

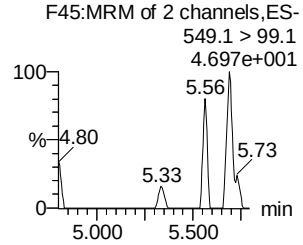

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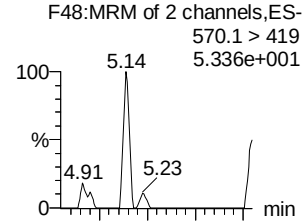

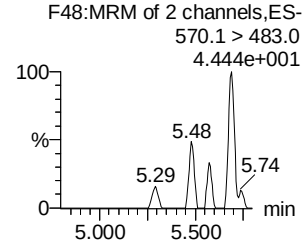

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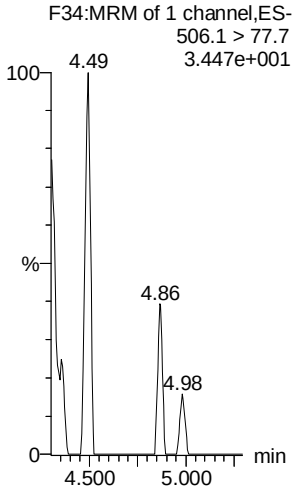

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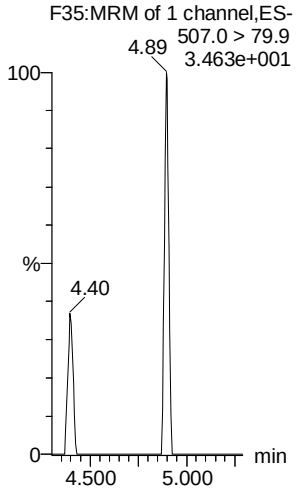

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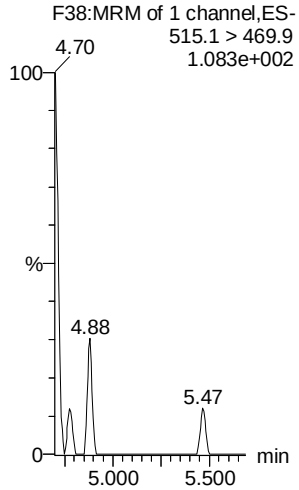
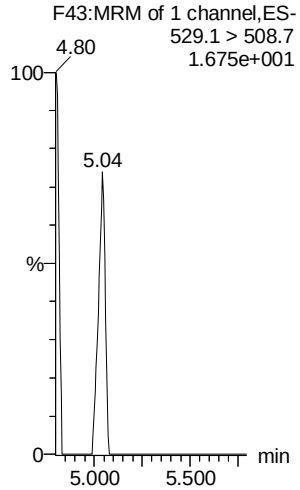


13C2-8:2 FTS



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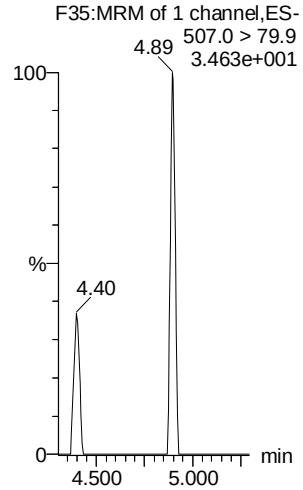
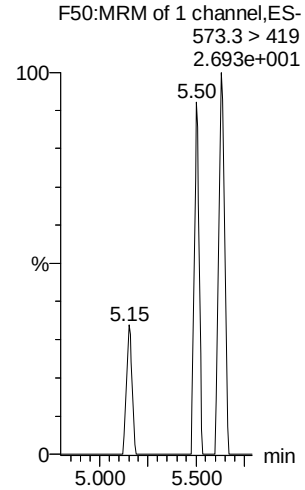


d3-N-MeFOSAA



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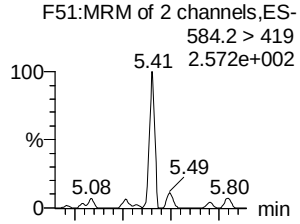
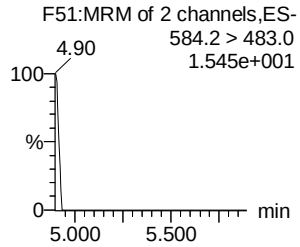
Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

L-EtFOSAA





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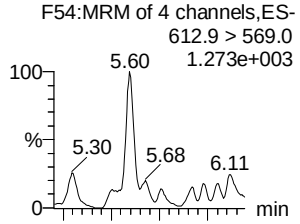

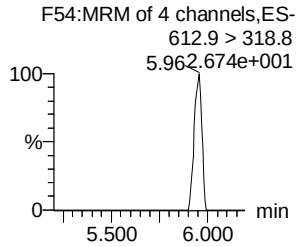

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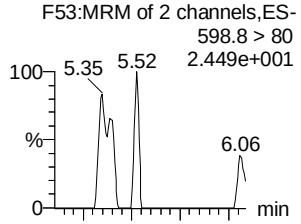

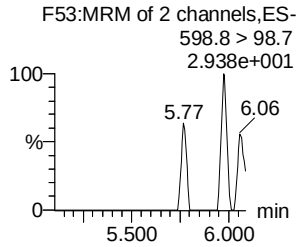

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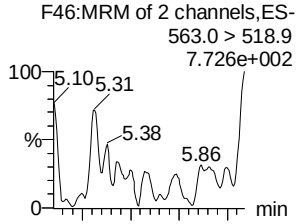

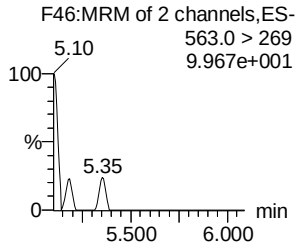

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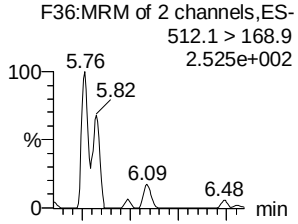

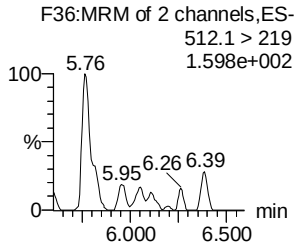

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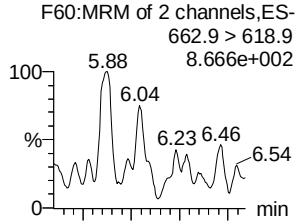

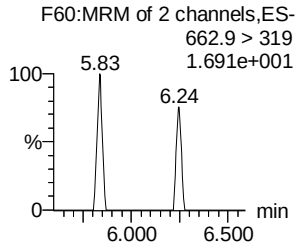

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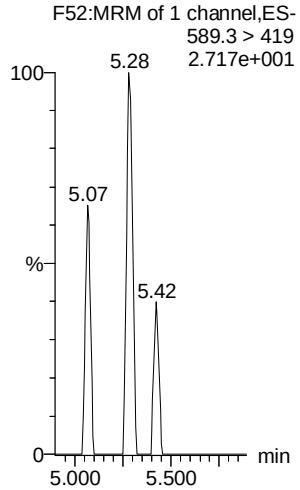

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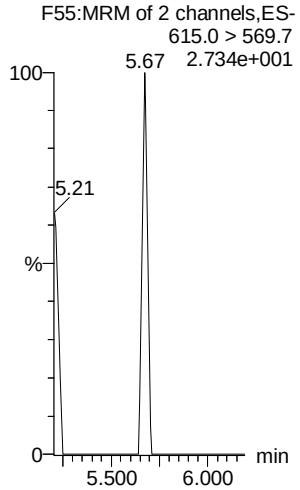

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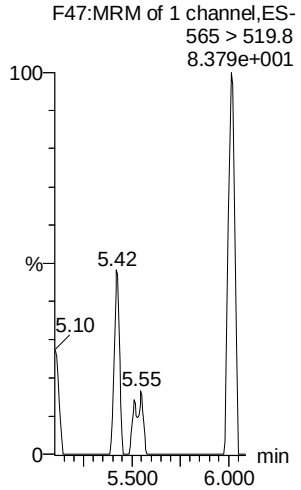

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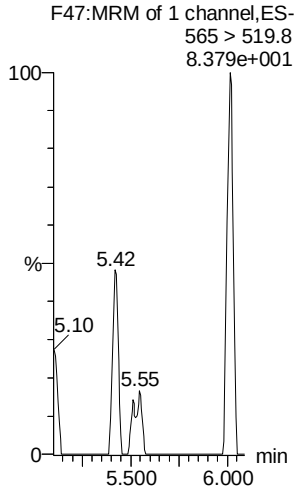

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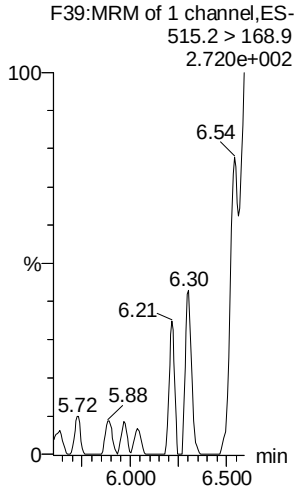

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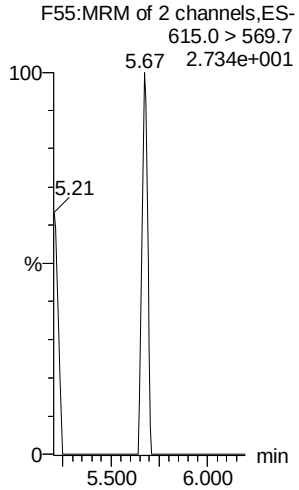

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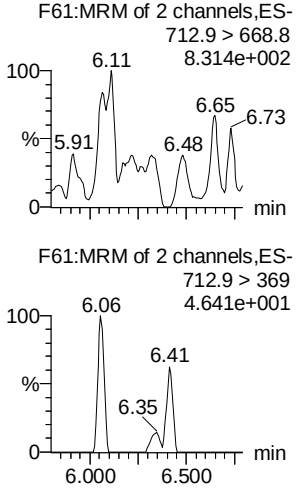

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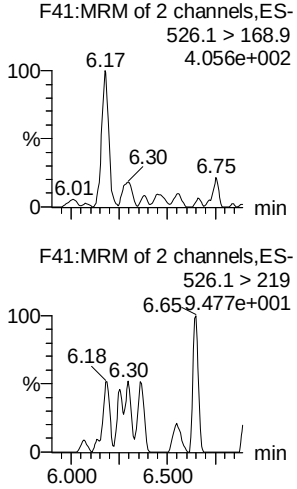

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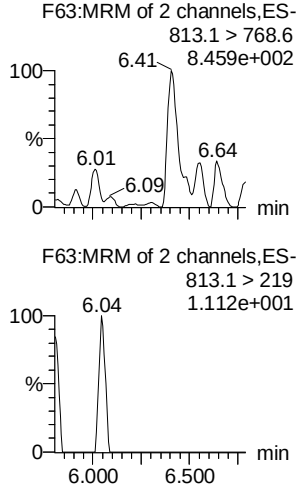

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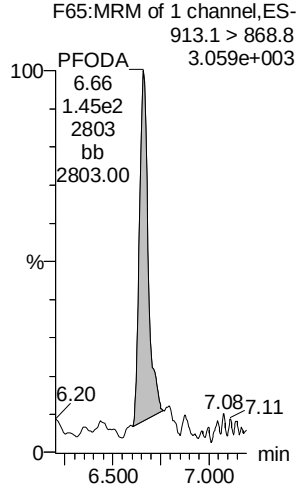

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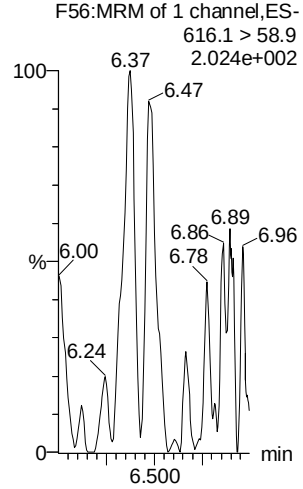

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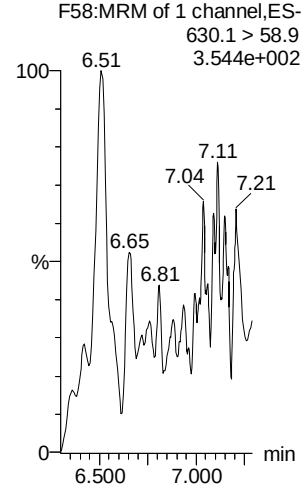

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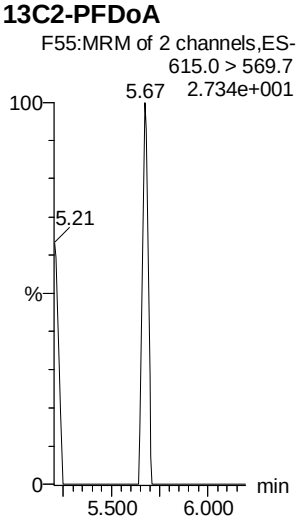

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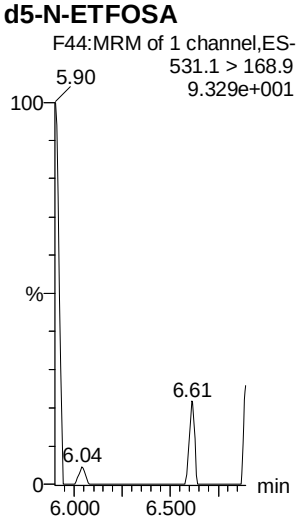

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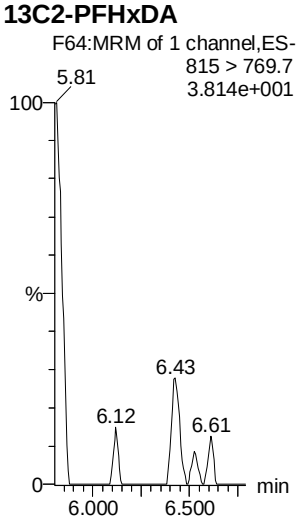

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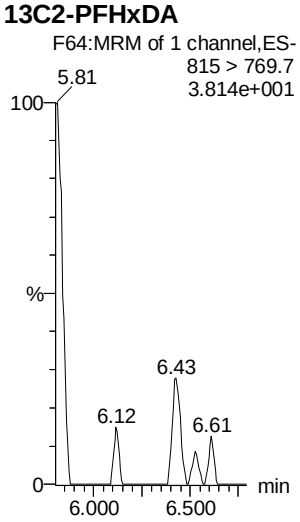

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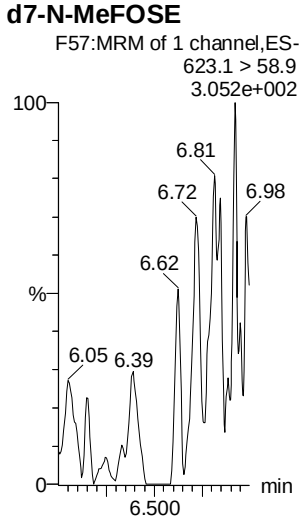

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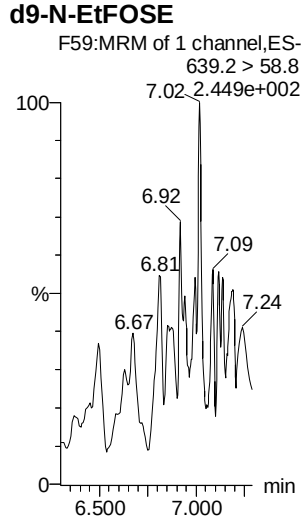

Vista Analytical Laboratory

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Name: 180604M2_12, Date: 04-Jun-2018, Time: 20:56:24, ID: IPA, Description: IPA

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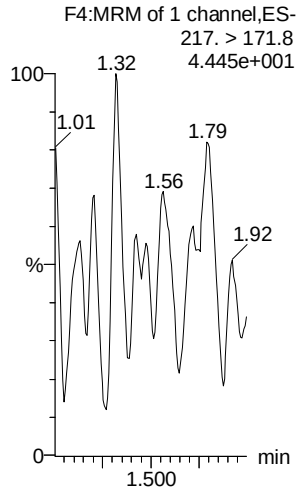

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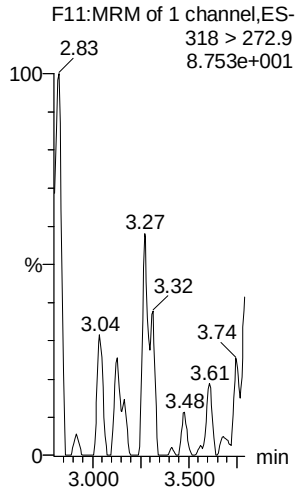

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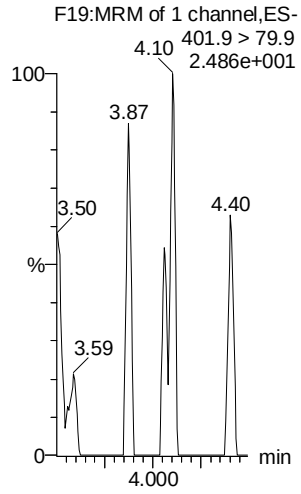

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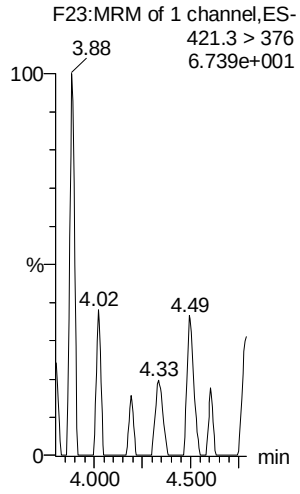

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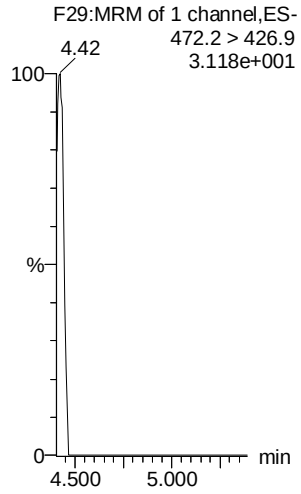

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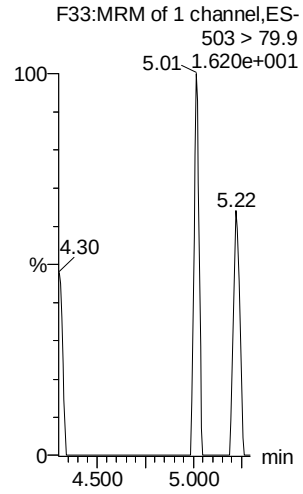

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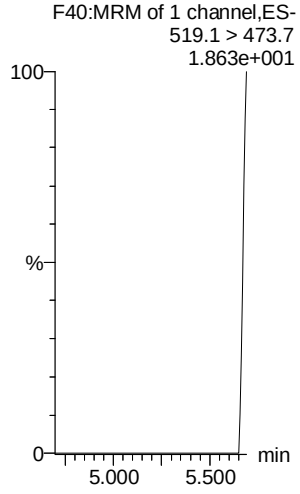

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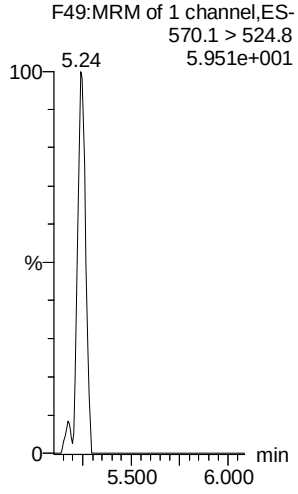


Tune Check

Mass Calibration Q4(M) 05-30-2018

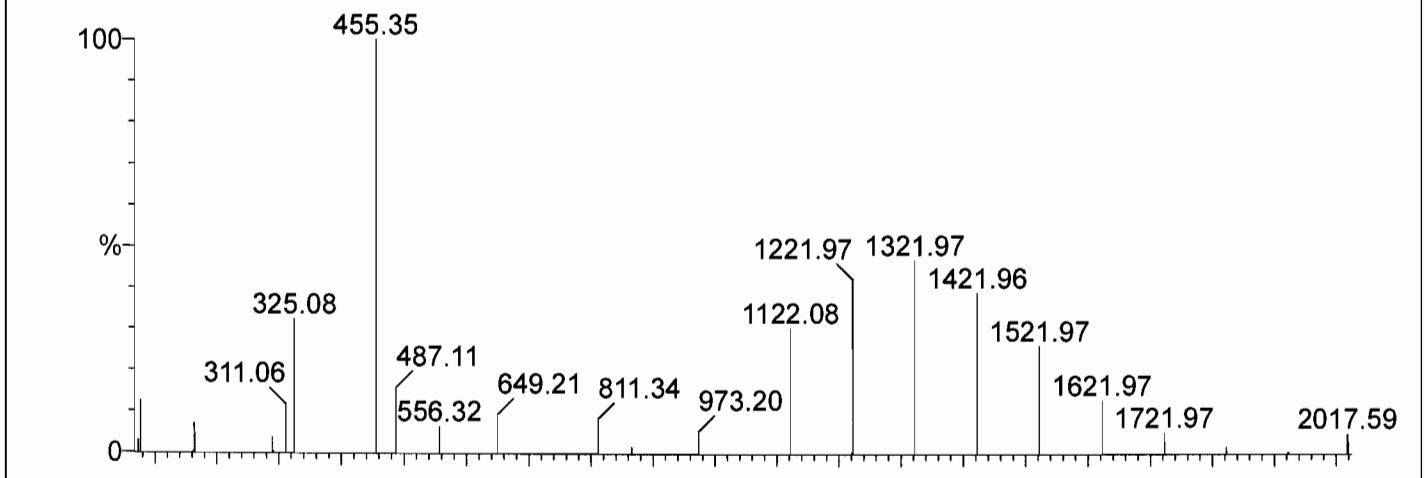
Calibration Report - MS1 Static

20180530

Printed: **Wed May 30 17:00:26 2018**

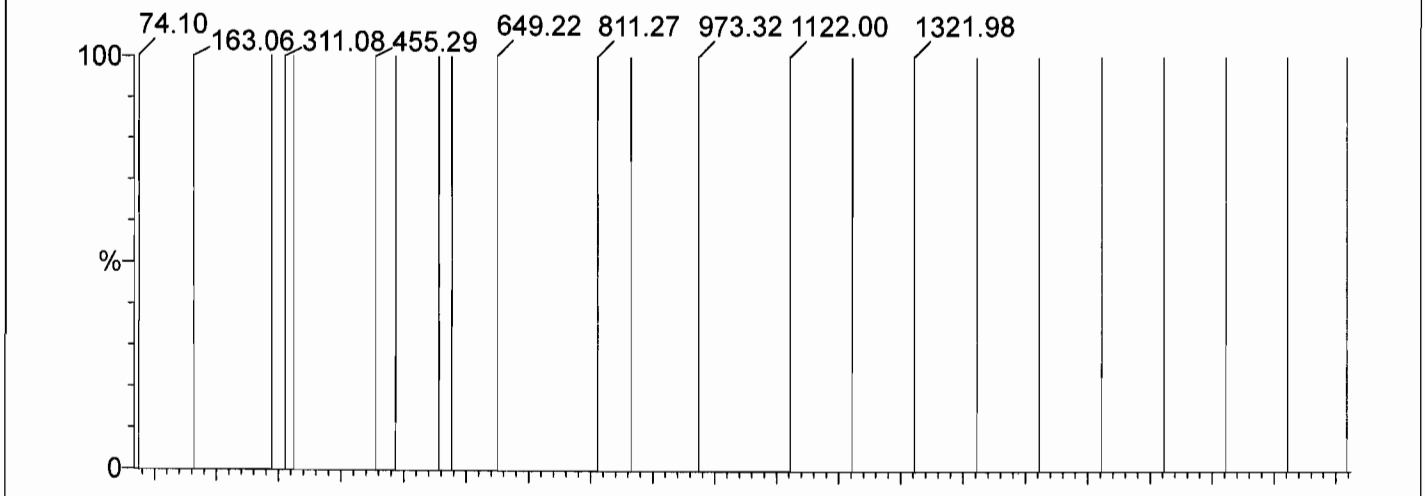
Data file: STATMS1 - Calibrated

21 matches of 23 tested references



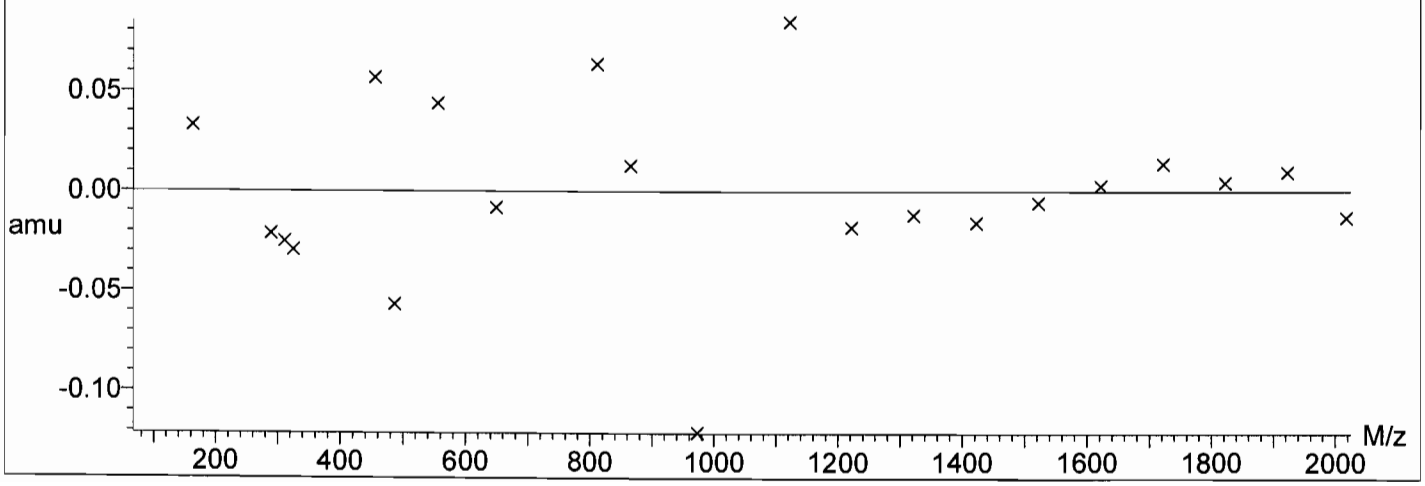
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref

Mean residual = 0.0309 amu

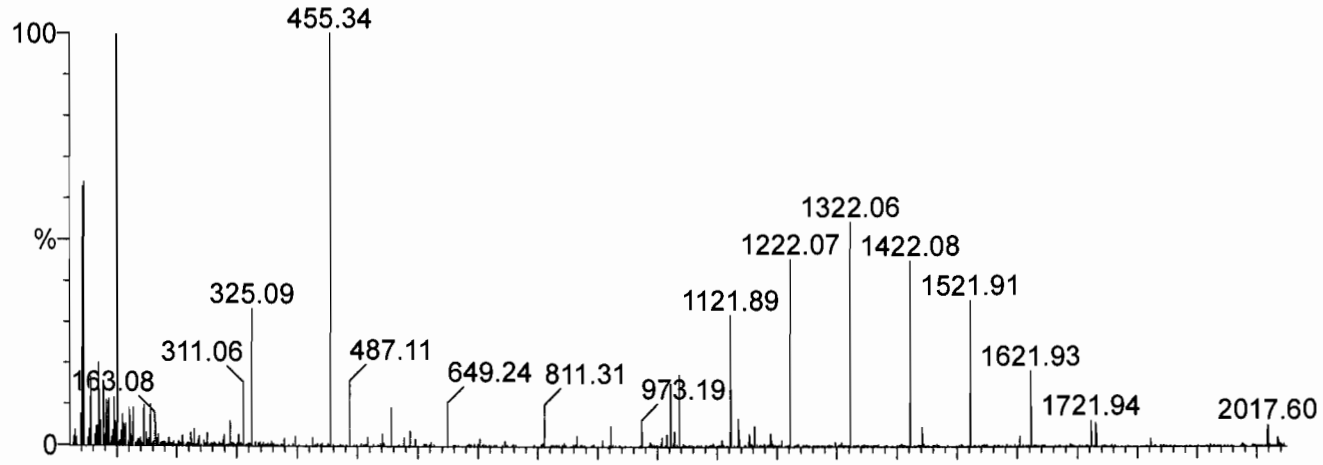


Residual Polynomial order = 4

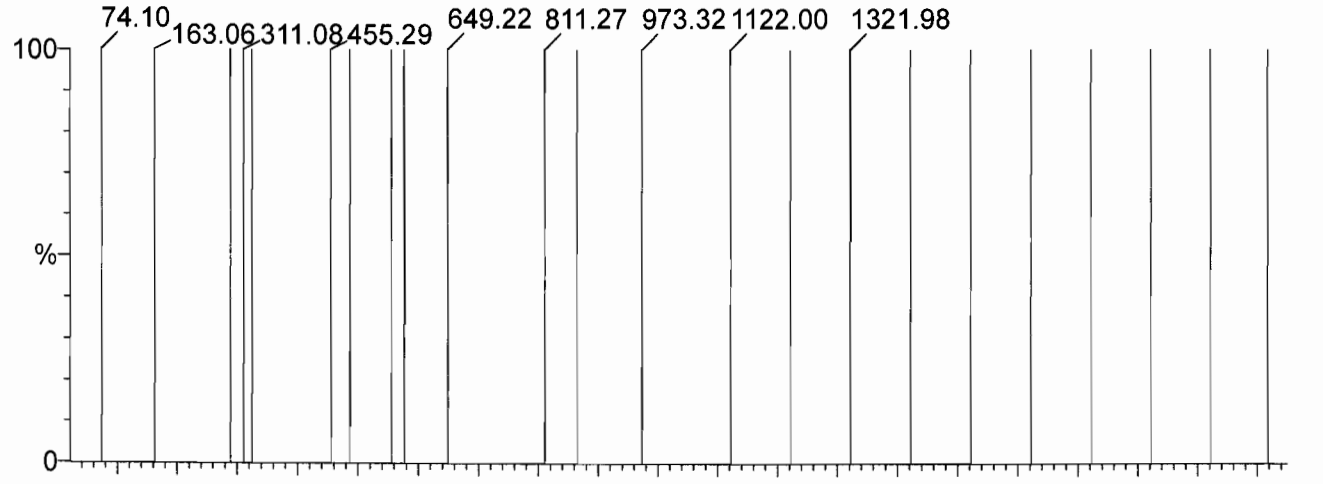
RMS residual = 0.0428 amu



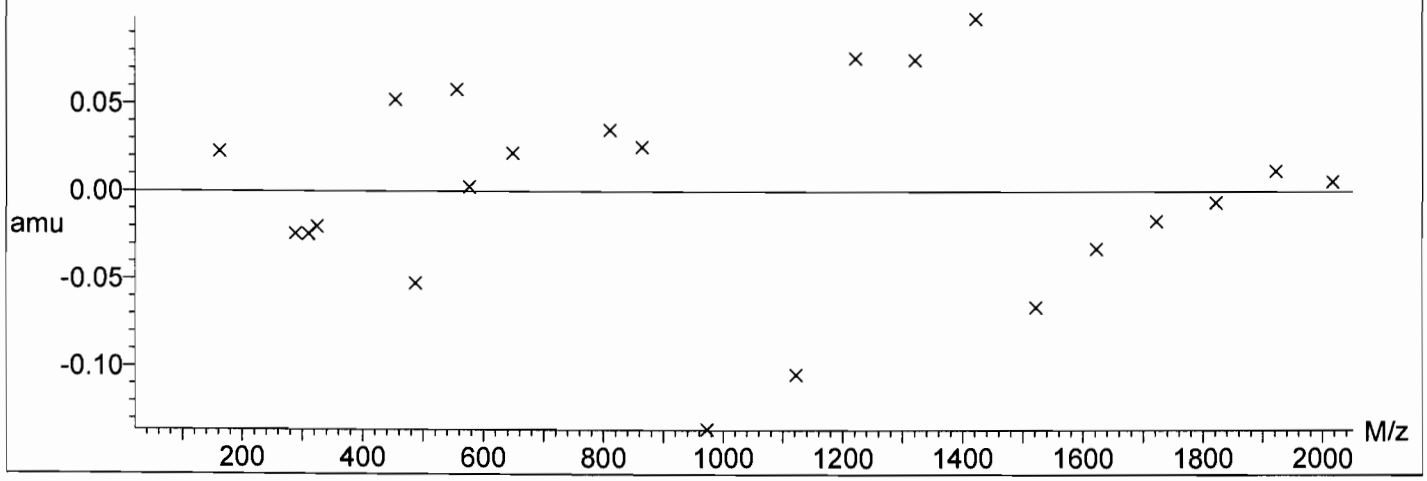
Data file: SCNMS1 - Calibrated 22 matches of 23 tested references



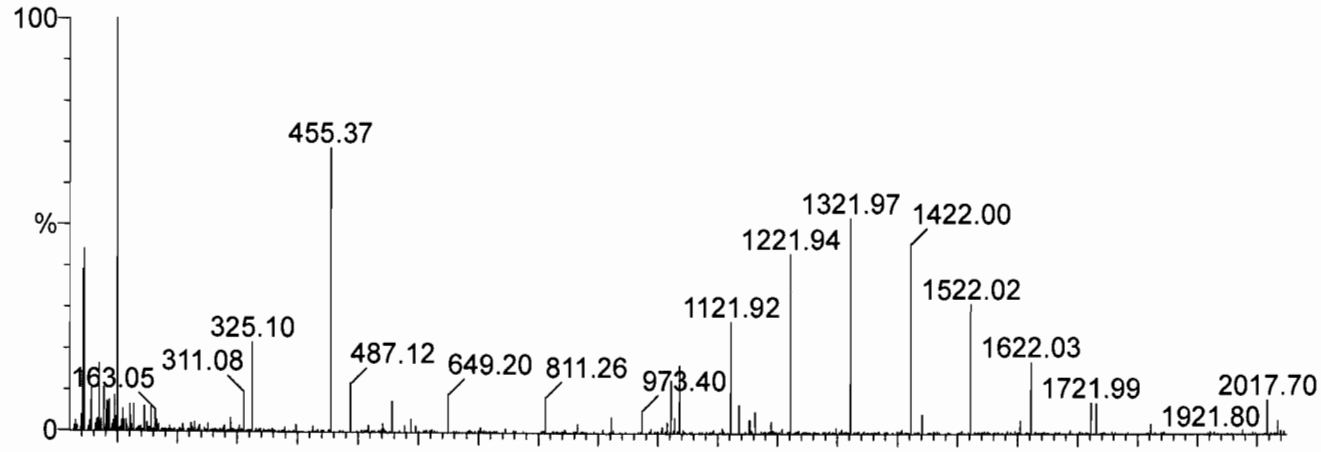
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.044 amu



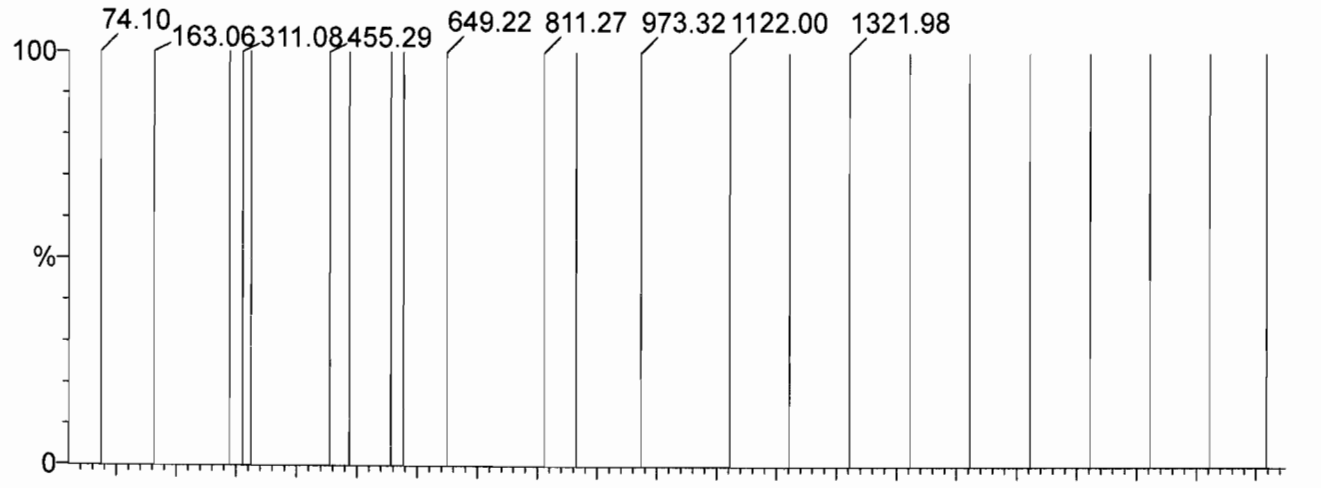
Residual Polynomial order = 4 RMS residual = 0.0563 amu



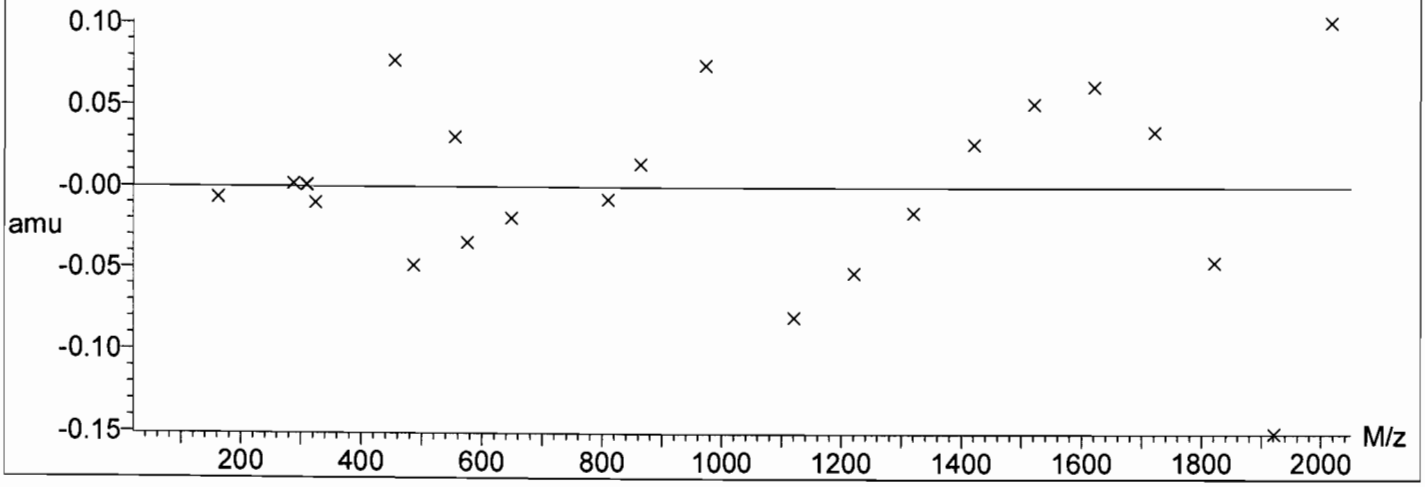
Data file: FASTMS1 - Calibrated 22 matches of 23 tested references



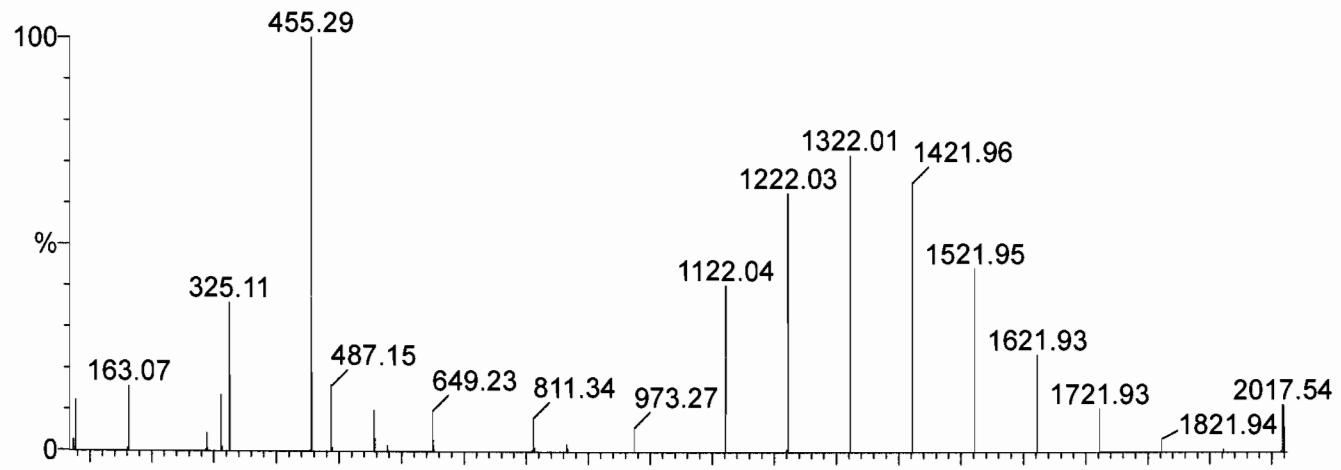
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.043 amu



Residual Polynomial order = 4 RMS residual = 0.0563 amu



Data file: STATMS2 - Calibrated 23 matches of 23 tested references



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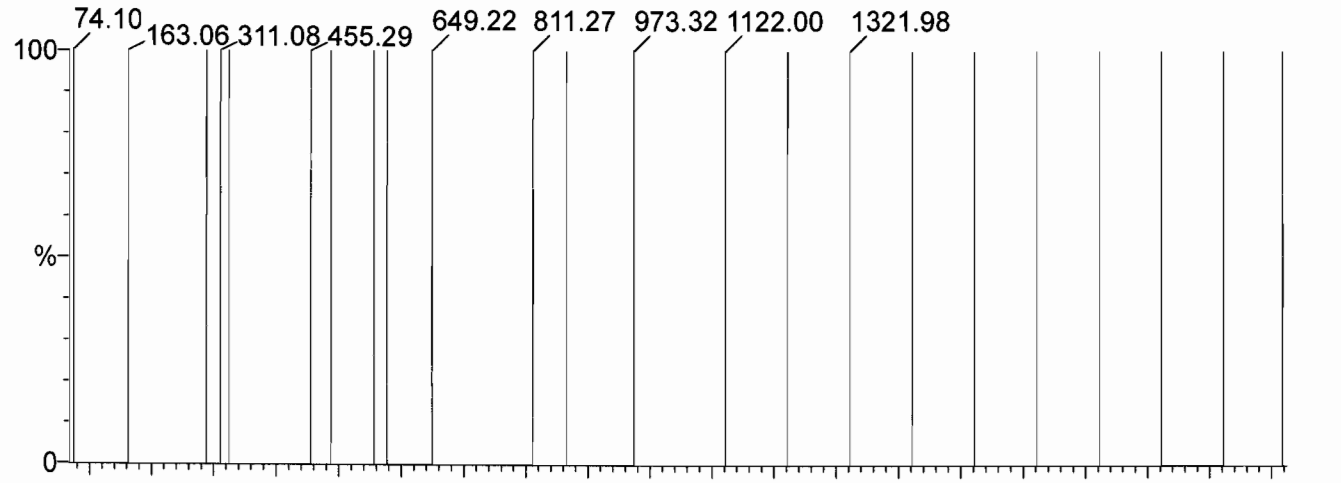

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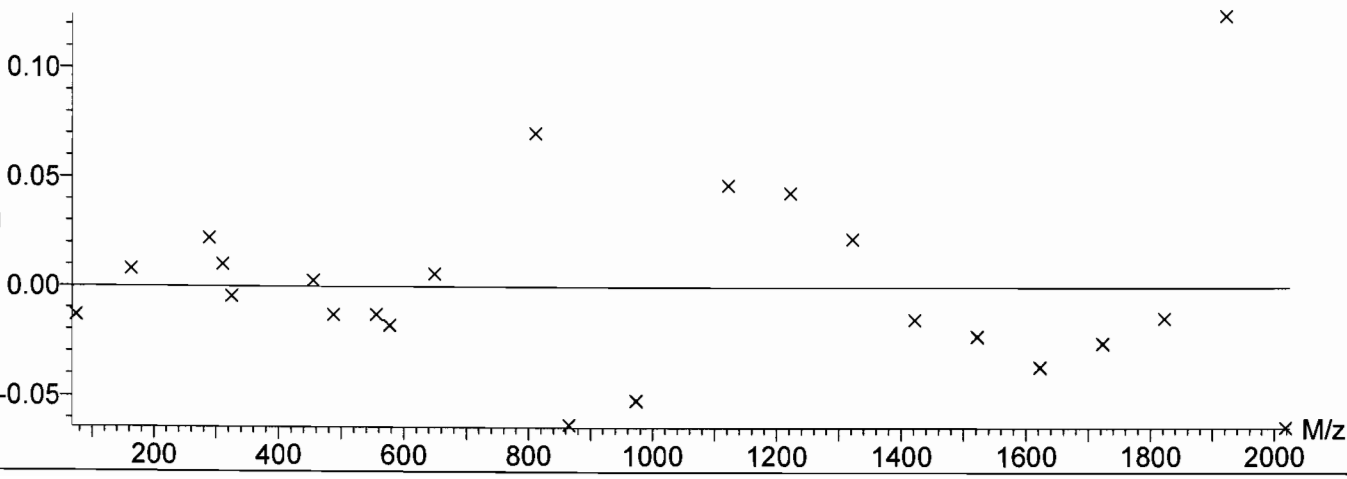
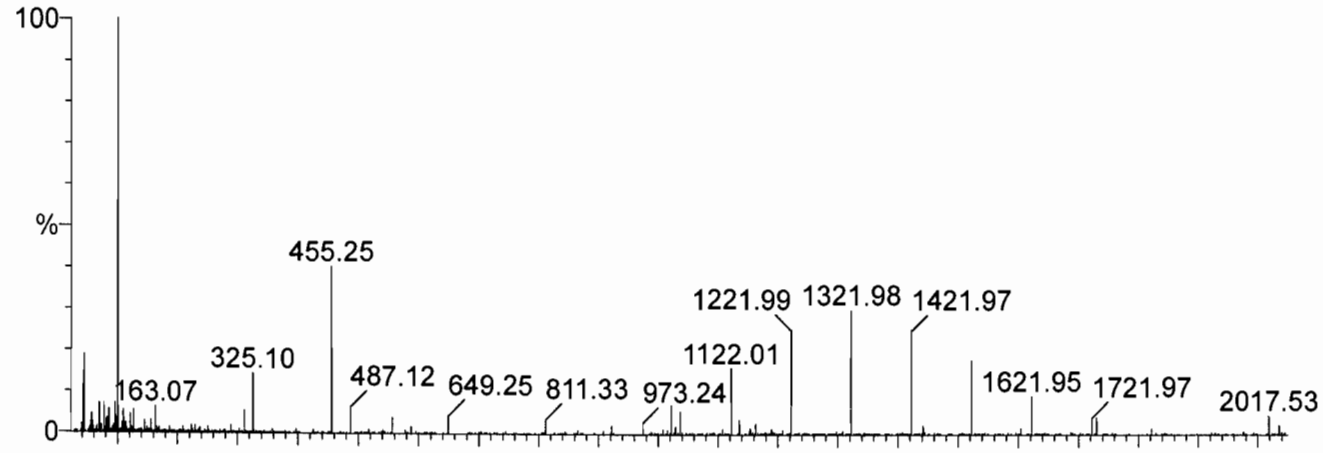
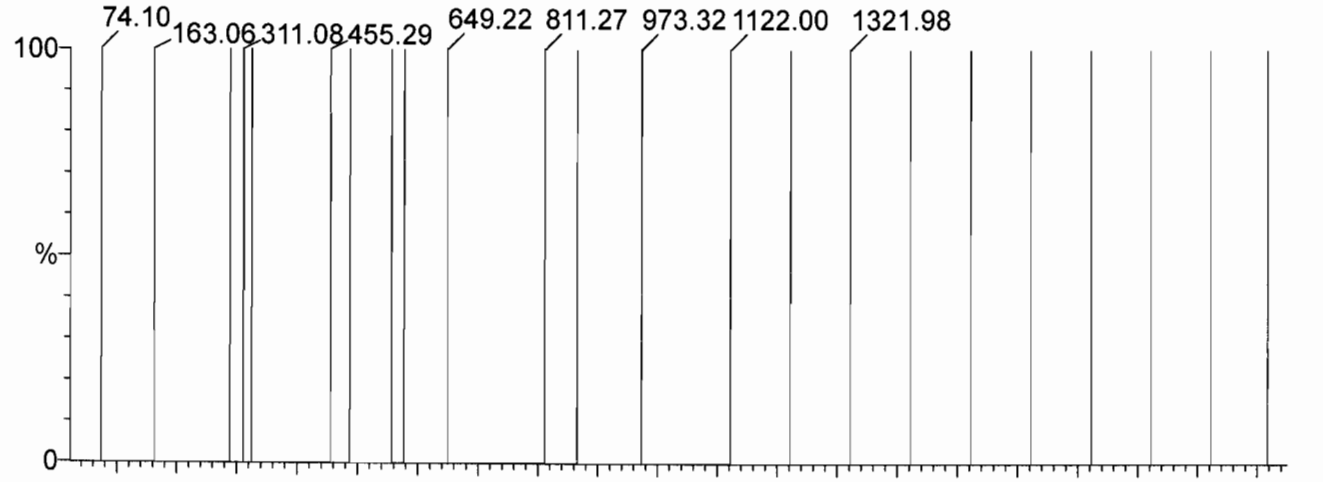


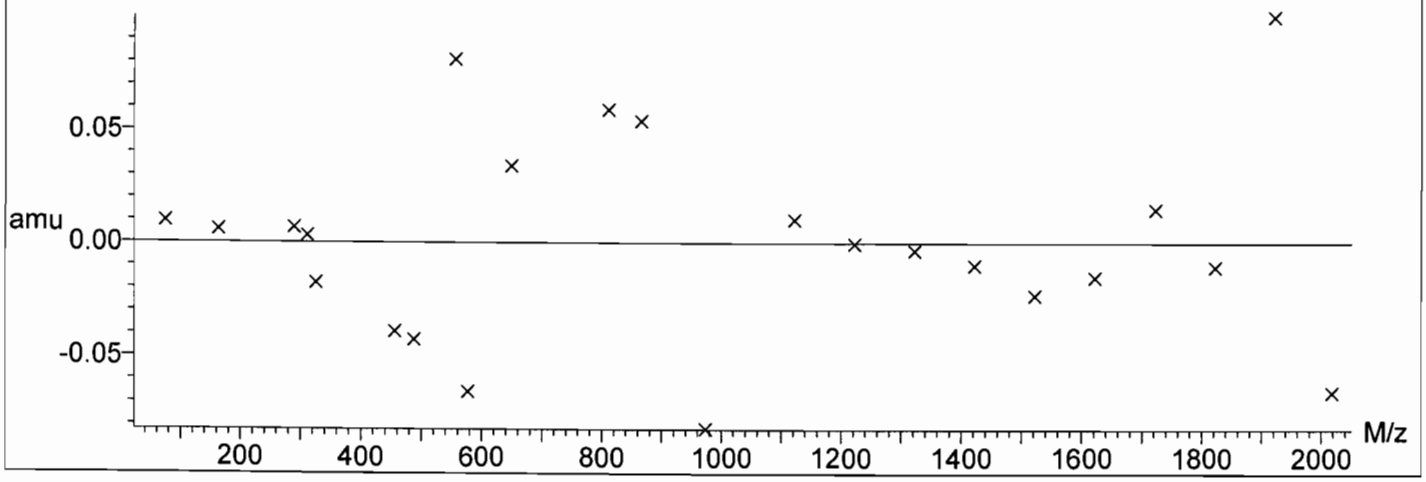
Data file: SCNMS2 - Calibrated 23 matches of 23 tested references



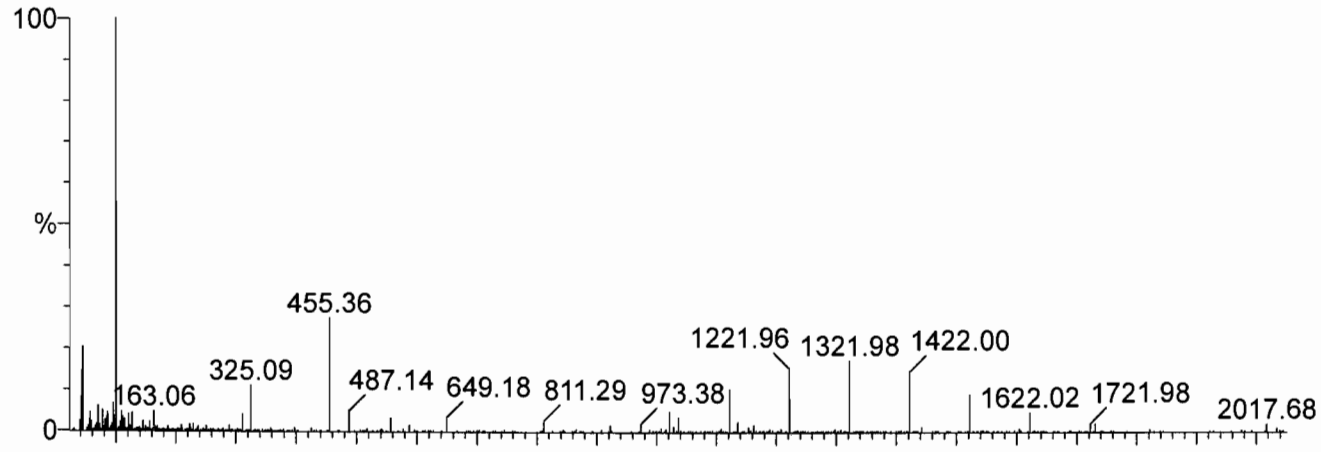
Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.0327 amu



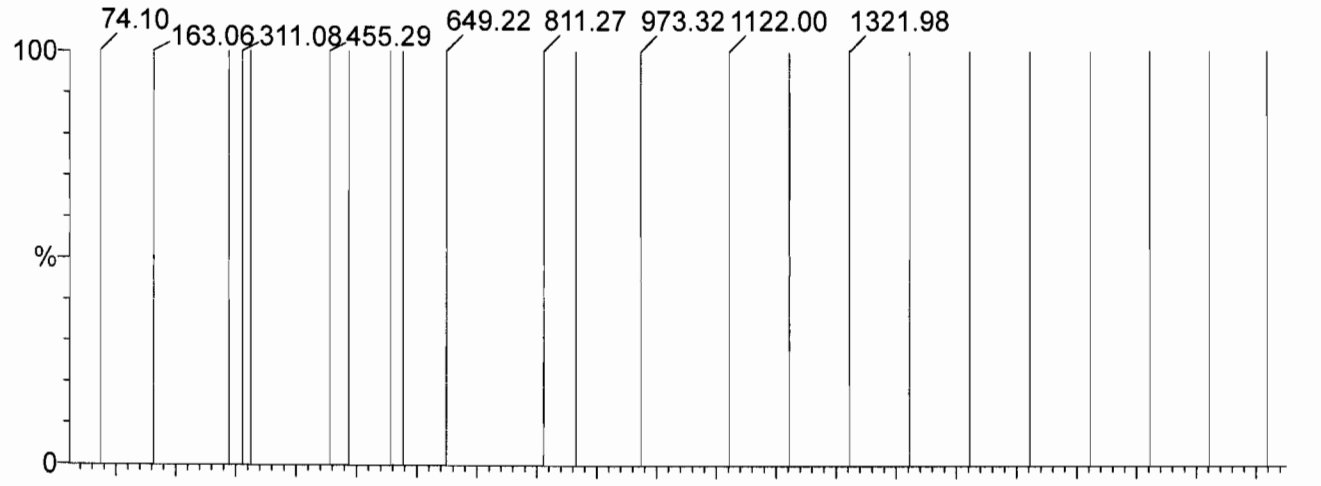
Residual Polynomial order = 4 RMS residual = 0.044 amu



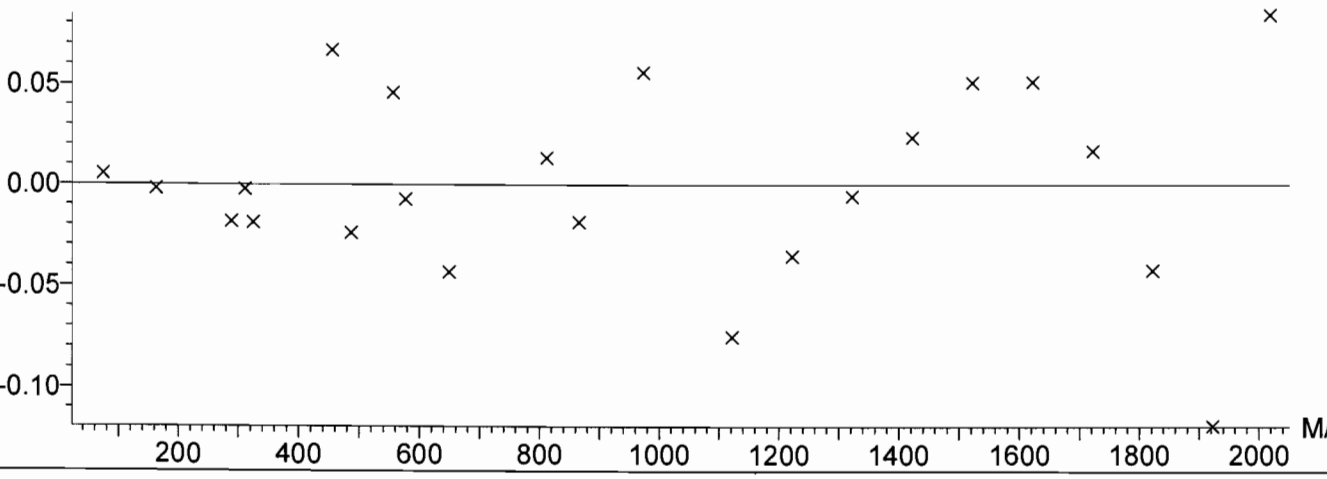
Data file: FASTMS2 - Calibrated 23 matches of 23 tested references



Reference: c:\masslynx\ref\ESI Calibration TQ ResCal.ref Mean residual = 0.036 amu



Residual Polynomial order = 4 RMS residual = 0.0464 amu



Standards

Analytical Standard Record

Vista Analytical Laboratory

18D2004

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18A2908	13C2-PFHxA	29-Jan-18	** Vendor **	27-Sep-22	0.4
18B1503	13C2-6:2 FTS	15-Feb-18	** Vendor **	17-Feb-22	1.05
18B1504	13C2-8:2 FTS	15-Feb-18	** Vendor **	24-Jan-23	1.044
18B1505	13C3-PFBA	15-Feb-18	** Vendor **	27-May-21	1
18B1506	13C2-PFDA	15-Feb-18	** Vendor **	13-Jul-22	1
18B1507	13C2-PFUdA	15-Feb-18	** Vendor **	11-Nov-21	1
18B1508	13C2-PFTeDA	15-Feb-18	** Vendor **	30-Nov-22	1
18B1509	13C5-PFNA	15-Feb-18	** Vendor **	14-Dec-22	1
18B1510	13C2-PFDoA	15-Feb-18	** Vendor **	23-May-22	1
18B1511	13C4-PFHpA	15-Feb-18	** Vendor **	03-May-22	1
18B1512	13C2-PFOA	15-Feb-18	** Vendor **	26-Oct-22	1
18B1513	13C3-PFPeA	15-Feb-18	** Vendor **	20-Apr-22	1
18B1514	13C2-PFHxDA	15-Feb-18	** Vendor **	13-Jul-22	0.4
18B1515	d3-N-Me-FOSAA	15-Feb-18	** Vendor **	08-Nov-19	1
18B1516	d5-N-EtFOSAA	15-Feb-18	** Vendor **	08-Nov-22	1
18B1517	13C3-PFBS	15-Feb-18	** Vendor **	24-May-22	1.076
18B1518	18O2-PFHxS	15-Feb-18	** Vendor **	17-Feb-22	1.058
18B1520	13C8-PFOS	15-Feb-18	** Vendor **	08-Nov-22	1.05
18B1525	13C8-FOSA-I	15-Feb-18	** Vendor **	11-Oct-22	1
18C0910	13C2-4:2 FTS	09-Mar-18	** Vendor **	01-Sep-22	1.07

Description:	PFC - IS	Expires:	08-Nov-19
Standard Type:	Reagent	Prepared:	20-Apr-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	20-Apr-18 10:40 by GRB

Analyte	CAS Number	Concentration	Units
13C3-PFBA		1.25	ug/mL
13C2-6:2 FTS		1.25	ug/mL
13C2-8:2 FTS		1.25	ug/mL
13C2-PFDA		1.25	ug/mL
13C2-PFDoA		1.25	ug/mL
13C2-PFHxA		0.5	ug/mL
13C2-PFHxDA		0.5	ug/mL
13C2-PFOA		1.25	ug/mL
13C2-4:2 FTS		1.25	ug/mL
13C2-PFUnA		1.25	ug/mL
d5-EtFOSAA		1.25	ug/mL
13C3-PFBS		1.25	ug/mL
13C3-PFPeA		1.25	ug/mL

Analytical Standard Record

Vista Analytical Laboratory

18D2004

Description:	PFC - IS	Expires:	08-Nov-19
Standard Type:	Reagent	Prepared:	20-Apr-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	20-Apr-18 10:40 by GRB

Analyte	CAS Number	Concentration	Units
13C4-PFHpA		1.25	ug/mL
13C5-PFNA		1.25	ug/mL
13C8-PFOS		1.25	ug/mL
13C8-PFOSA		1.25	ug/mL
18O2-PFHxS		1.25	ug/mL
d3-MeFOSAA		1.25	ug/mL
13C2-PFTeDA		1.25	ug/mL

18A2908

WELLINGTON LABORATORIES

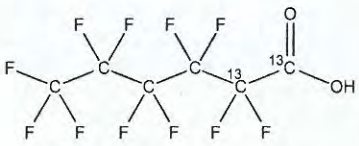
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFHxA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexanoic acid

LOT NUMBER: MPFHxA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4HF_{11}O_2$	**MOLECULAR WEIGHT:**	316.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	10/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/27/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of perfluoro-n-hexanoic acid and < 0.3% of perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18A2908

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

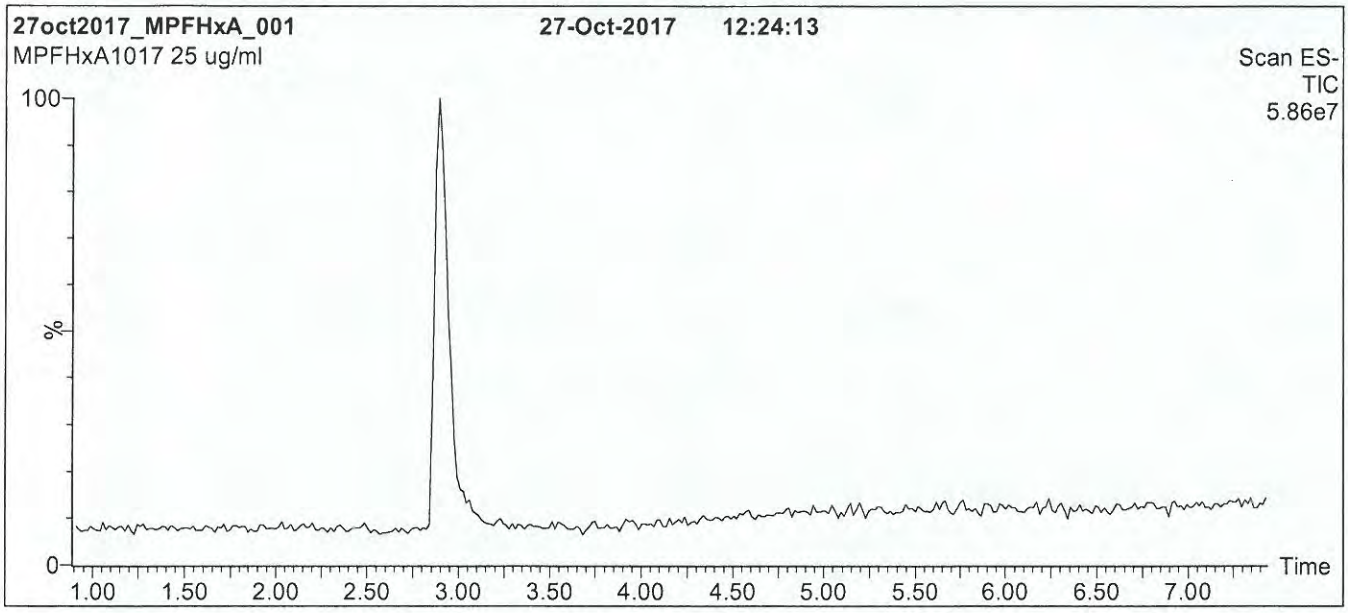
CALA Testing Accreditation No. A 1226

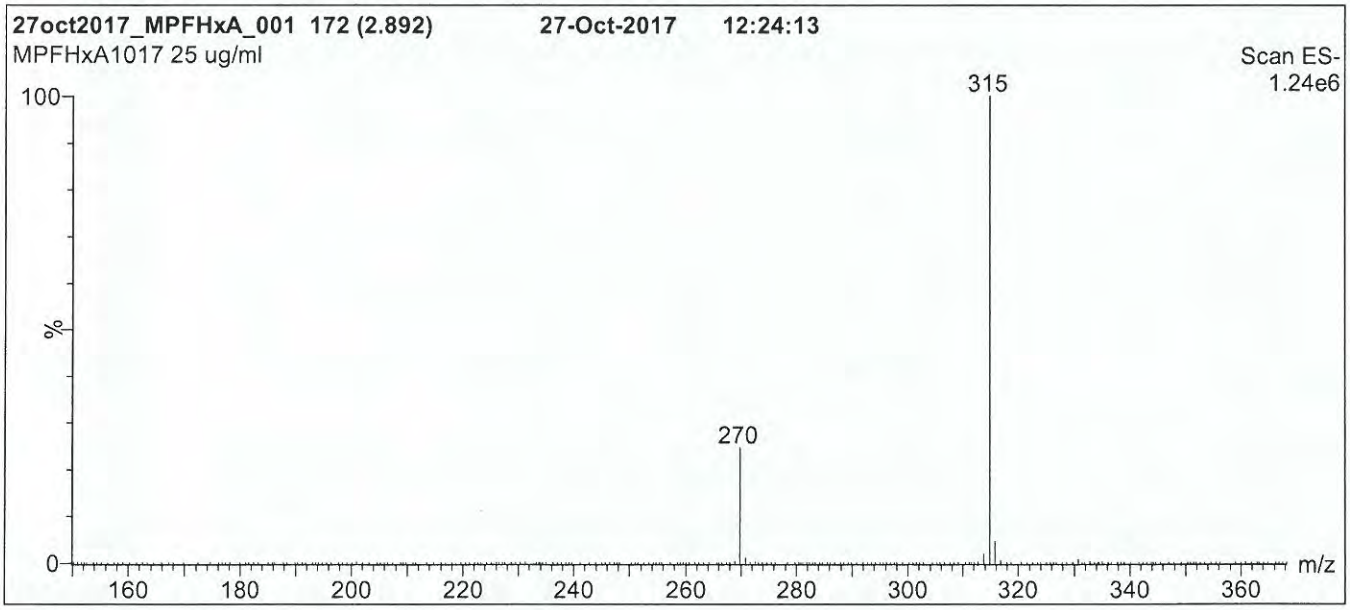
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18A2908

Figure 1: **MPFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 µl/min

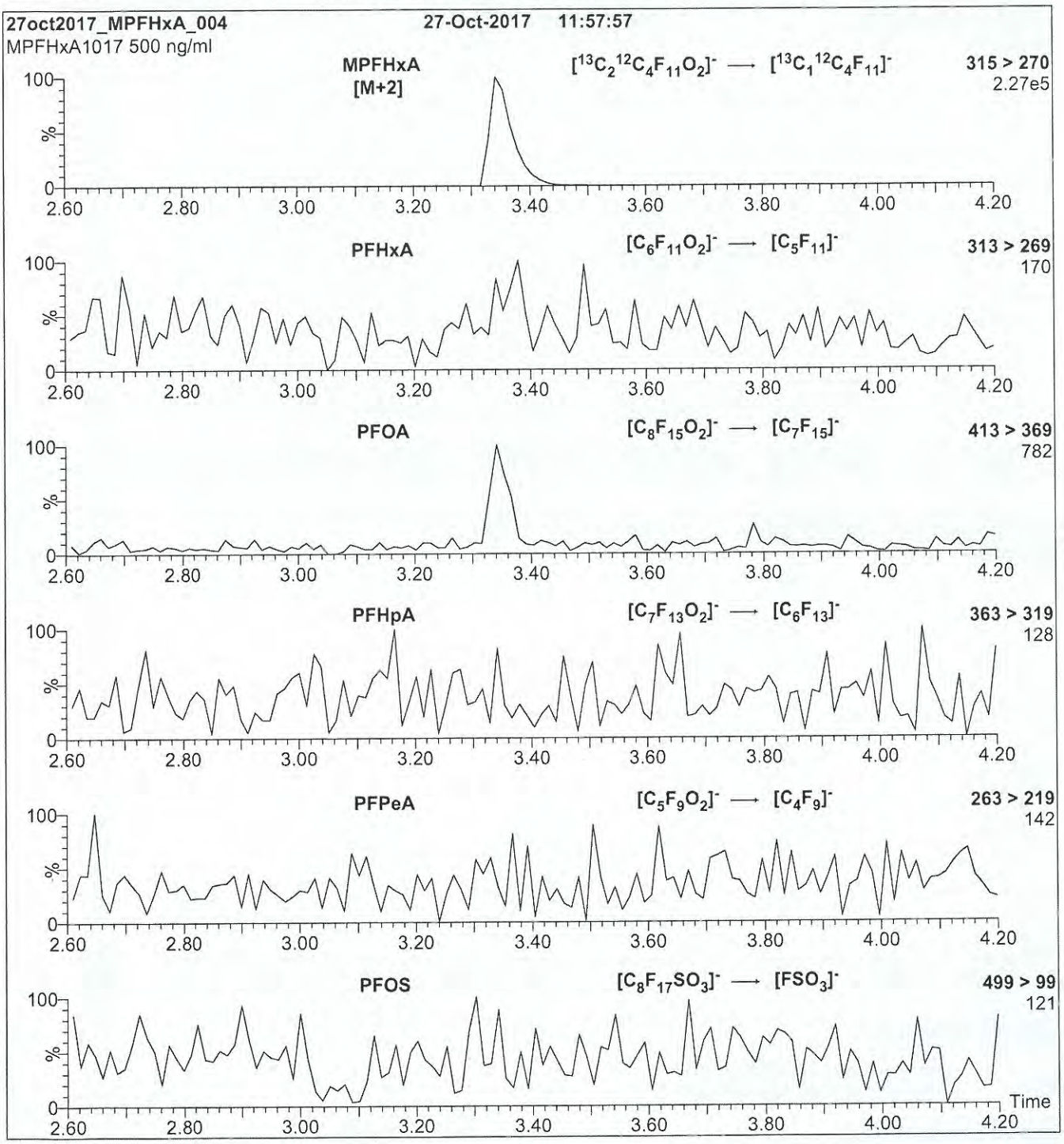
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18A2908

Figure 2: **MPFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.58e-3
Collision Energy (eV) = 10

1881503

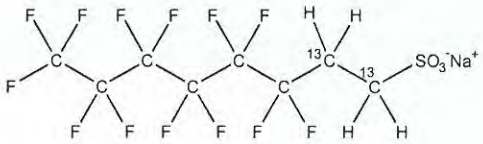
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2-6:2FTS **LOT NUMBER:** M262FTS0217

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]octane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6H_4F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	452.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.5 ± 2.4 µg/ml (M2-6:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 6:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 6:2FTS and M2-6:2FTS will produce signals in the m/z 429 to m/z 409 channel during SRM analysis. We recommend using the m/z 429 to m/z 81 transition to monitor for M2-6:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 02/24/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1503

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

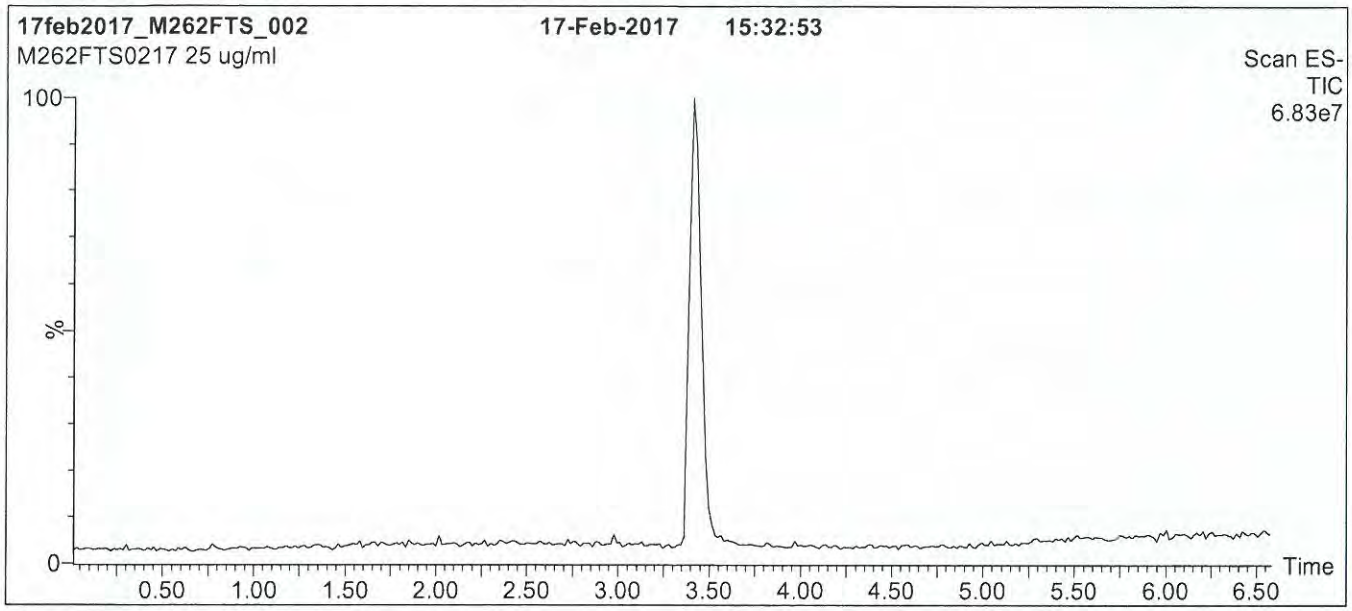
CALA

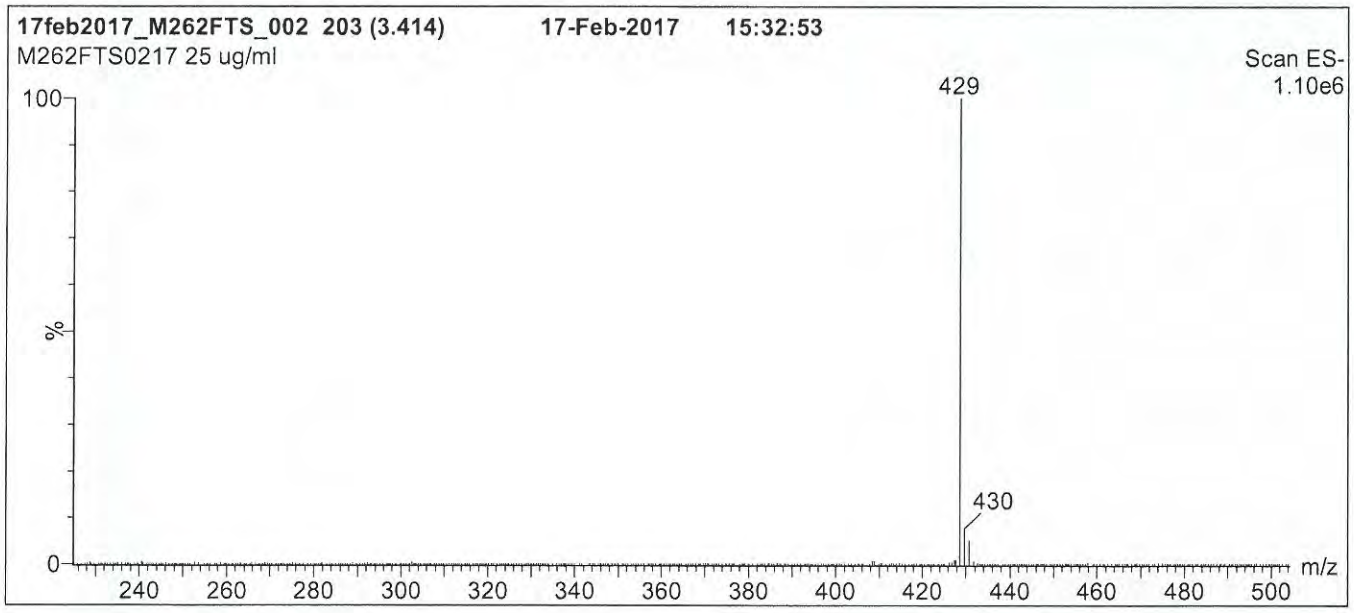
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1503

Figure 1: **M2-6:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

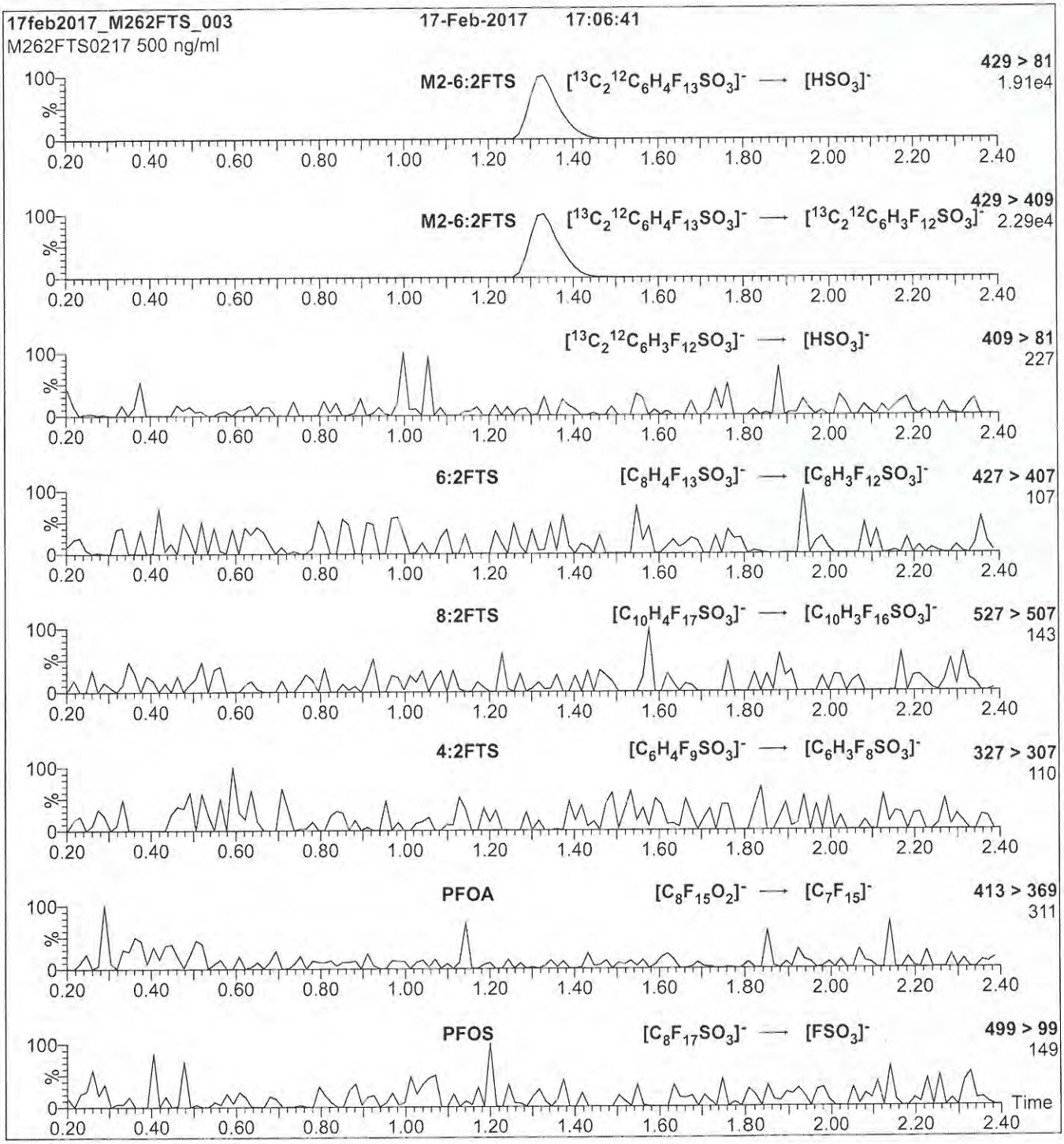
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1801503

Figure 2: **M2-6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-6:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

1801504

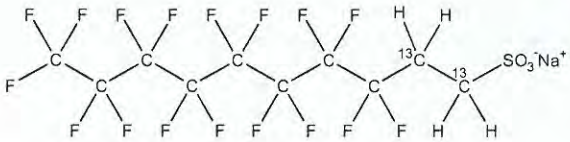
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-8:2FTS **LOT NUMBER:** M282FTS0118

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]decane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	552.15
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml (M2-8:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	01/24/2018		
EXPIRY DATE: (mm/dd/yyyy)	01/24/2023		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 8:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 8:2FTS and M2-8:2FTS will produce signals in the m/z 529 to m/z 509 channel during SRM analysis. We recommend using the m/z 529 to m/z 81 transition to monitor for M2-8:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 01/26/2018 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1504

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HANDLING:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

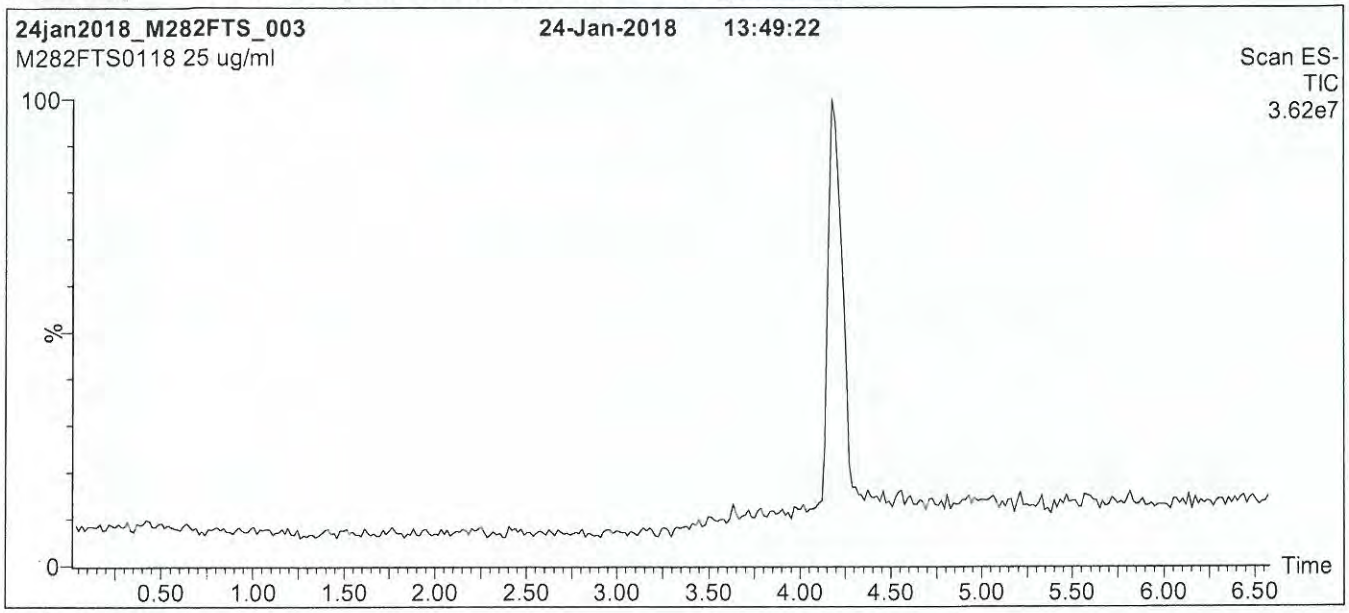
CALA

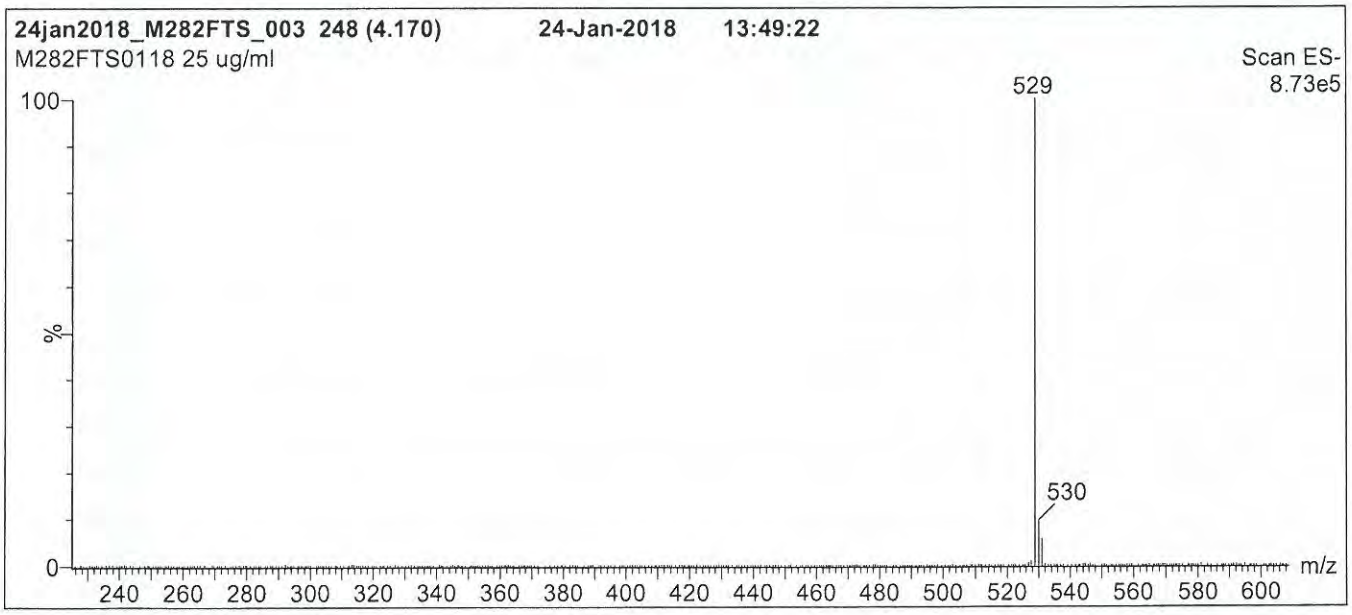
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1504

Figure 1: **M2-8:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

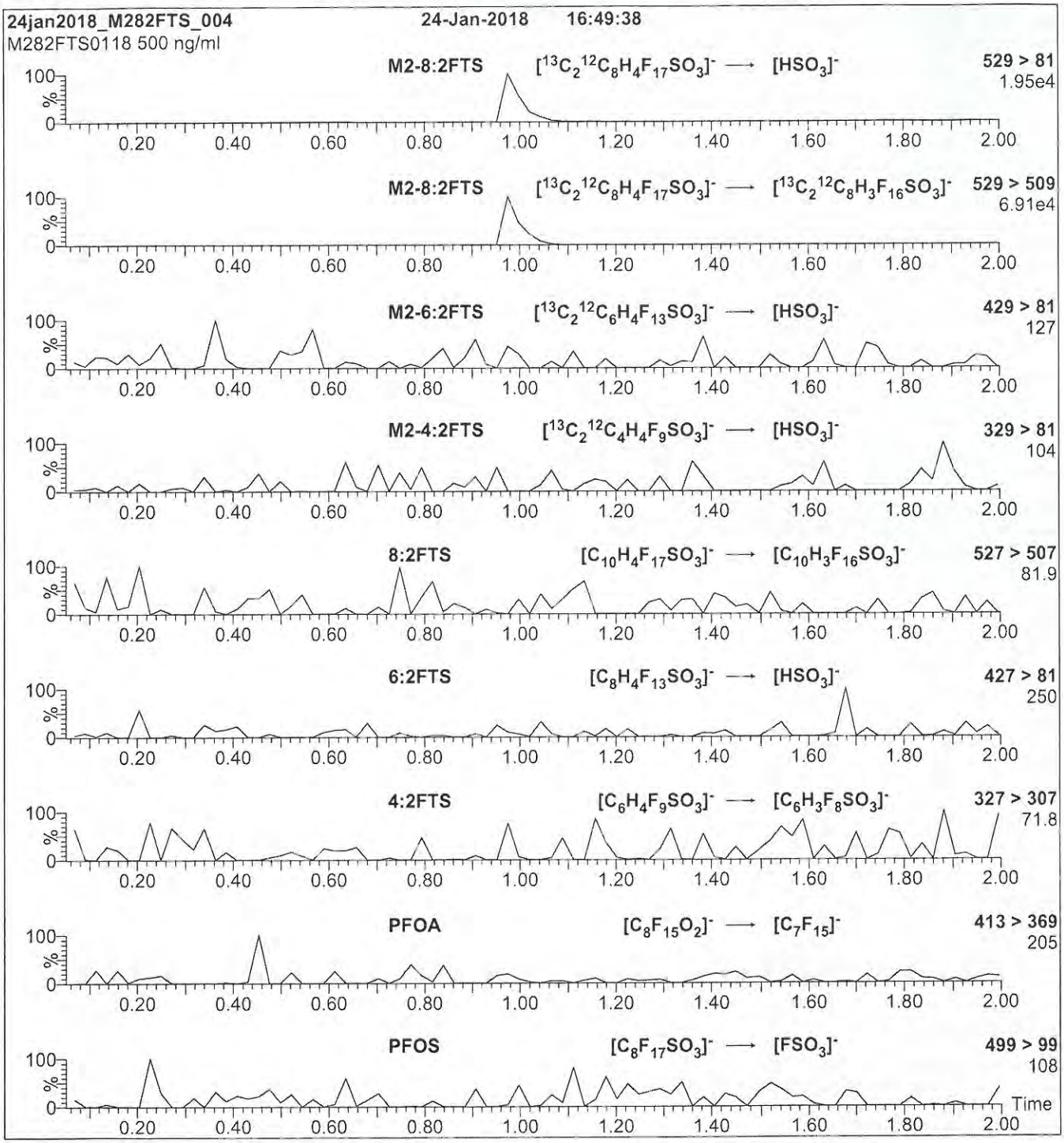
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source:Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1504

Figure 2: **M2-8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

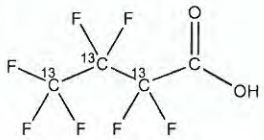
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 25

18B1505

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M3PFBA	**LOT NUMBER:**	M3PFBA0516
COMPOUND:	Perfluoro-n-[2,3,4-$^{13}C_3$]butanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}CHF_7O_2$	**MOLECULAR WEIGHT:**	217.02
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	05/27/2016		
EXPIRY DATE: (mm/dd/yyyy)	05/27/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of perfluoro-n-[$^{13}C_3$]propanoic acid and also contains ~ 1.0% of perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid due to the naturally occurring isotopic abundance of ^{13}C in the unlabelled carbon atom.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ B.G. Chittim **Date:** 07/08/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1505

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SYNTHESIS / CHARACTERIZATION:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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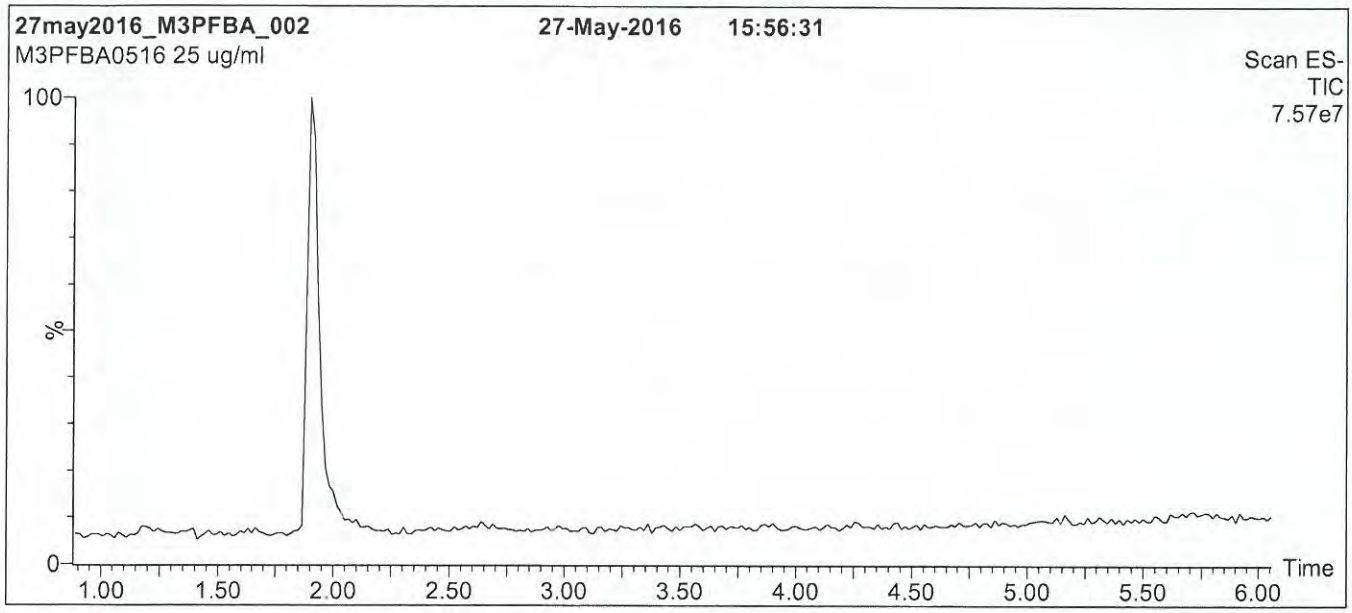
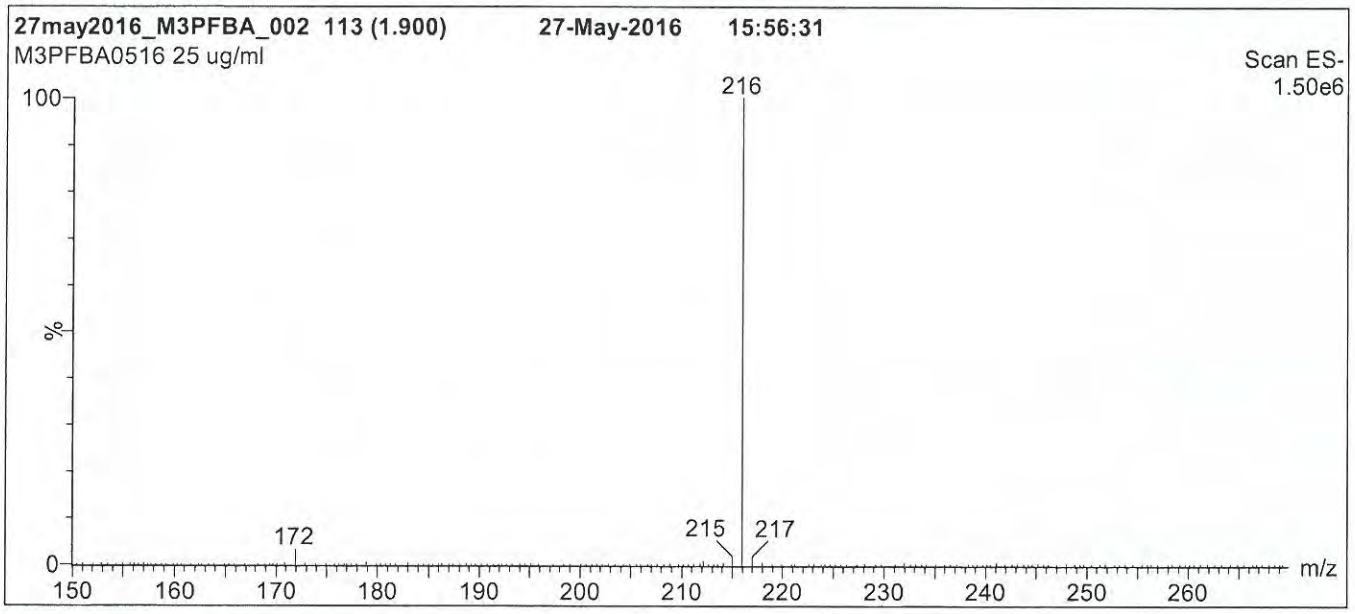
18B1505

Figure 1: **M3PFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

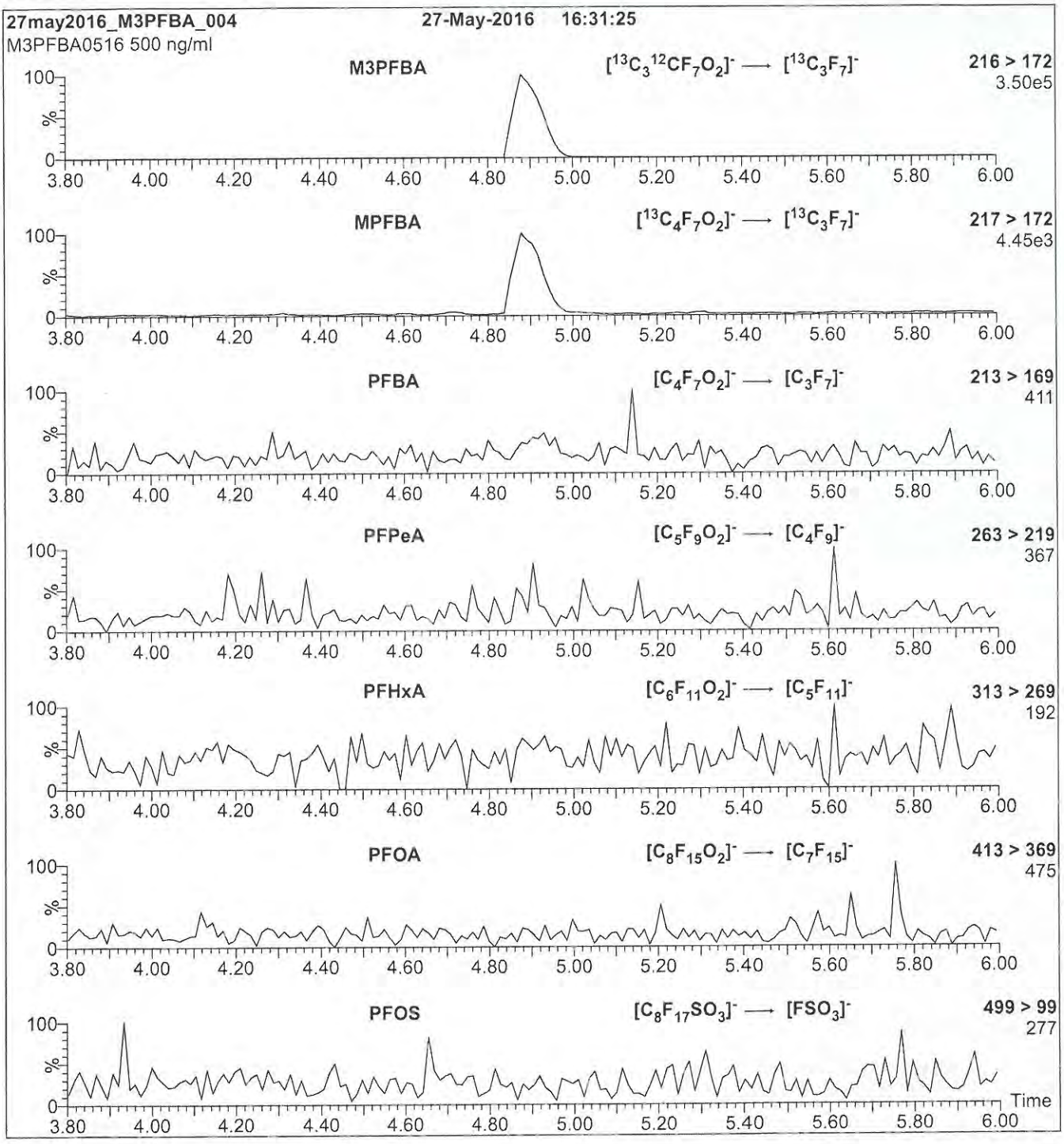
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1505

Figure 2: **M3PFBA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.62e-3
Collision Energy (eV) = 10

18B1506

WELLINGTON LABORATORIES

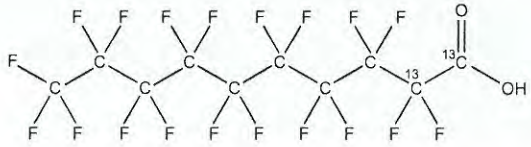
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]decanoic acid

LOT NUMBER: MPFDA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8HF_{19}O_2$	**MOLECULAR WEIGHT:**	516.07
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	07/13/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/13/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of $^{13}C_1$-PFNA.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1881506

INTENDED USE:

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HAZARDS:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

ANAB ACCREDITED

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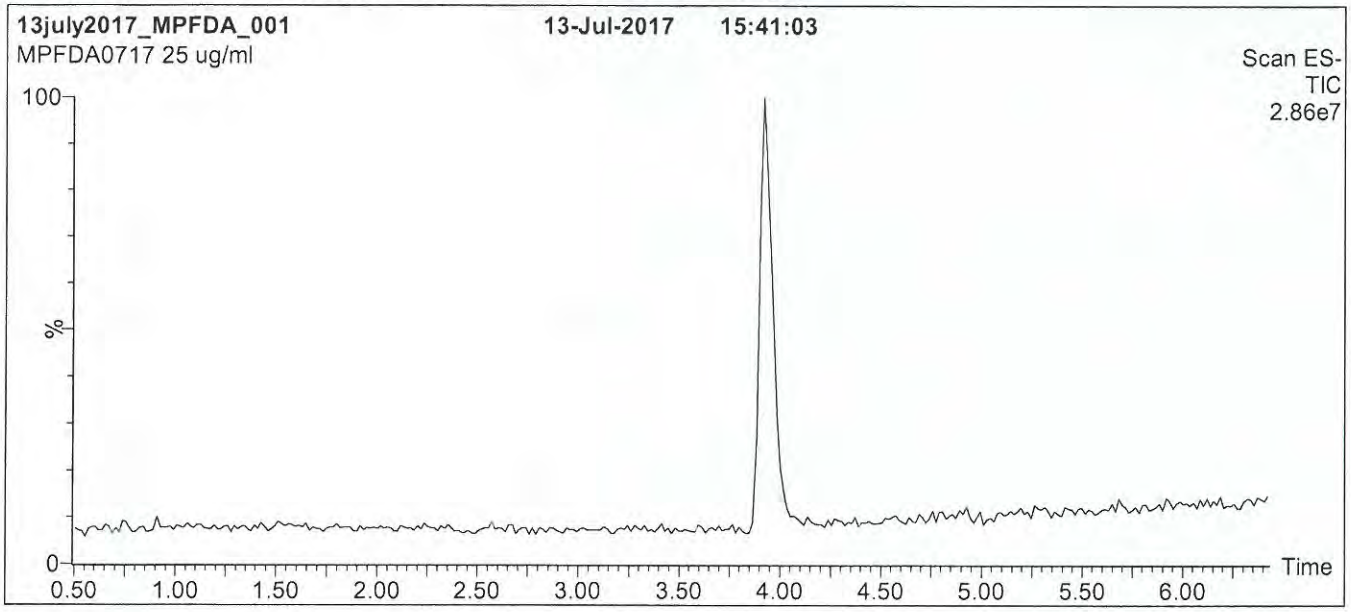
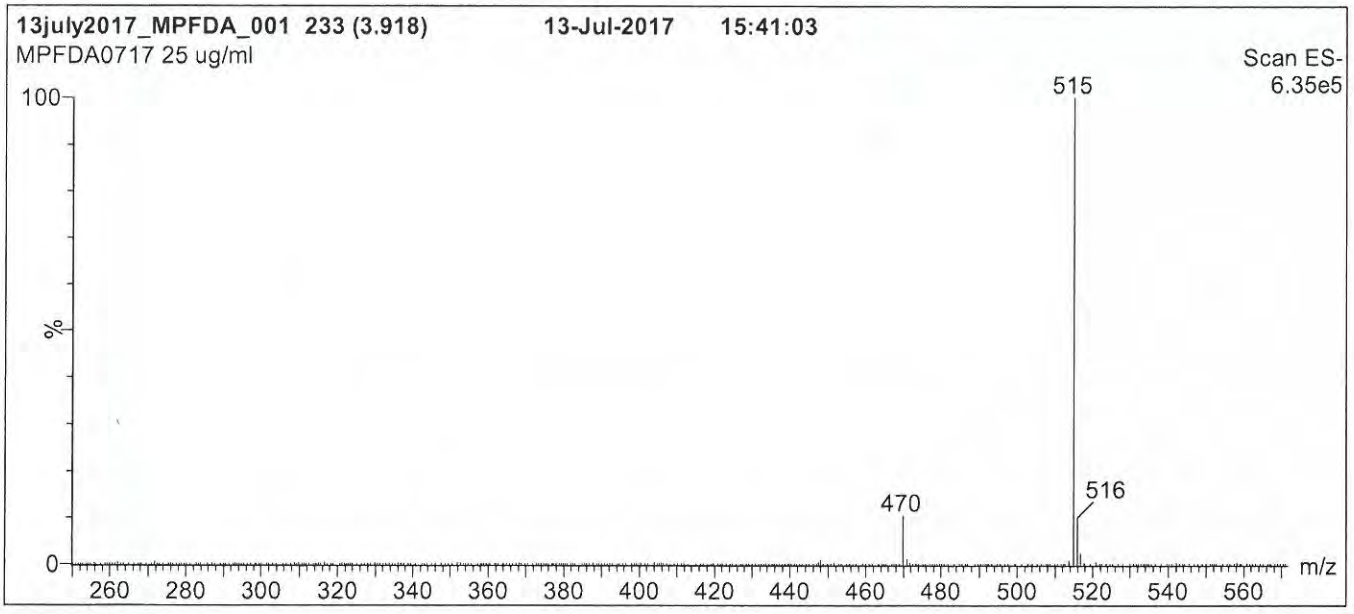
18B1506

Figure 1: **MPFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

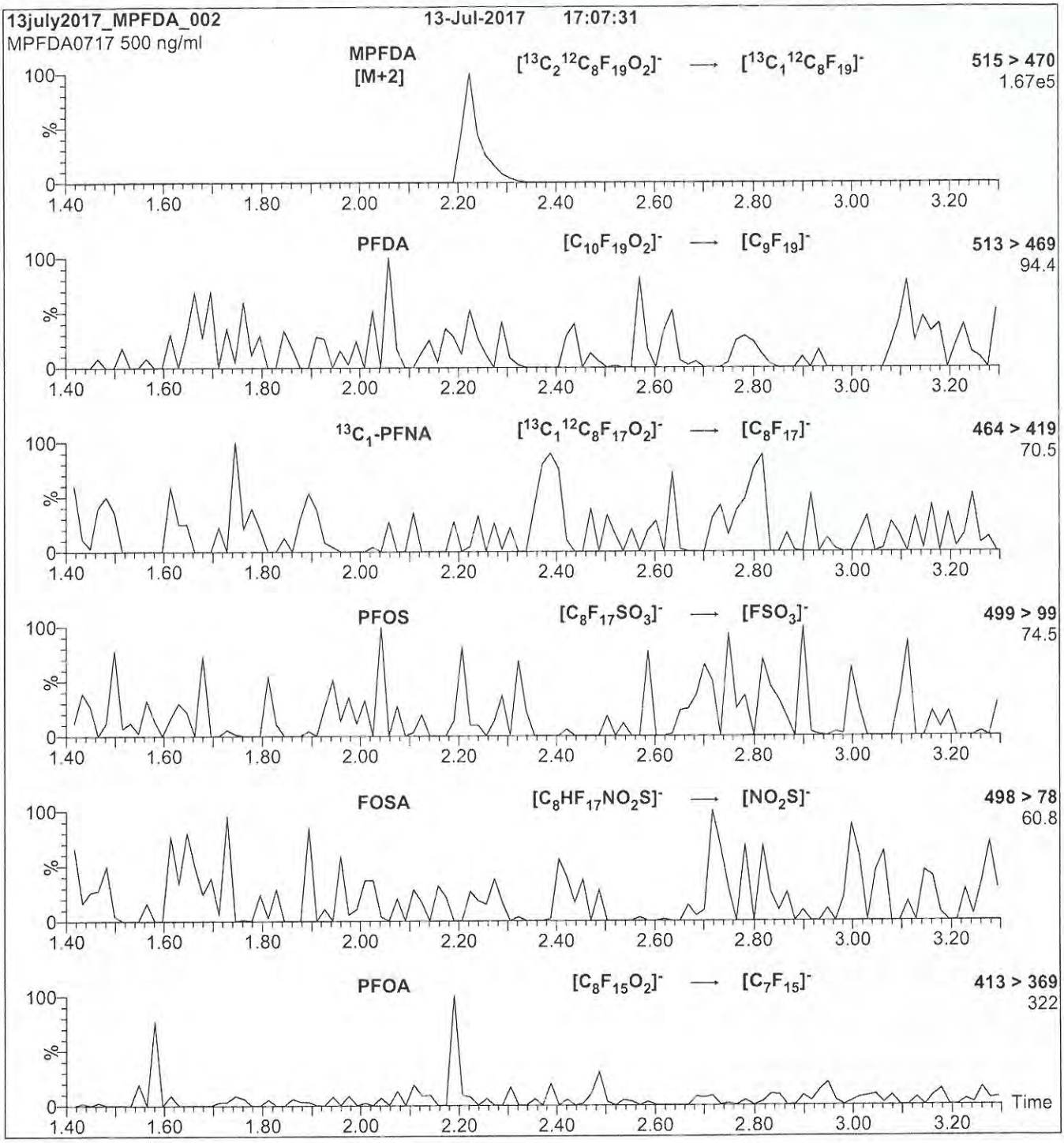
MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1506

Figure 2: **MPFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

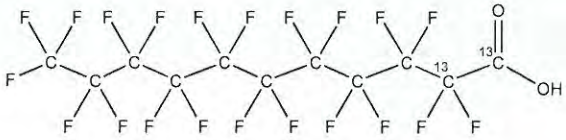
Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 13

18B1507

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	MPFUdA	**LOT NUMBER:**	MPFUdA1116
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]undecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_9HF_{21}O_2$	**MOLECULAR WEIGHT:**	566.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/22/2016		
EXPIRY DATE: (mm/dd/yyyy)	11/22/2021		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Presence of 1-$^{13}C_1$-PFUdA (~1%; see Figure 2), 2-$^{13}C_1$-PFUdA (~1%), and PFUdA (~0.2%; see Figure 2) are due to the isotopic purity of the ^{13}C-precursor.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/07/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1881507

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

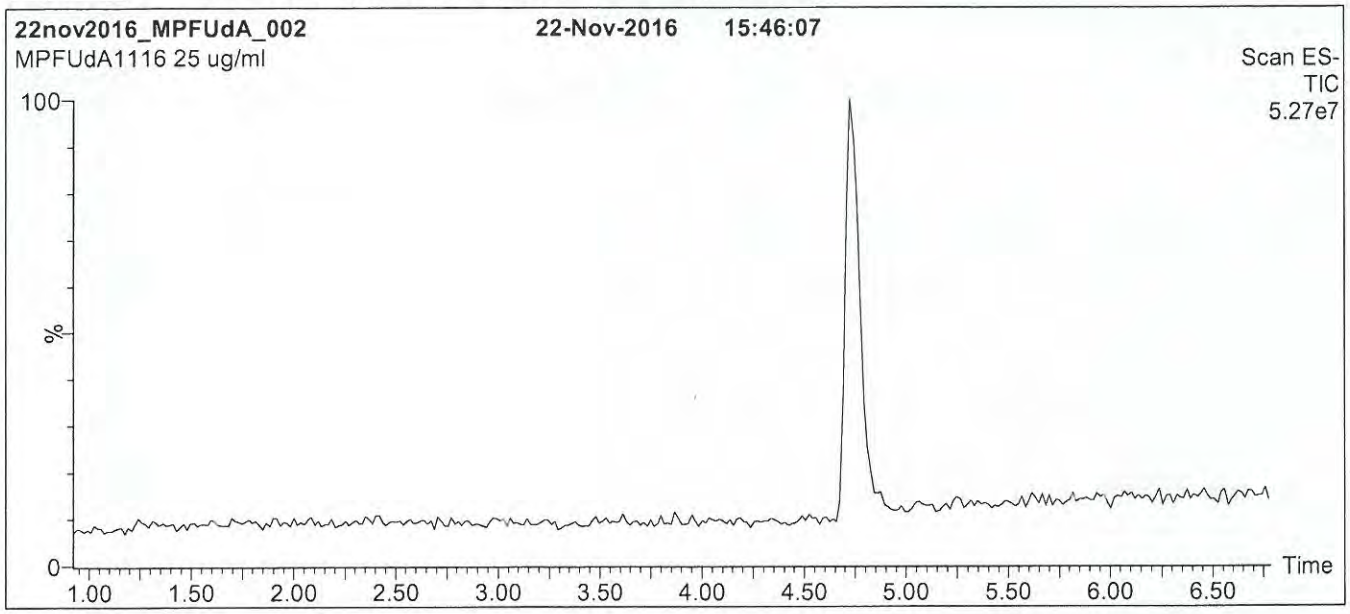
CALA

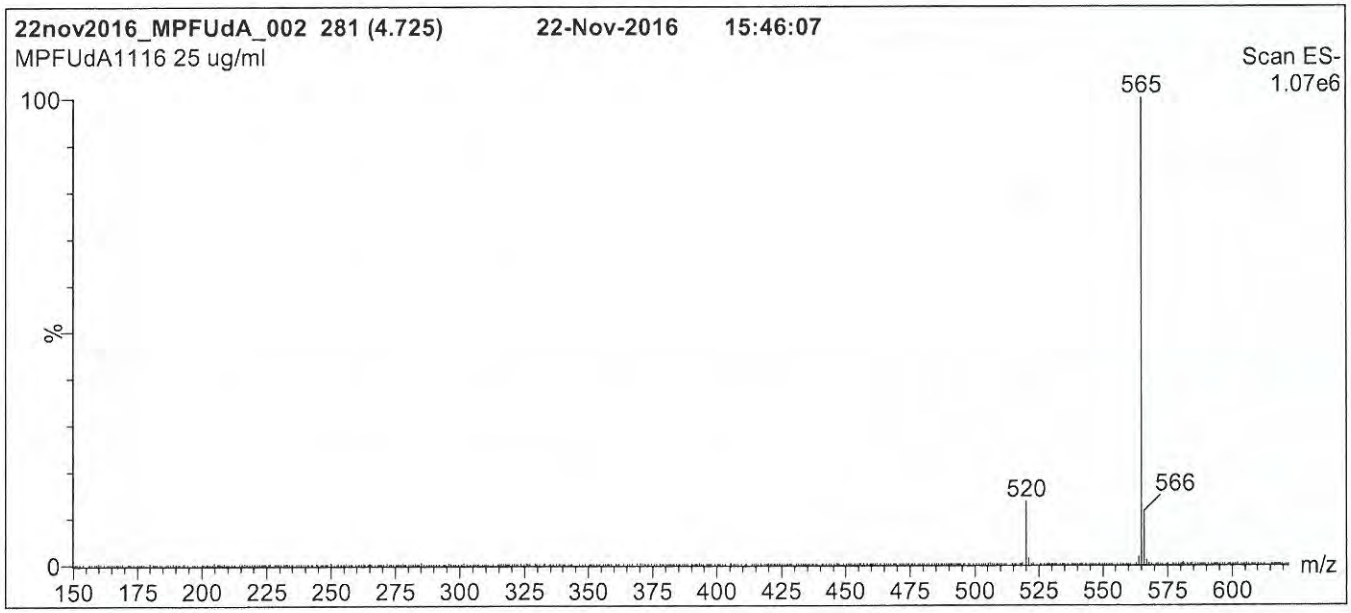
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1507

Figure 1: **MPFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

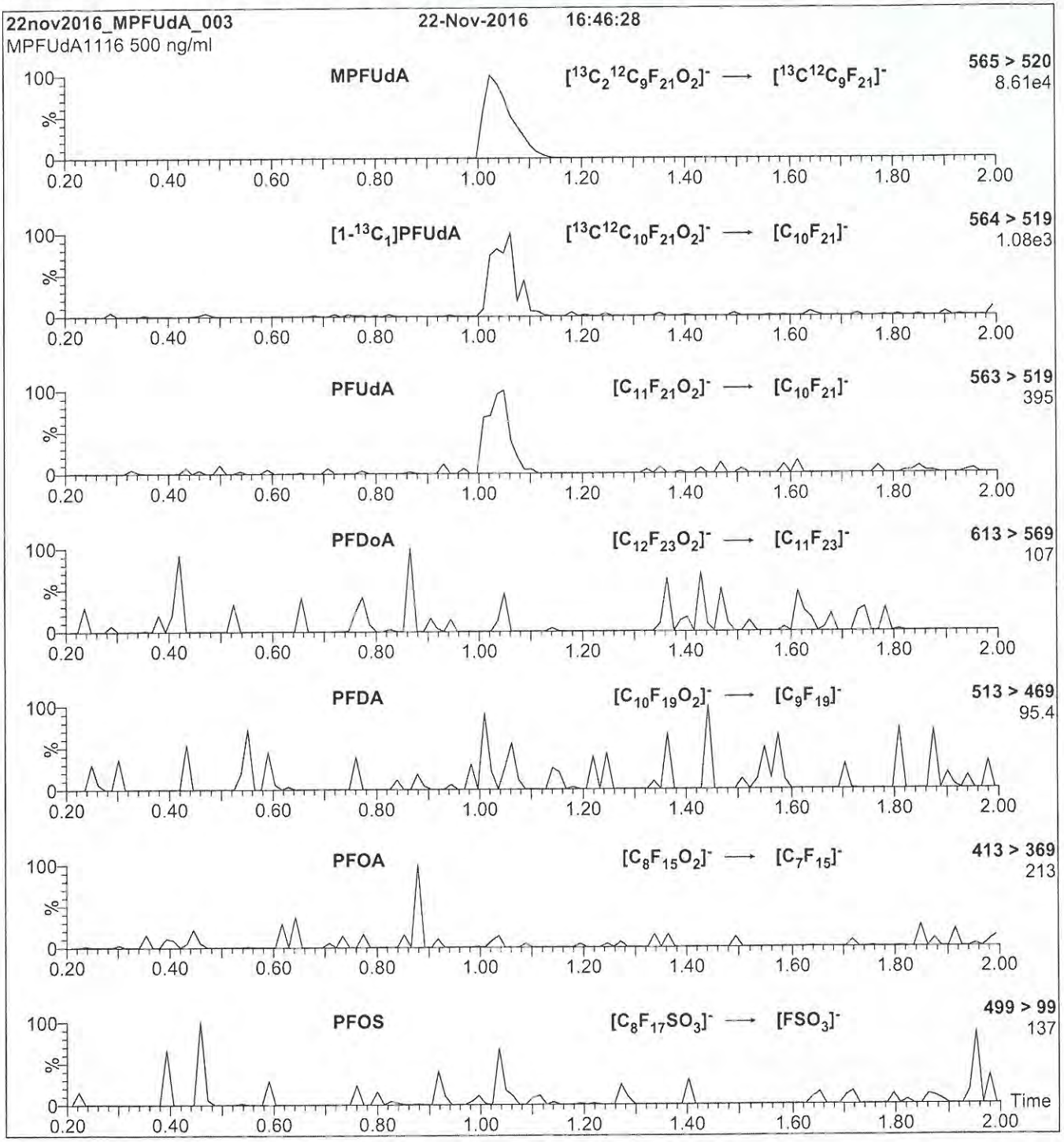
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

1881507

Figure 2: **MPFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

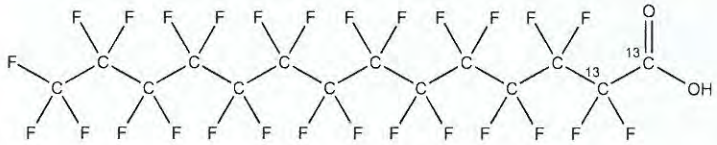
Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

18B1508

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M2PFTeDA	**LOT NUMBER:**	M2PFTeDA1117
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]tetradecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{12}HF_{27}O_2$	**MOLECULAR WEIGHT:**	716.10
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/30/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/30/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/01/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1881508

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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CALA

ANAB ACCREDITED

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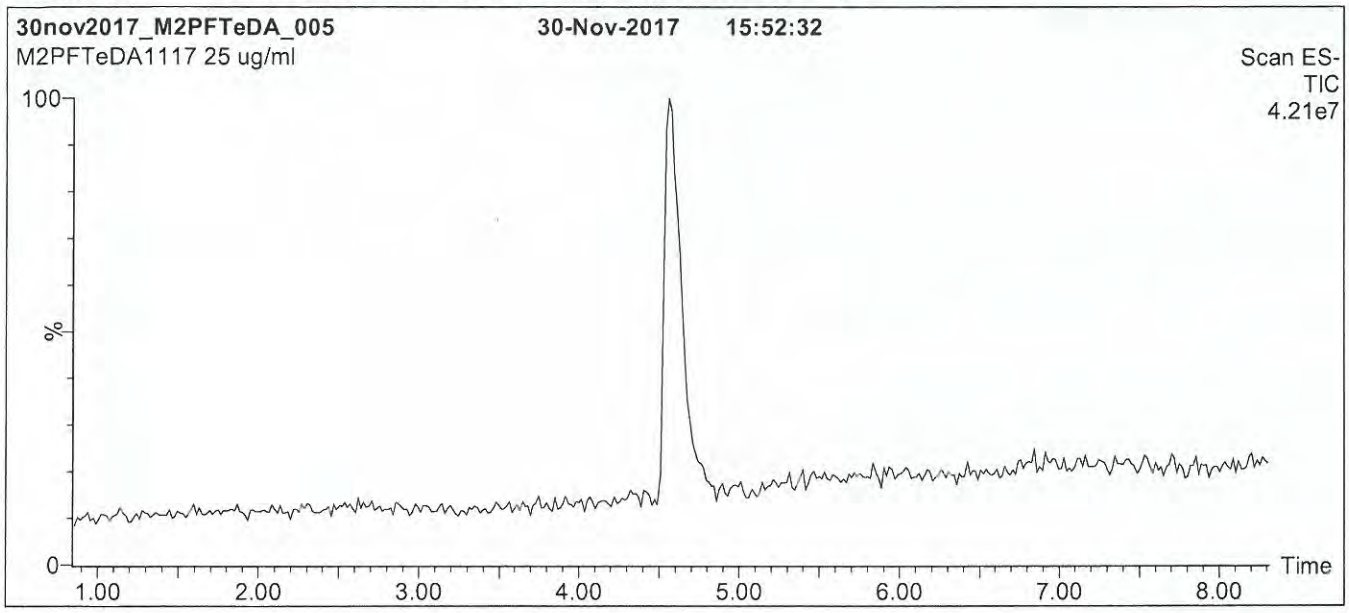
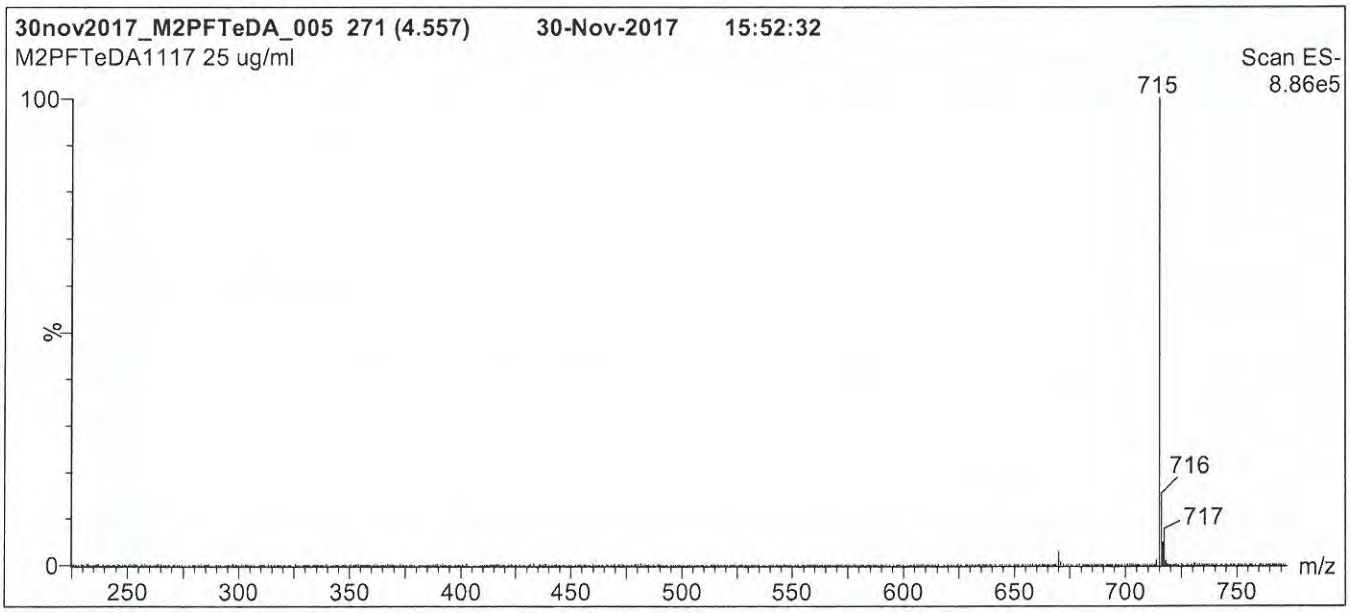
18B1508

Figure 1: **M2PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 65% (80:20 MeOH:ACN) / 35% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

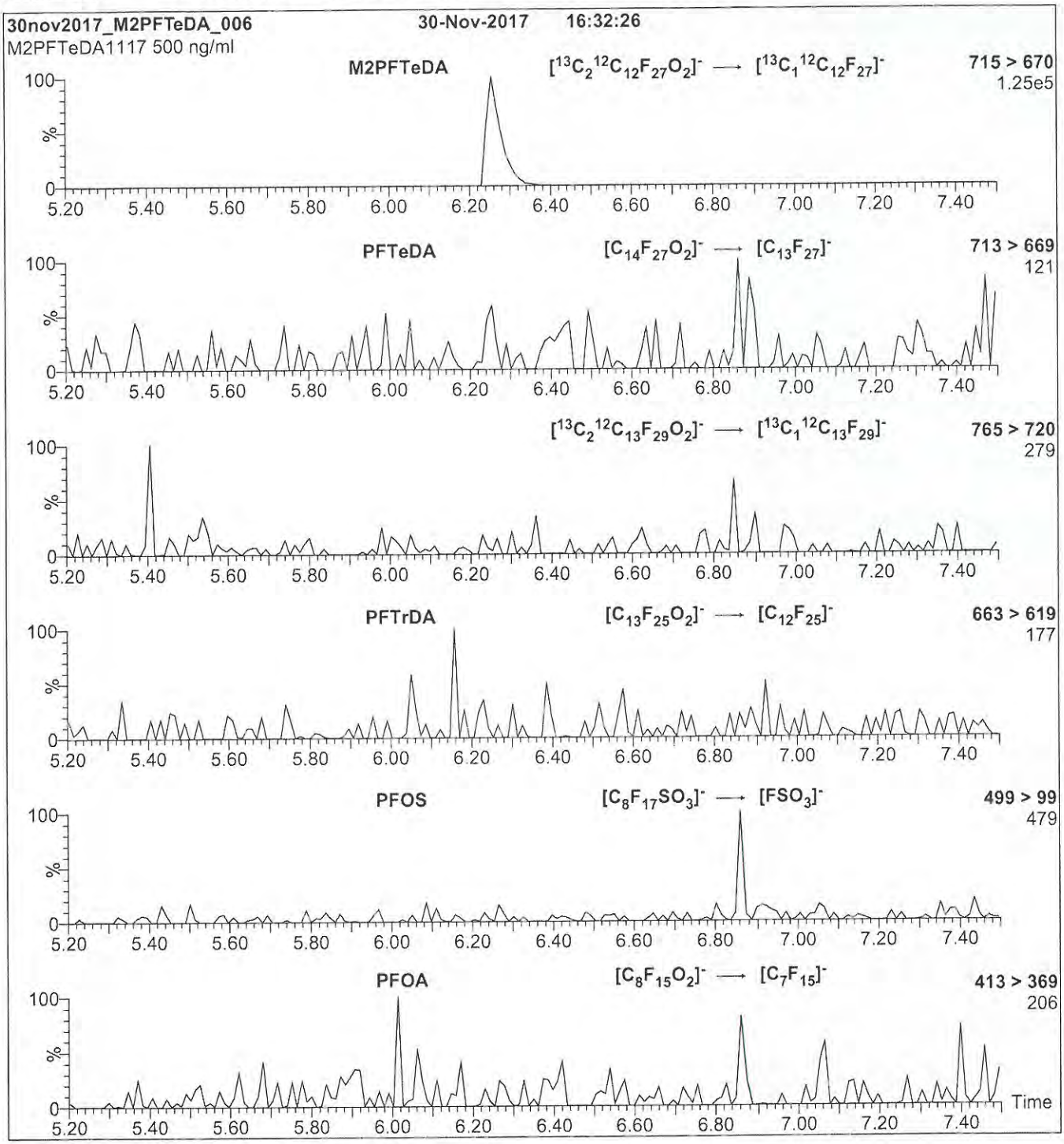
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1508

Figure 2: **M2PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 14

18B1509

WELLINGTON LABORATORIES

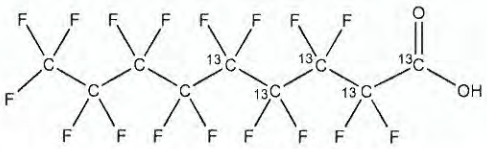
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: MPFNA
COMPOUND: Perfluoro-n-[1,2,3,4,5-$^{13}C_5$]nonanoic acid

LOT NUMBER: MPFNA1217

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_4HF_{17}O_2$	**MOLECULAR WEIGHT:**	469.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	12/14/2017		
EXPIRY DATE: (mm/dd/yyyy)	12/14/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/19/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1509

INTENDED USE:

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HAZARDS:

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CALA

ANAB ACCREDITED

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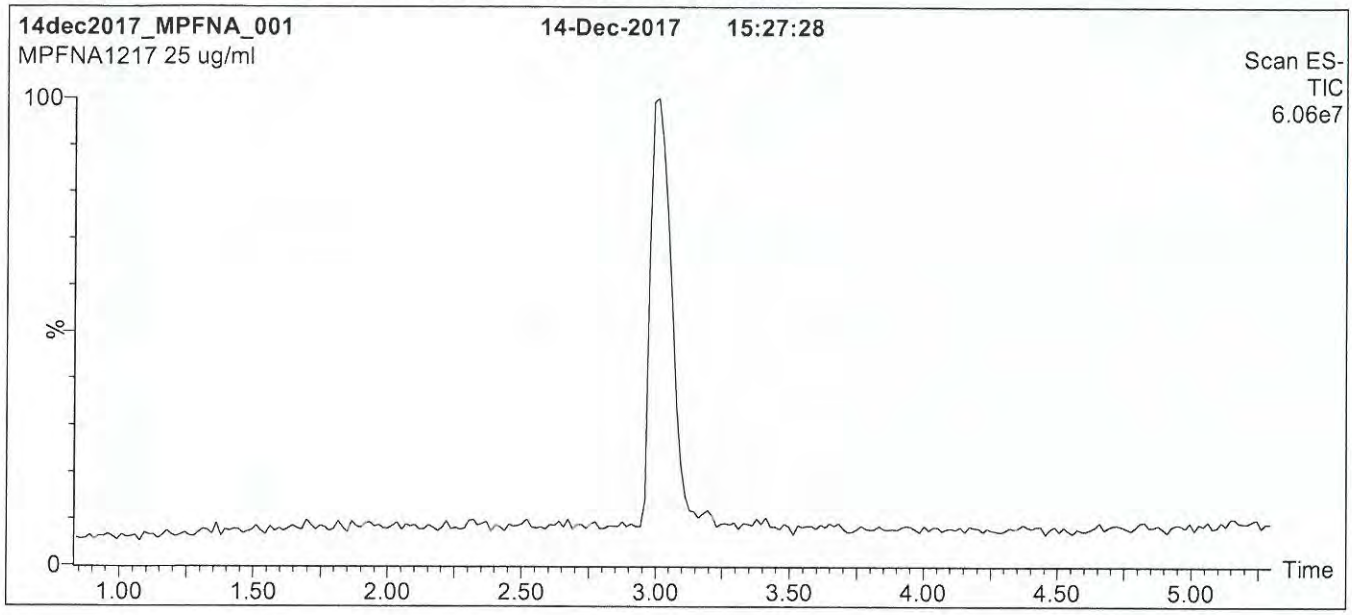
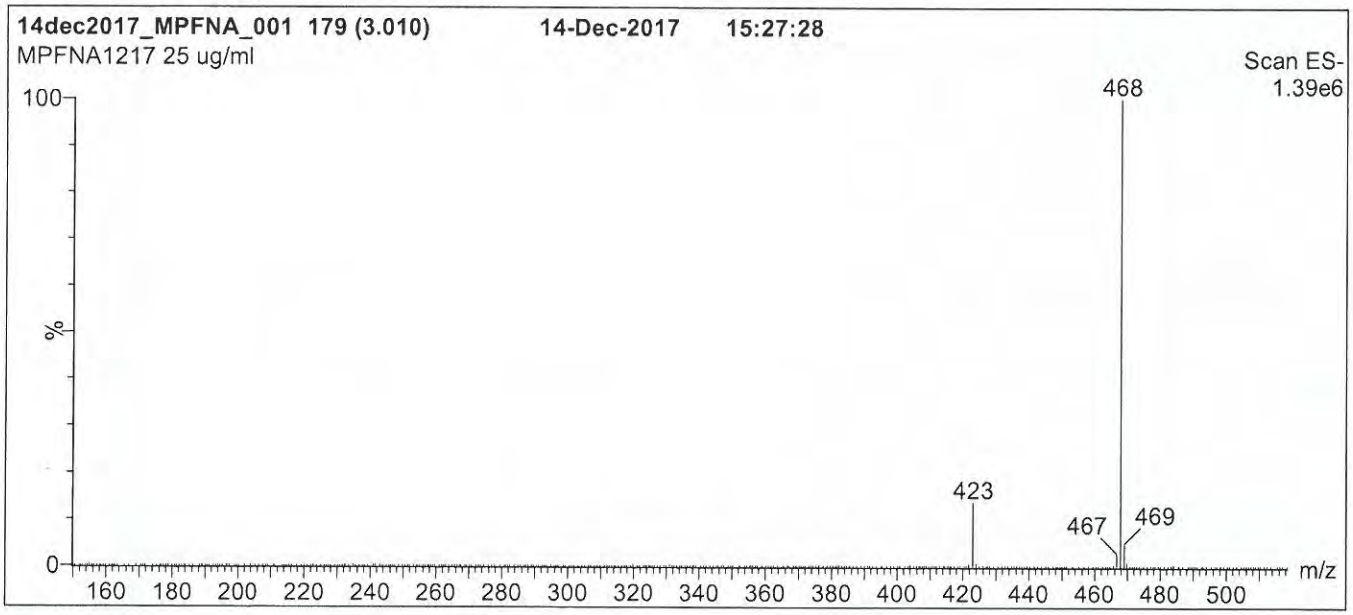
18B1509

Figure 1: **MPFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

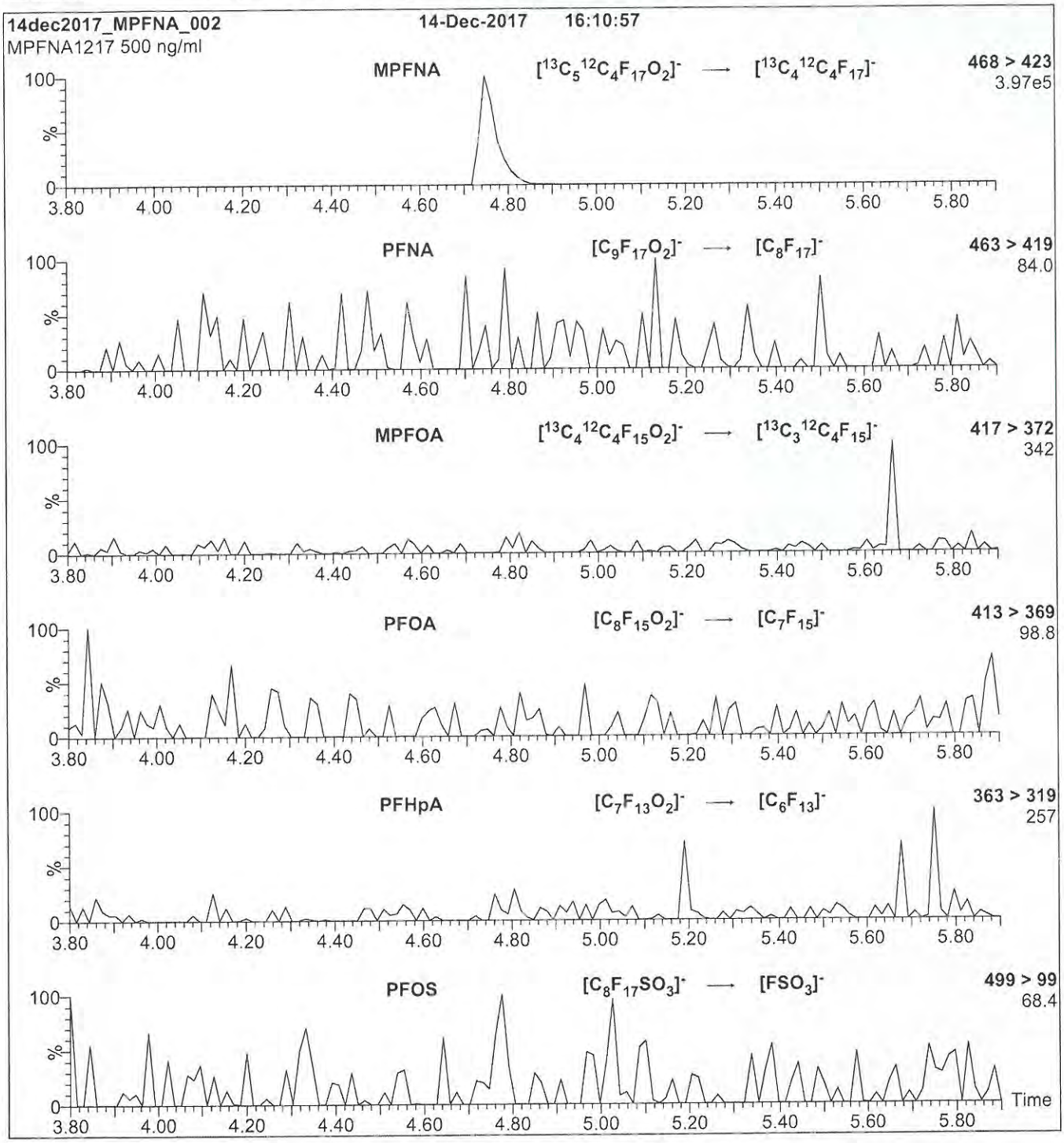
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1509

Figure 2: **MPFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

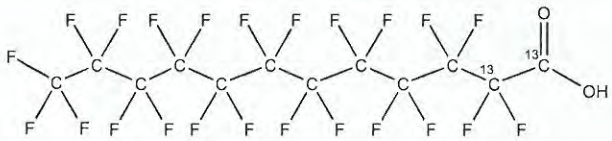
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

18B1510

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFDoA	**LOT NUMBER:**	MPFDoA0517
COMPOUND:	Perfluoro-n-[1,2-$^{13}C_2$]dodecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{10}HF_{23}O_2$	**MOLECULAR WEIGHT:**	616.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	05/23/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/23/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/26/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1570

INTENDED USE:

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CALA

ANAB ACCREDITED

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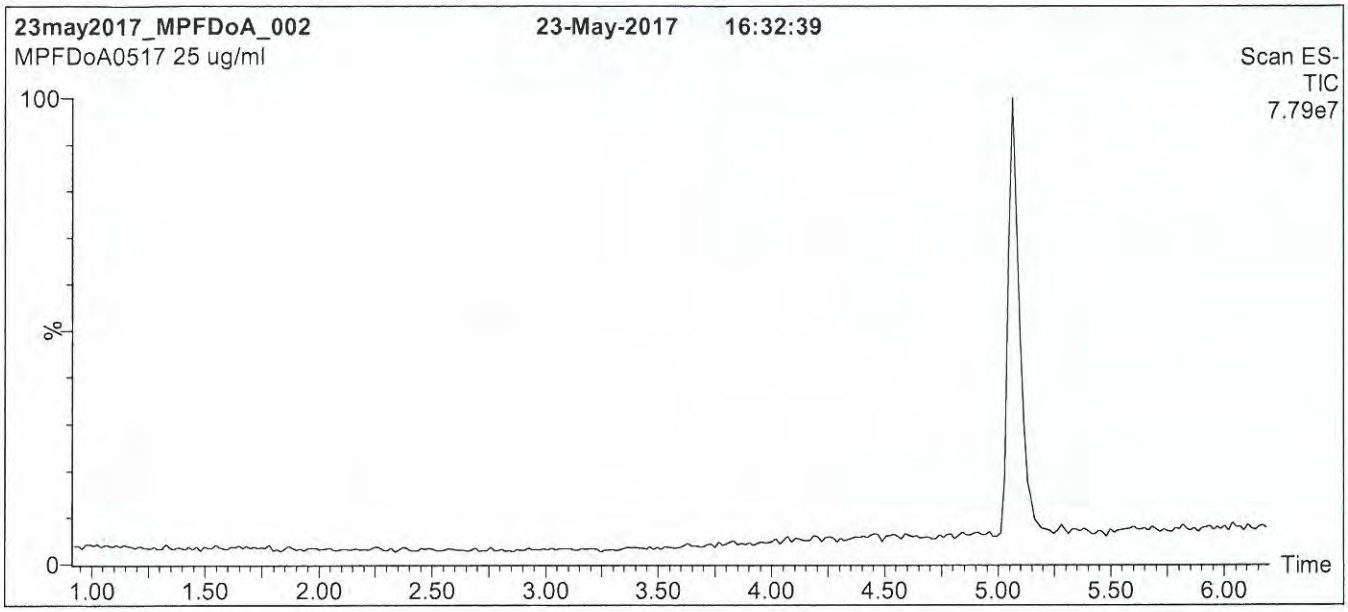
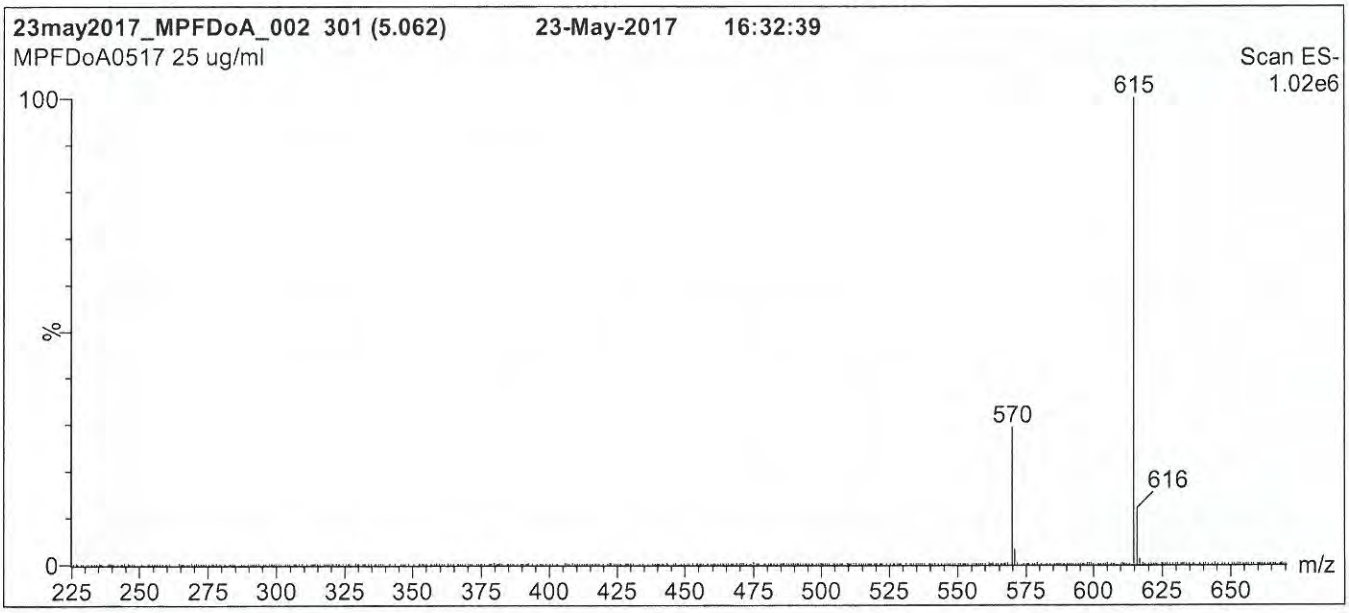
18B1510

Figure 1: **MPFDoA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

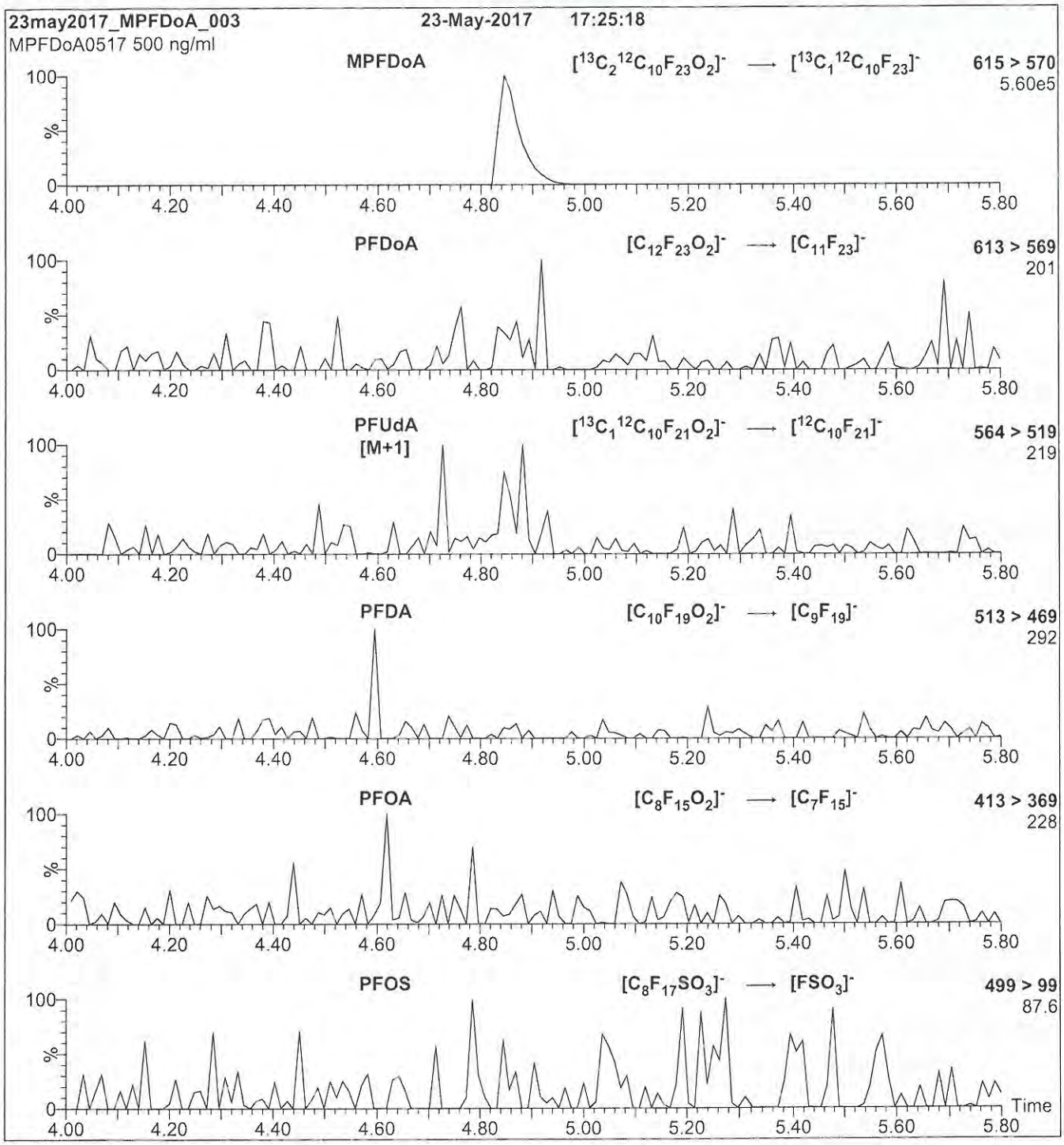
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1510

Figure 2: **MPFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

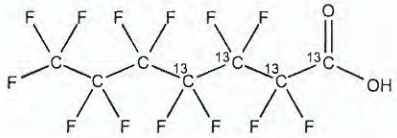
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

18B1511

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M4PFHpA	**LOT NUMBER:**	M4PFHpA0517
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]heptanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_3HF_{13}O_2$	**MOLECULAR WEIGHT:**	368.03
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4$-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	05/03/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/03/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/11/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1511

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, ...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ..x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

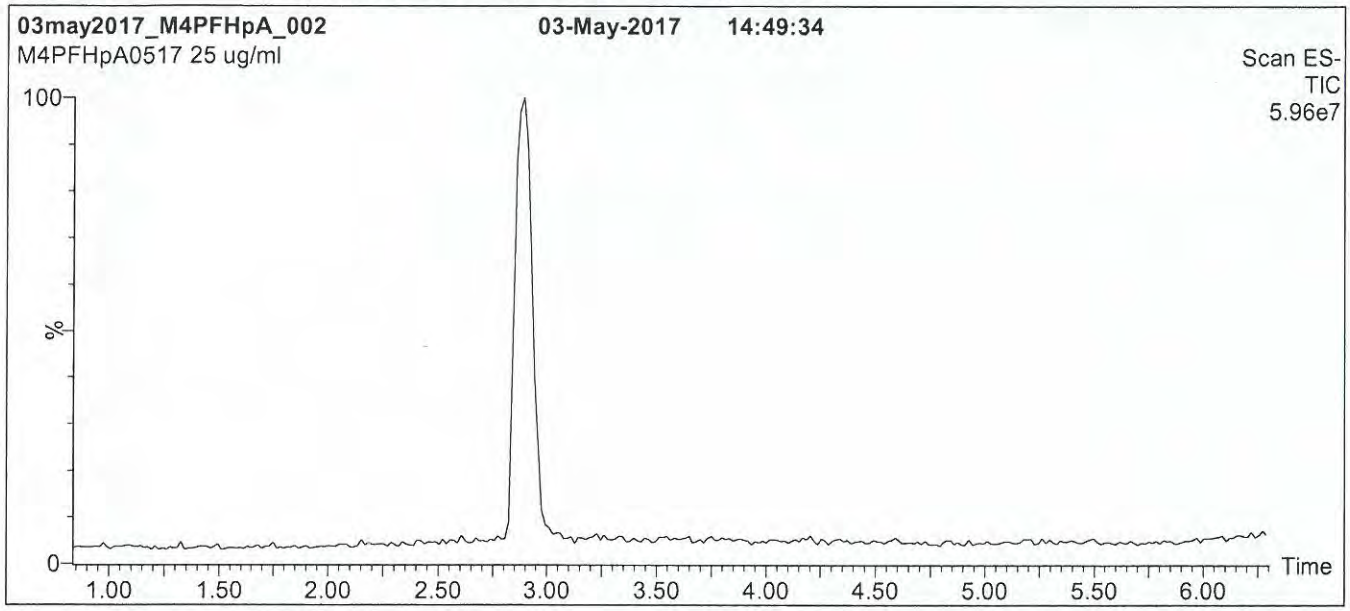
CALA

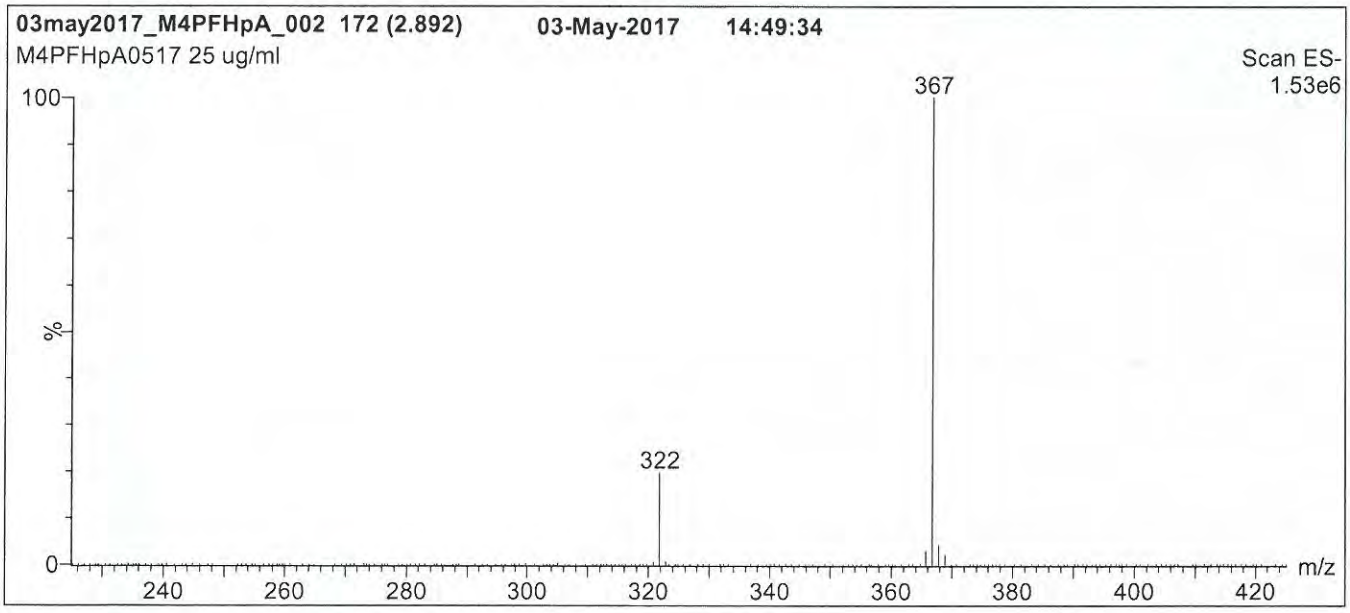
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1511

Figure 1: **M4PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

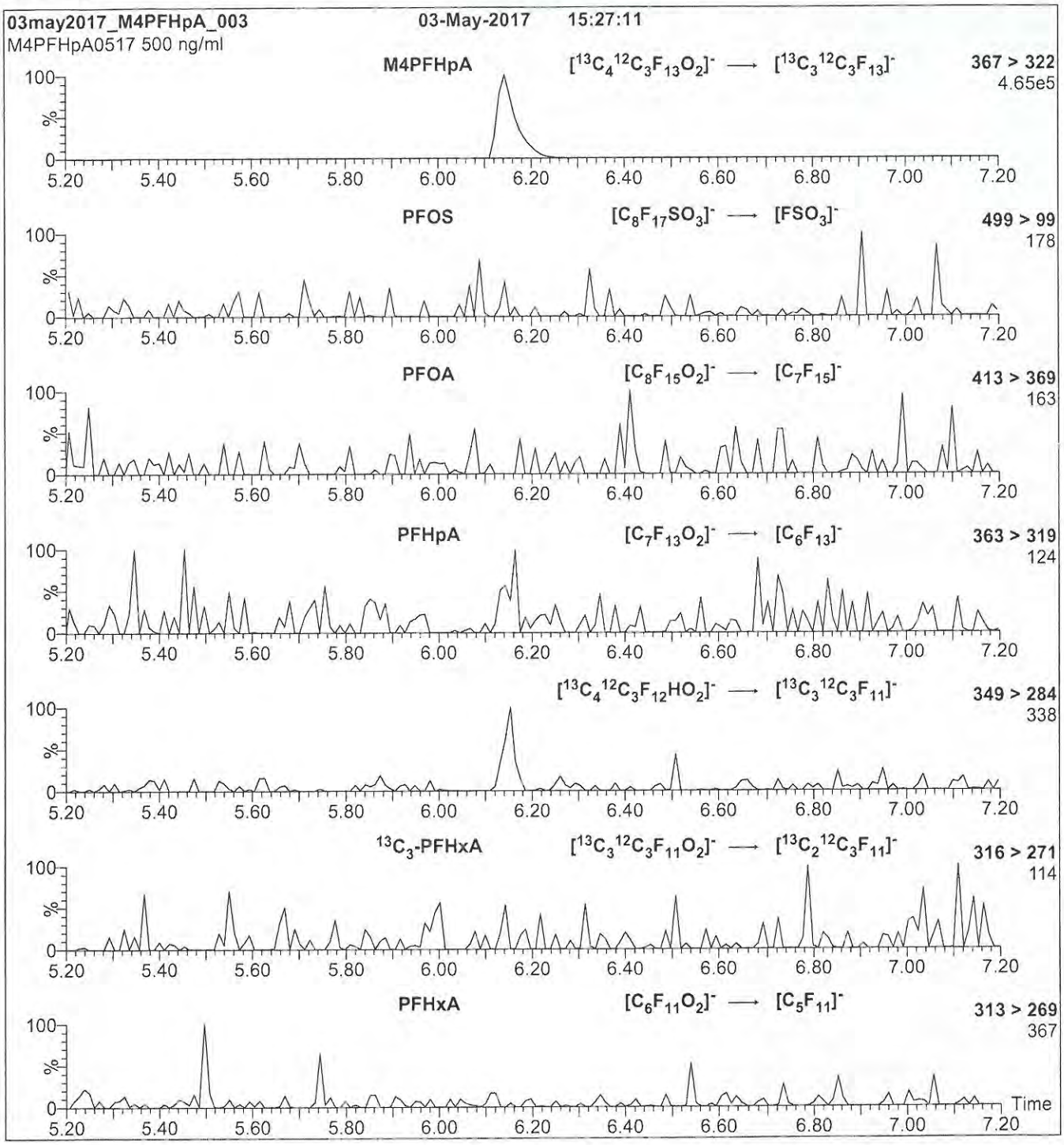
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1511

Figure 2: **M4PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M4PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 9

18B1512

WELLINGTON LABORATORIES

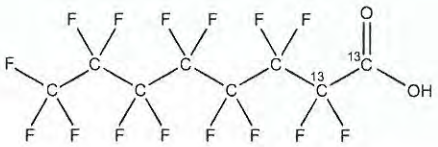
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2PFOA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]octanoic acid

LOT NUMBER: M2PFOA1017

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_6HF_{15}O_2$	**MOLECULAR WEIGHT:**	416.05
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	10/26/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/26/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1512

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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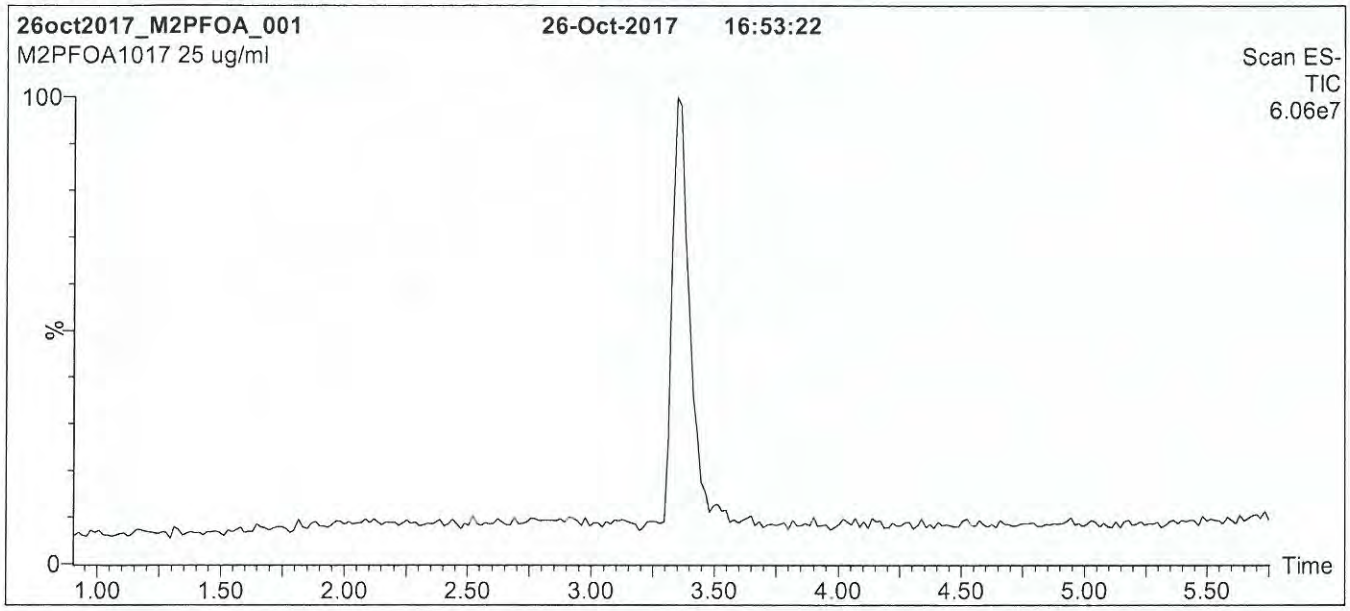
CALA

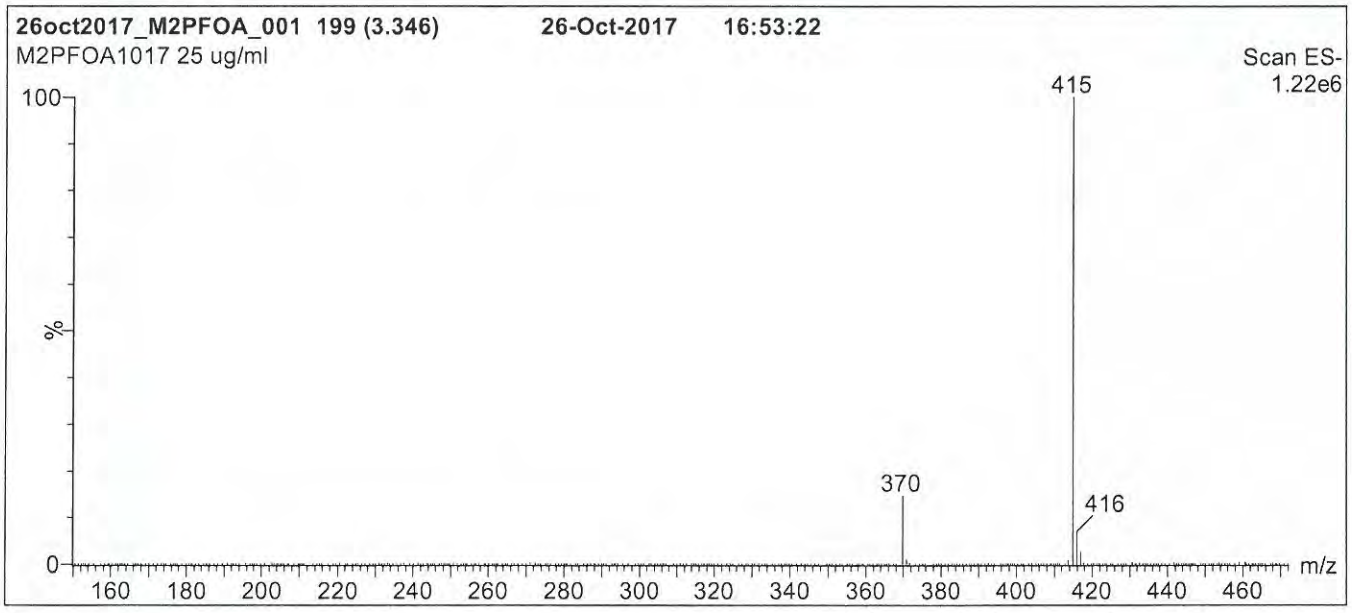
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1512

Figure 1: **M2PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

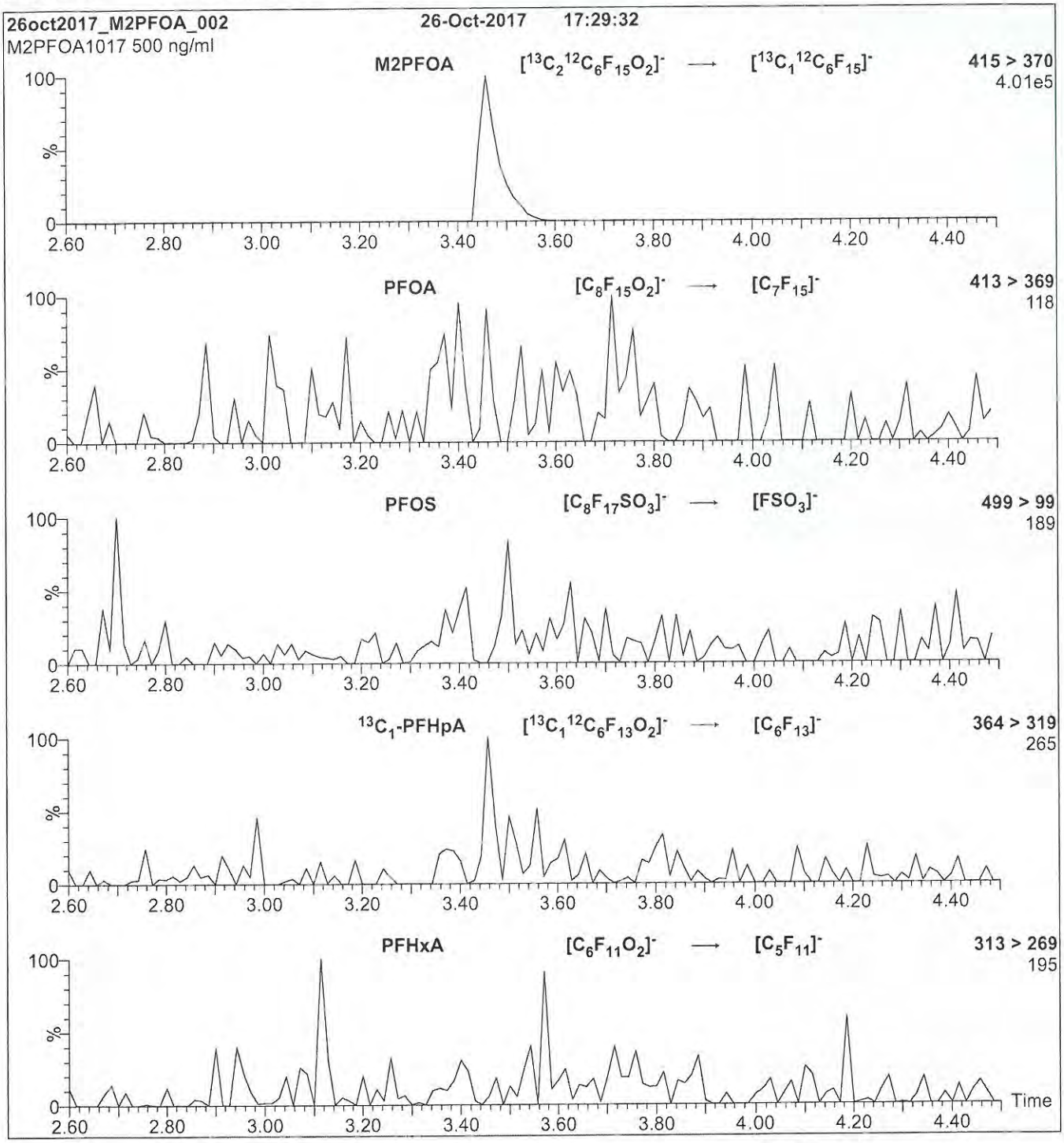
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

1801512

Figure 2: **M2PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

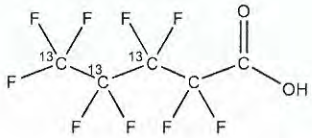
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

18B1513

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M3PFPeA	**LOT NUMBER:**	M3PFPeA0417
COMPOUND:	Perfluoro-n-[3,4,5-$^{13}C_3$]pentanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}C_2HF_9O_2$	**MOLECULAR WEIGHT:**	267.02
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($3,4,5$-$^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	04/20/2017		
EXPIRY DATE: (mm/dd/yyyy)	04/20/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.95% of perfluoro-n-[$^{13}C_3$]butanoic acid and 0.05% of perfluoro-1-pentanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/24/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1881513

INTENDED USE:

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CALA

ANAB ACCREDITED

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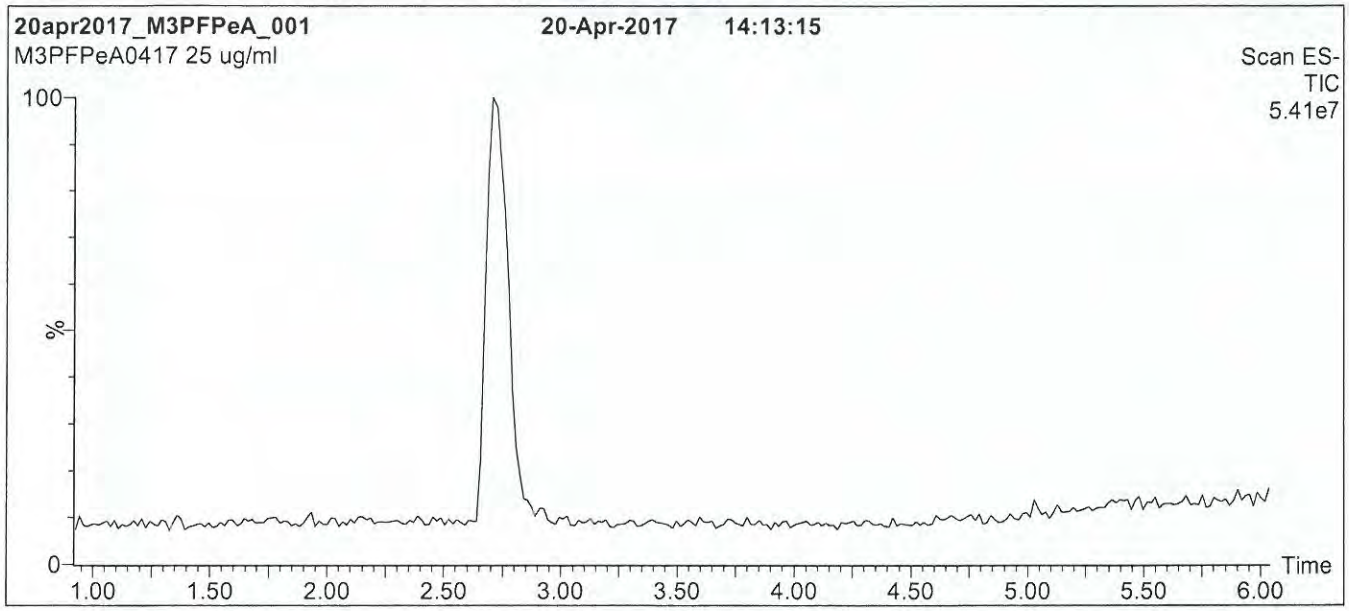
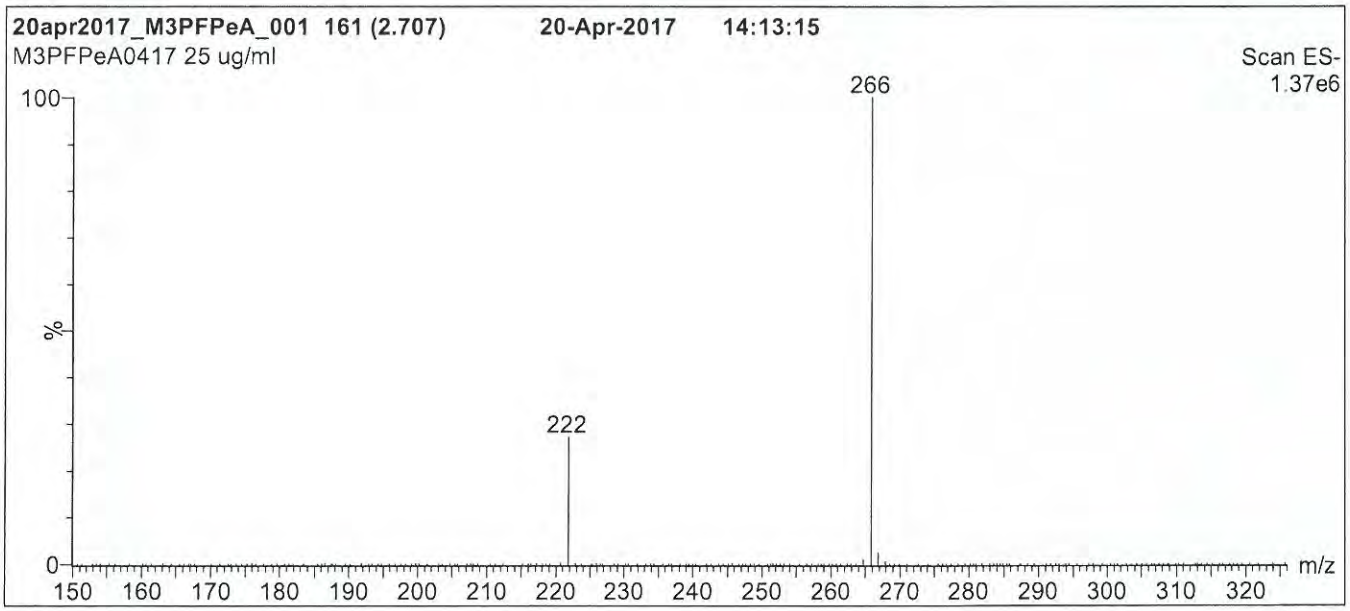
18B1513

Figure 1: **M3PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

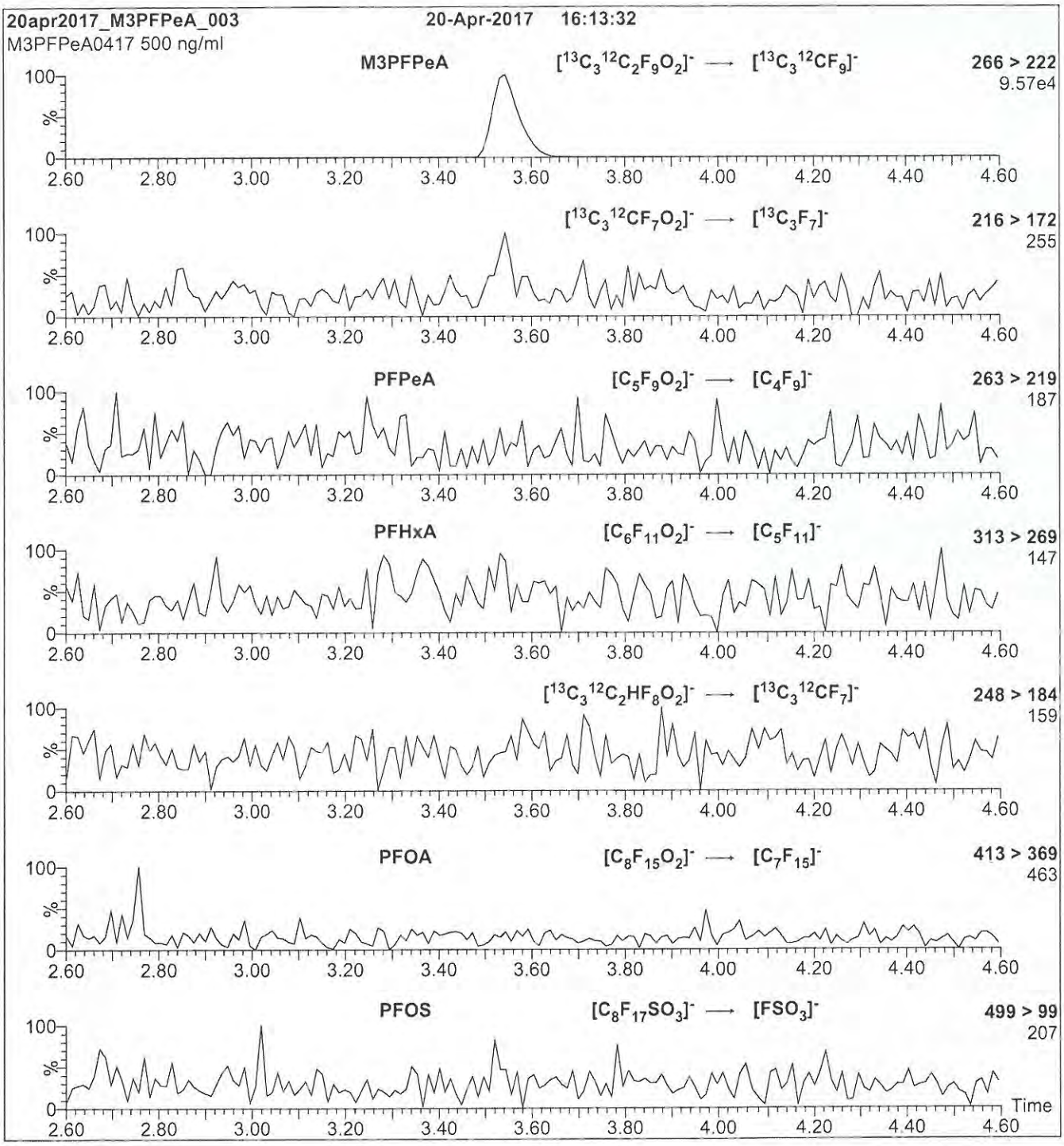
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1513

Figure 2: **M3PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18B1514

WELLINGTON LABORATORIES

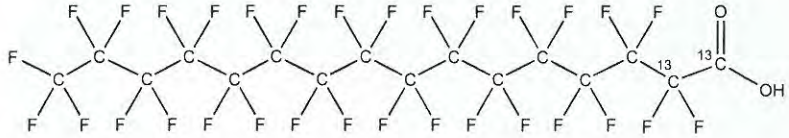
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M2PFHxDA
COMPOUND: Perfluoro-n-[1,2-$^{13}C_2$]hexadecanoic acid

LOT NUMBER: M2PFHxDA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_{14}HF_{31}O_2$	**MOLECULAR WEIGHT:**	816.11
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2-$^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	07/13/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/13/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of native perfluoro-n-hexadecanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1514

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

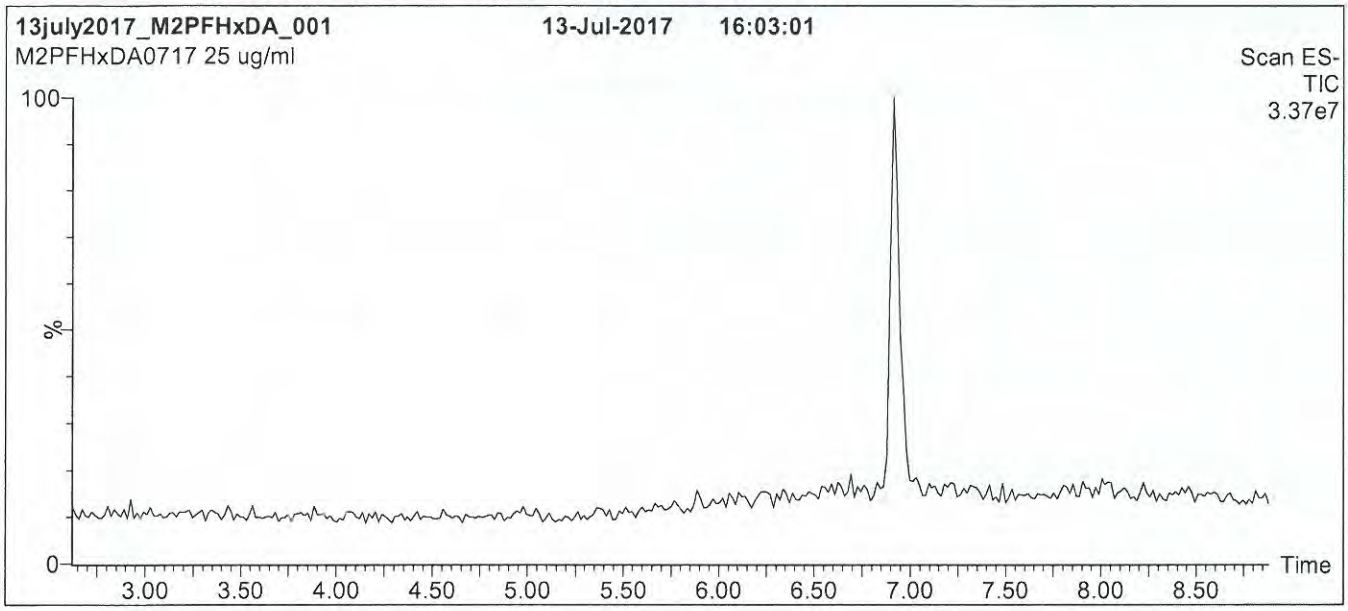
CALA

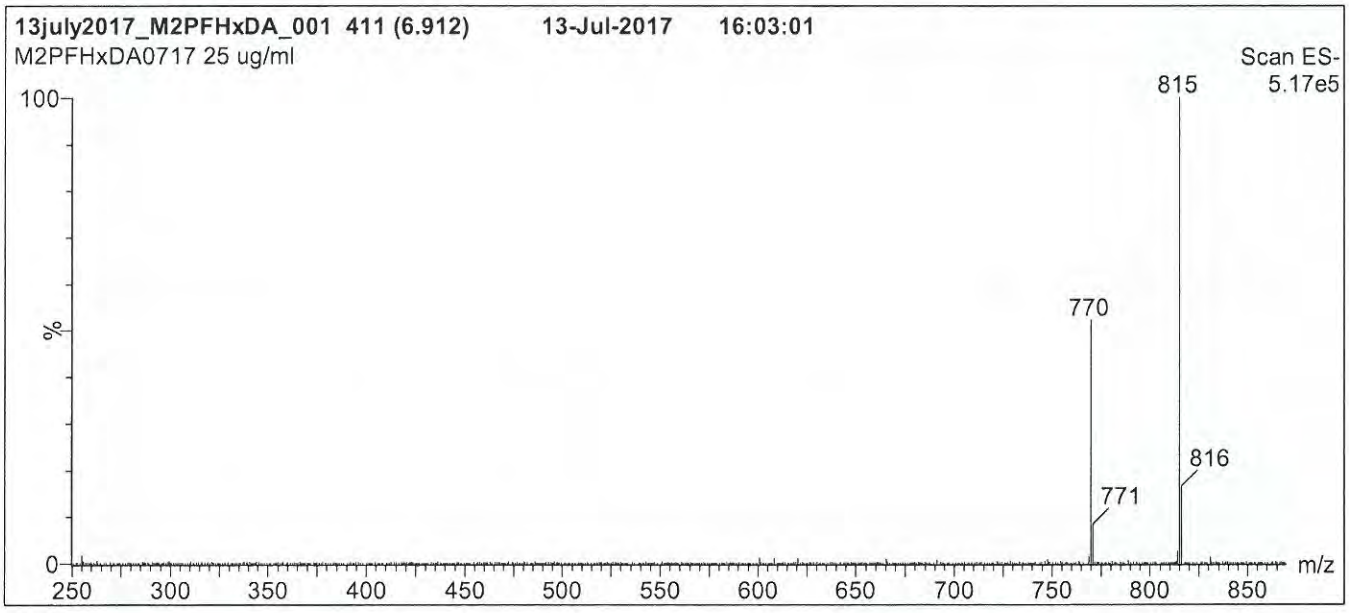
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B514

Figure 1: **M2PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

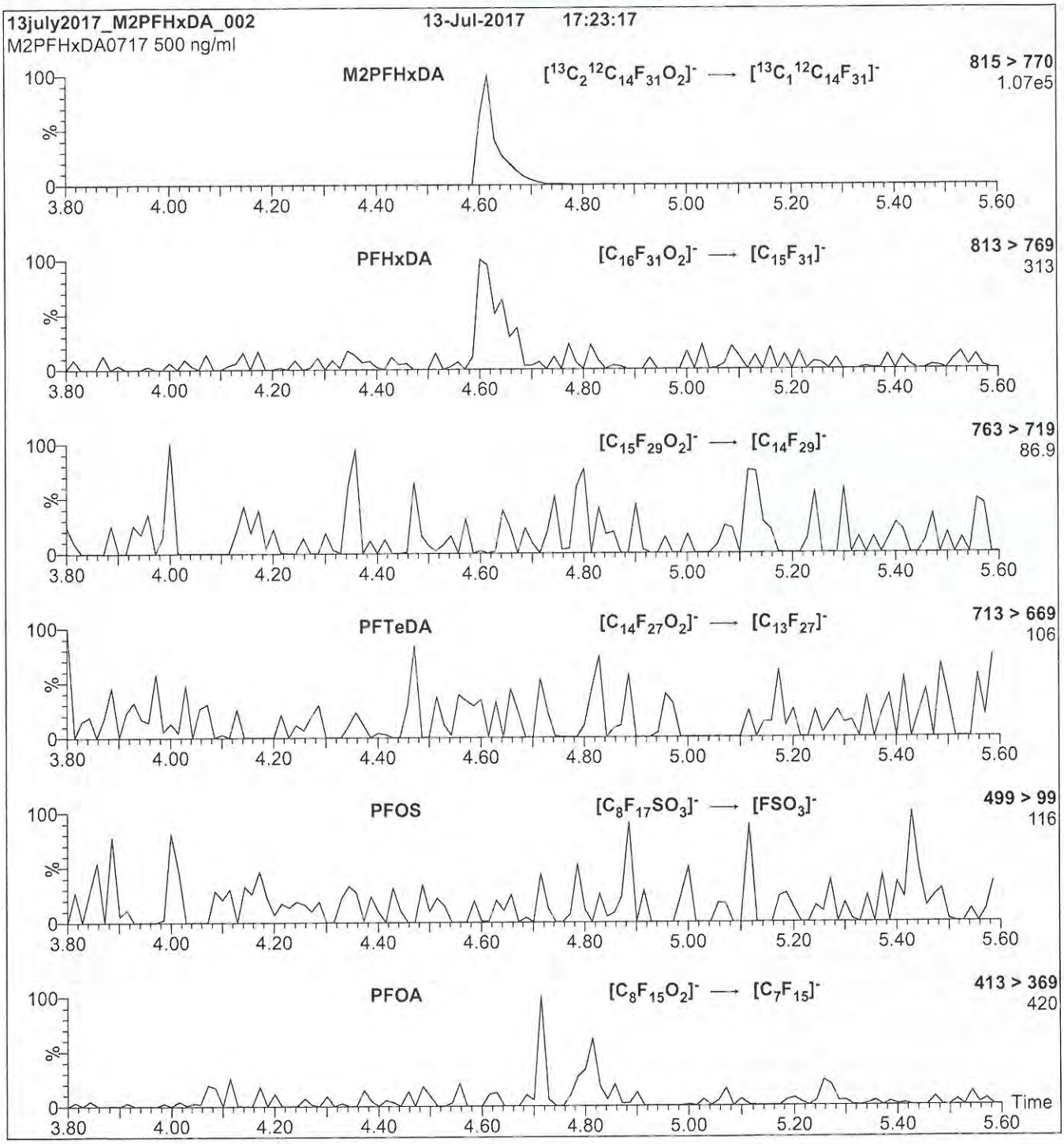
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1514

Figure 2: **M2PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 15

18B1515

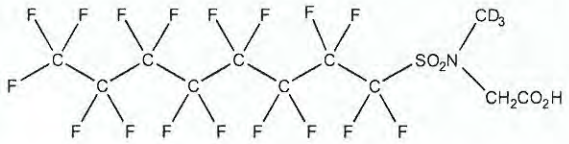
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: d3-N-MeFOSAA **LOT NUMBER:** d3NMeFOSAA1117

COMPOUND: N-methyl-d3-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{11}D_3H_3F_{17}NO_4S$	**MOLECULAR WEIGHT:**	574.23
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥98% $^2H_3$
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801515

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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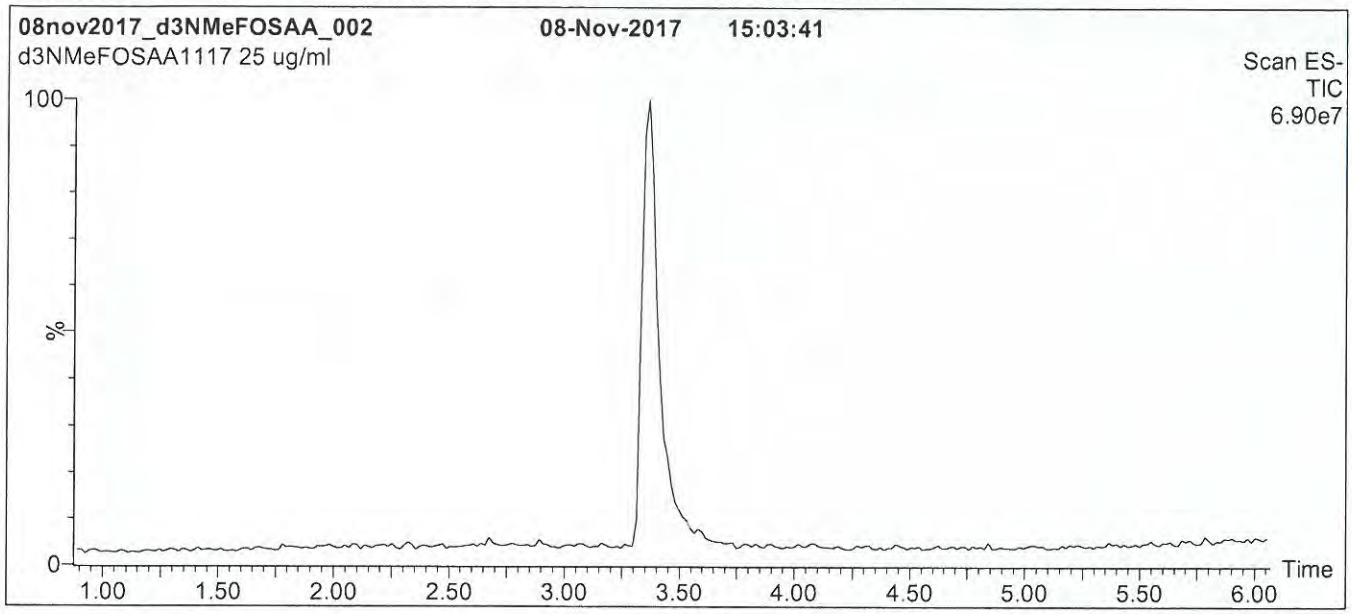
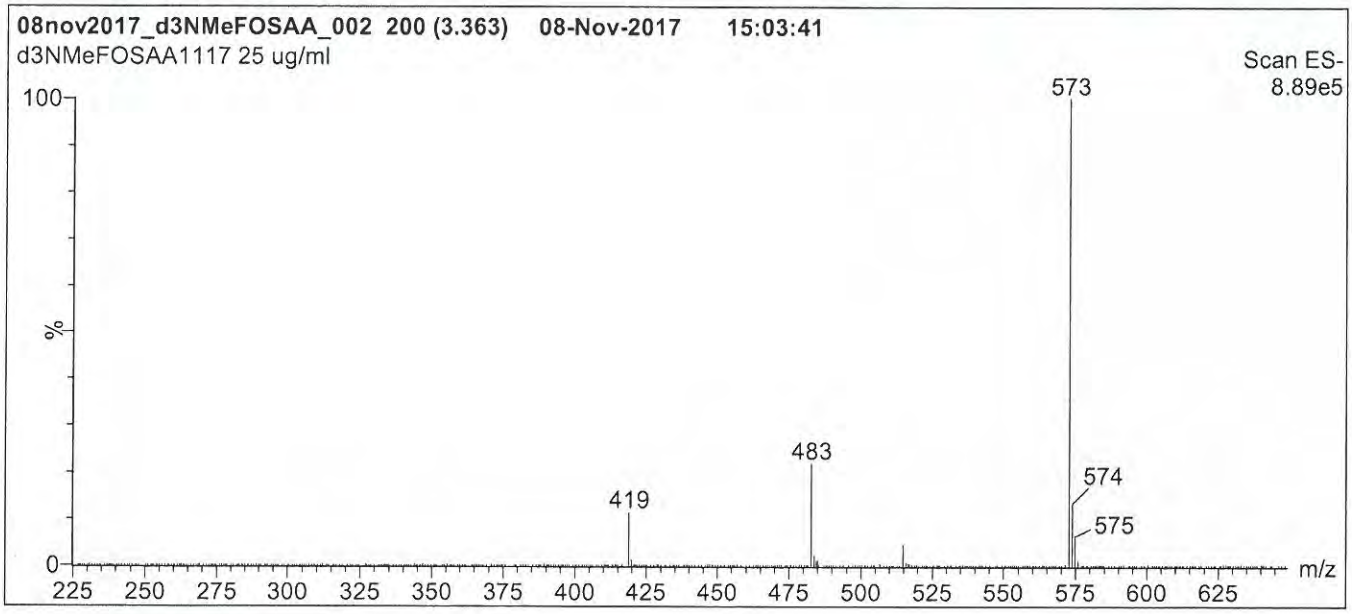
18B1515

Figure 1: **d3-N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

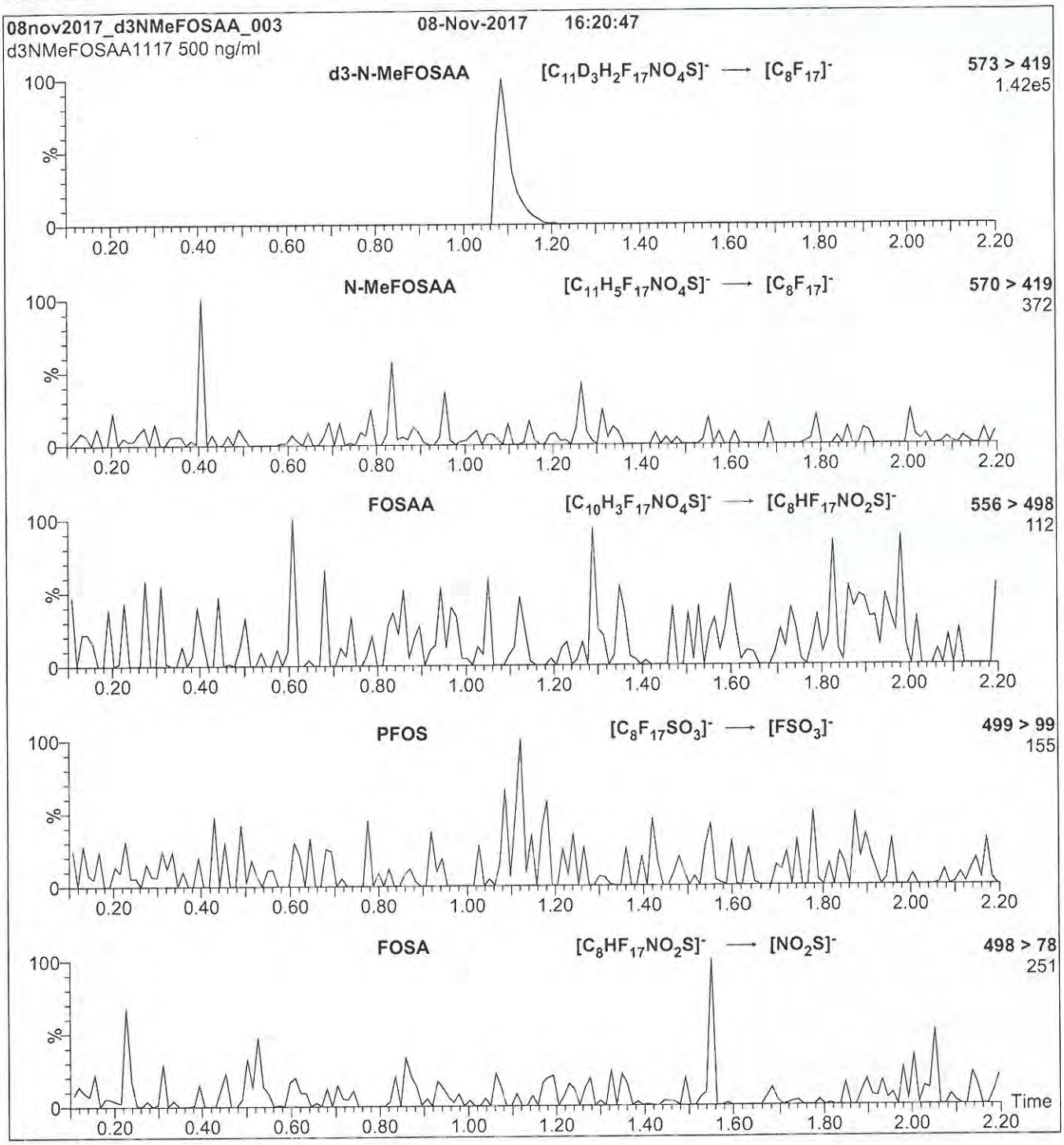
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1881515

Figure 2: **d3-N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d3-N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 20

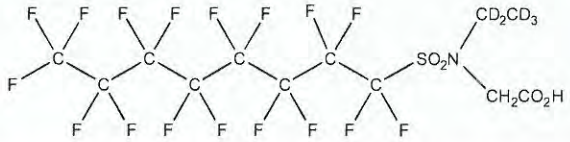
18B1516

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: d5-N-EtFOSAA **LOT NUMBER:** d5NEtFOSAA1117
COMPOUND: N-ethyl-d5-perfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: $C_{12}D_5H_3F_{17}NO_4S$ **MOLECULAR WEIGHT:** 590.26
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥98% $^2H_5$
LAST TESTED: (mm/dd/yyyy) 11/08/2017
EXPIRY DATE: (mm/dd/yyyy) 11/08/2022
RECOMMENDED STORAGE: Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/16/2017
(mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801516

INTENDED USE:

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HAZARDS:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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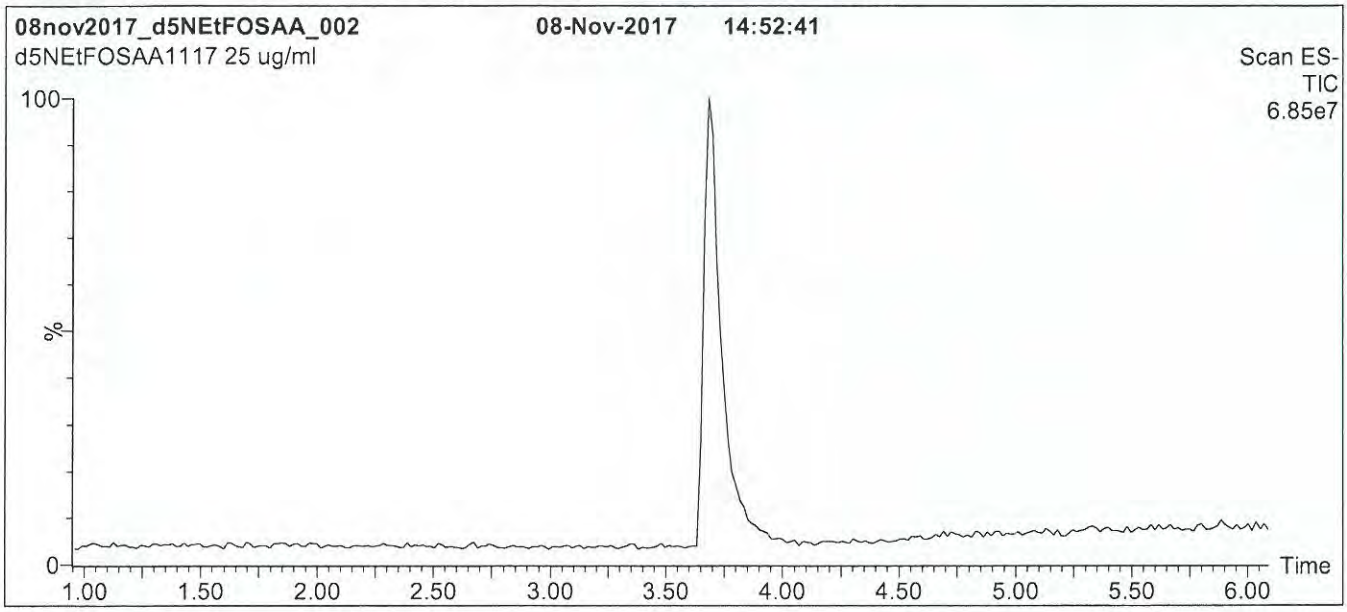
CALA

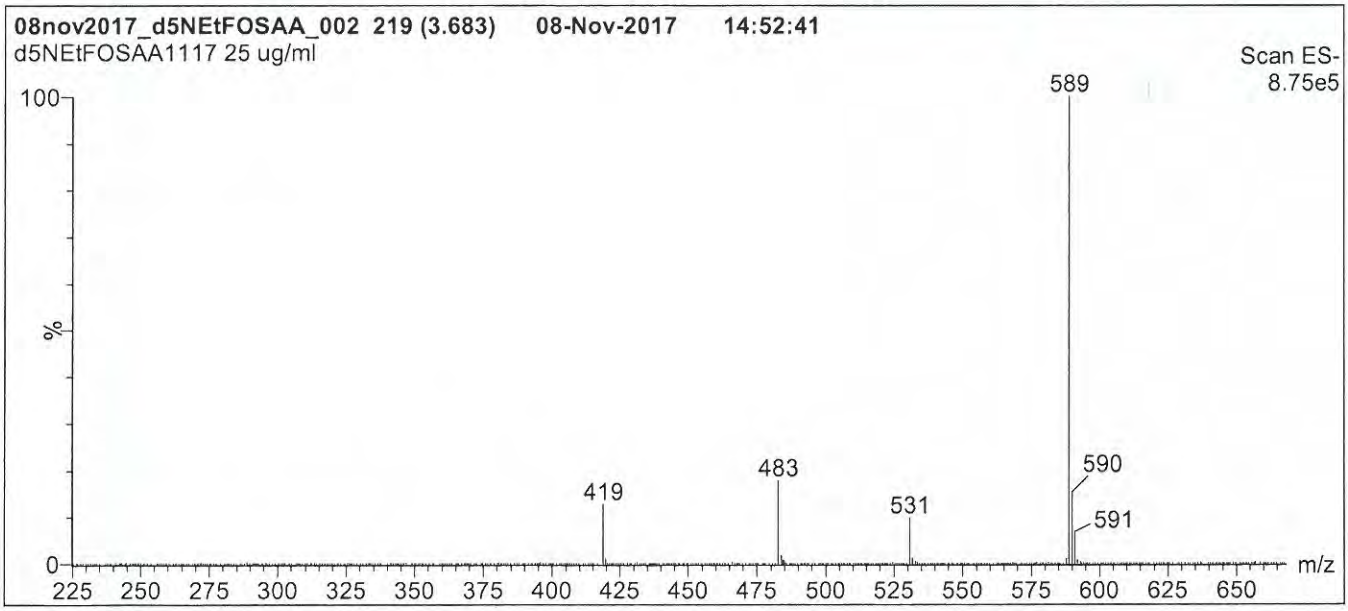
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1516

Figure 1: **d5-N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

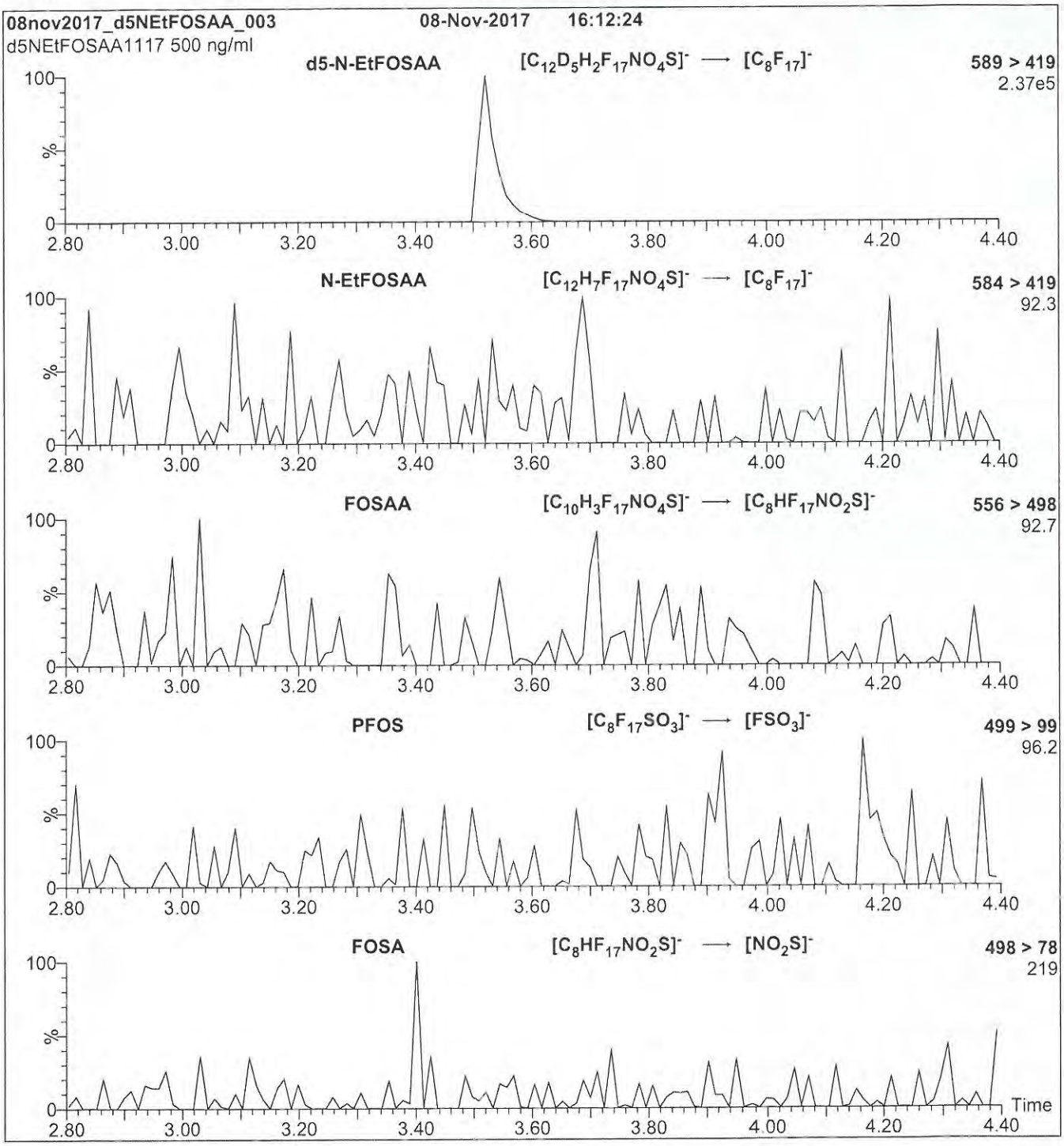
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1576

Figure 2: **d5-N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml d5-N-EtFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 20

18B1517

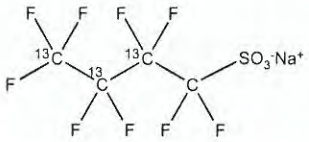
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: M3PFBS **LOT NUMBER:** M3PFBS0815

COMPOUND: Sodium perfluoro-1-[2,3,4-$^{13}C_3$]butanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}CF_9SO_3Na$	**MOLECULAR WEIGHT:**	325.06
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.5 ± 2.3 µg/ml (M3PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($2,3,4\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	05/24/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/24/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/25/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1517

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

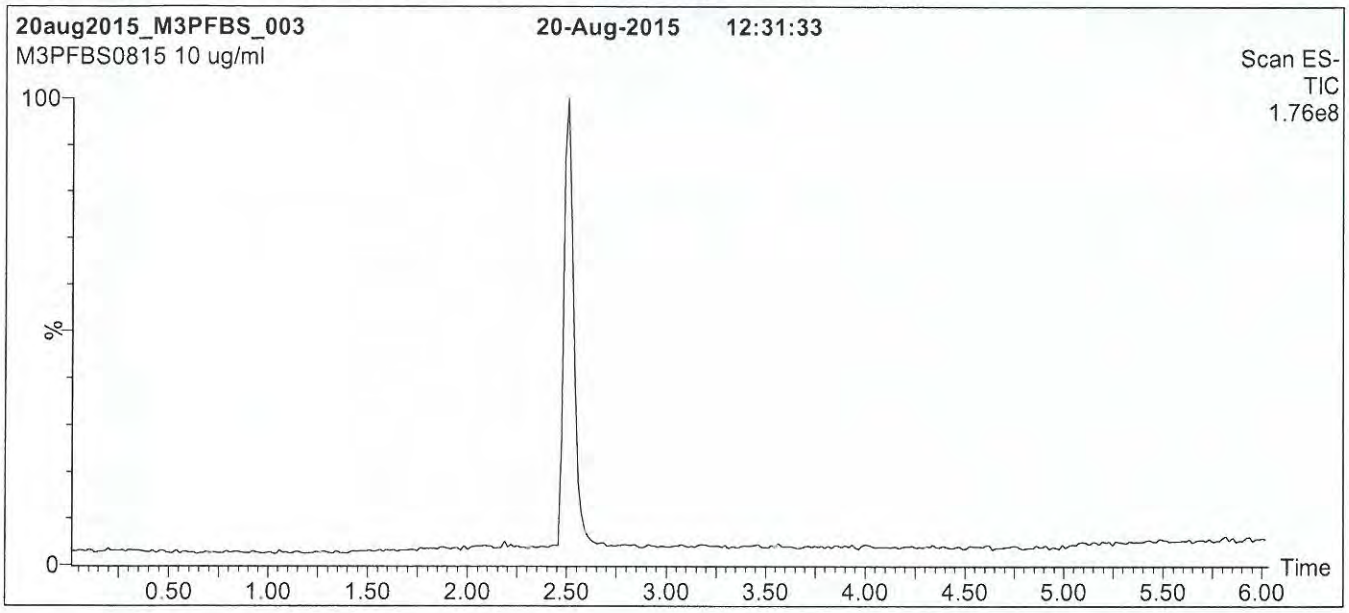
CALA

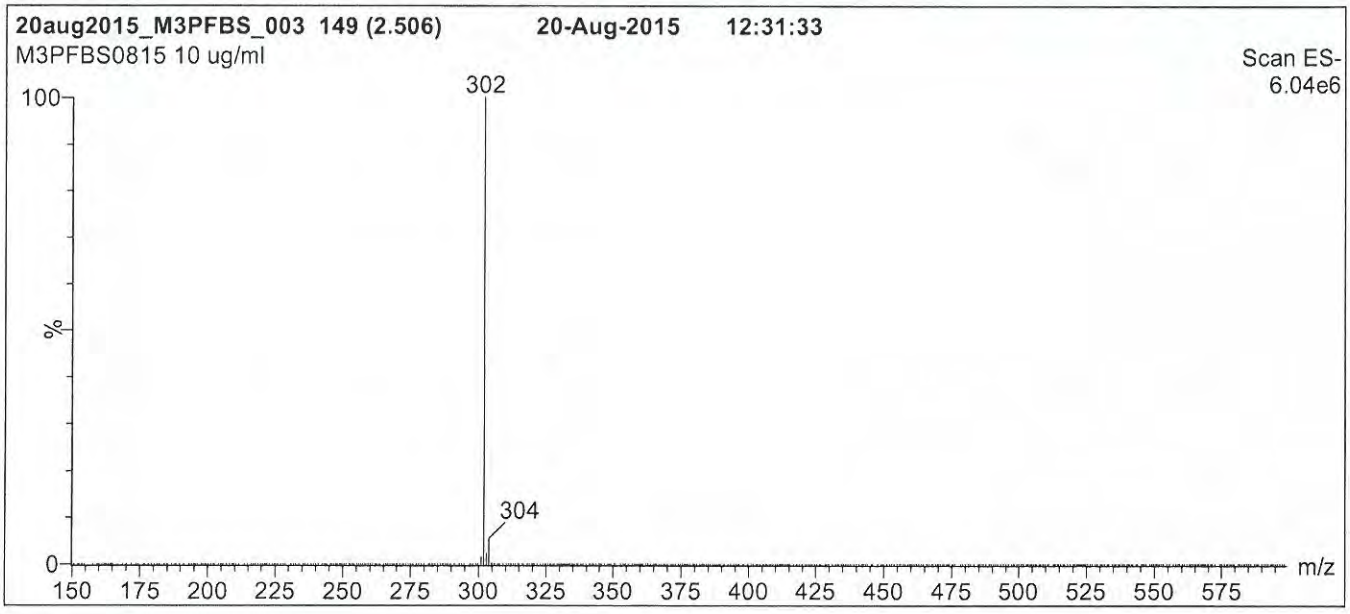
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1517

Figure 1: **M3PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

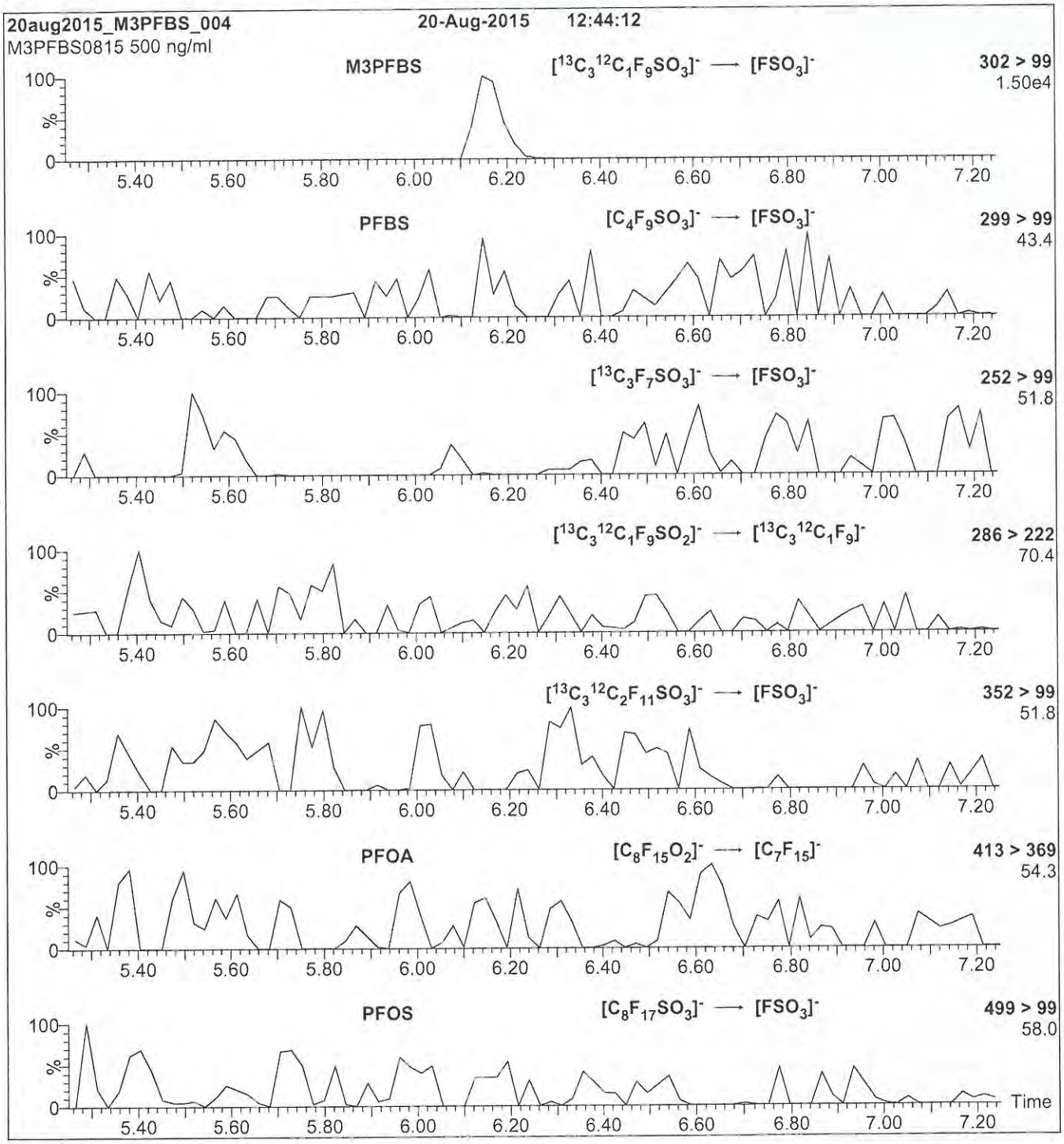
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1517

Figure 2: **M3PFBS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

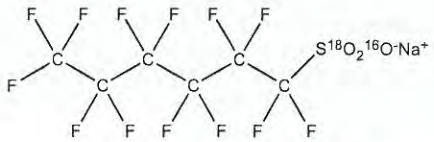
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

18B1518

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFHxS	**LOT NUMBER:**	MPFHxS0217
COMPOUND:	Sodium perfluoro-1-hexane[$^{18}O_2$]sulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$C_6F_{13}S^{18}O_2{}^{16}ONa$	**MOLECULAR WEIGHT:**	426.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (MPFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>94% ($^{18}O_2$)
LAST TESTED: (mm/dd/yyyy)	02/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	02/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The response factor for MPFHxS ($C_6F_{13}S^{18}O_2{}^{16}O^-$) has been observed to be up to 10% lower than for PFHxS ($C_6F_{13}S^{16}O_3^-$) when both compounds are injected together. This difference may vary between instruments.
- Contains ~ 1.0% of sodium perfluoro-1-octane[$^{18}O_2$]sulfonate ($^{18}O_2$-PFOS).
- Due to the isotopic purity of the starting material ($^{18}O_2$ >94%), MPFHxS contains ~ 0.3% of PFHxS. This value agrees with the theoretical percent relative abundance that is expected based on the stated isotopic purity.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 03/02/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1518

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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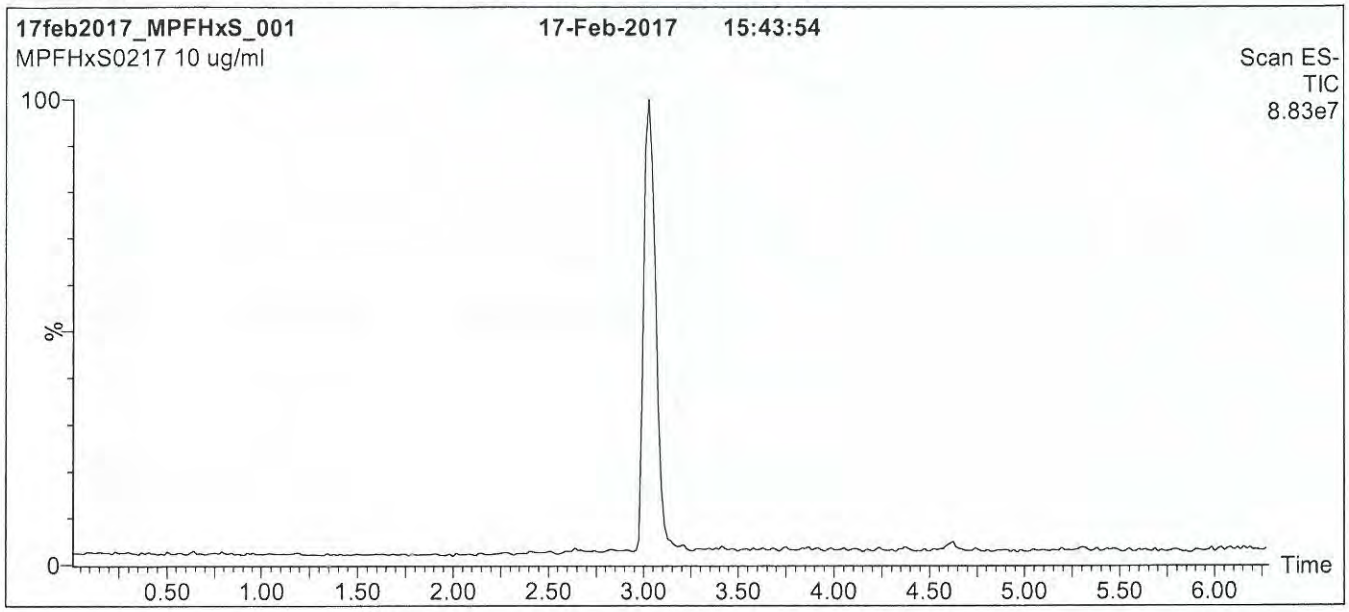
CALA

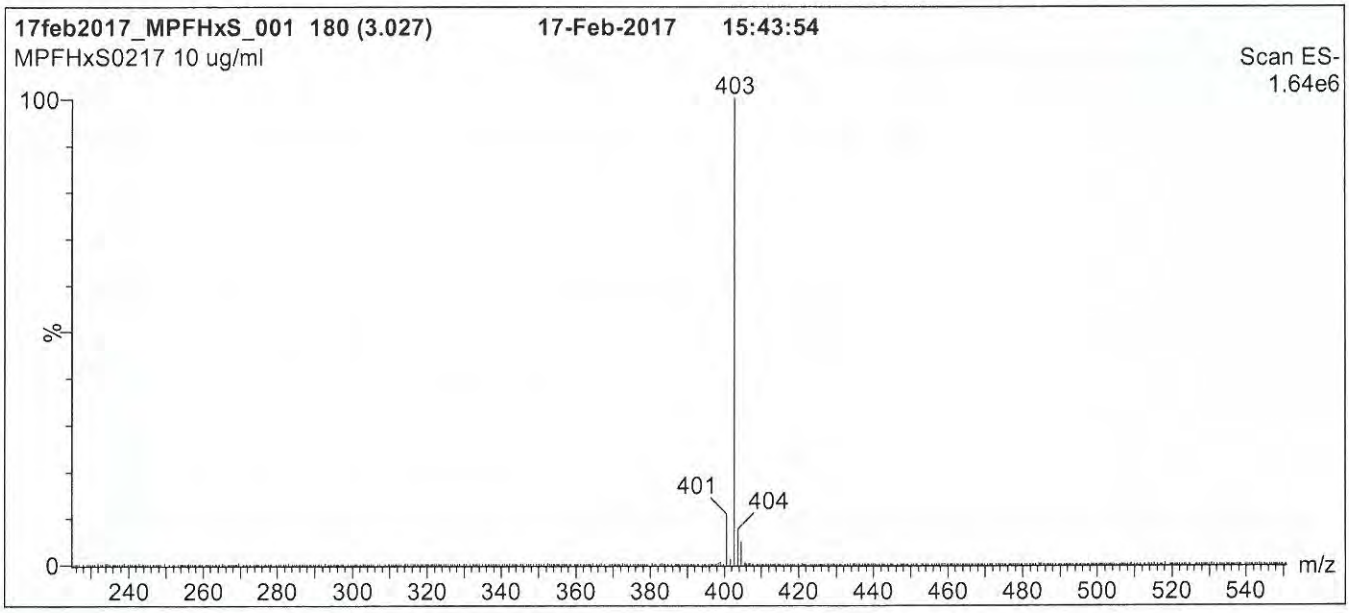
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1518

Figure 1: **MPFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

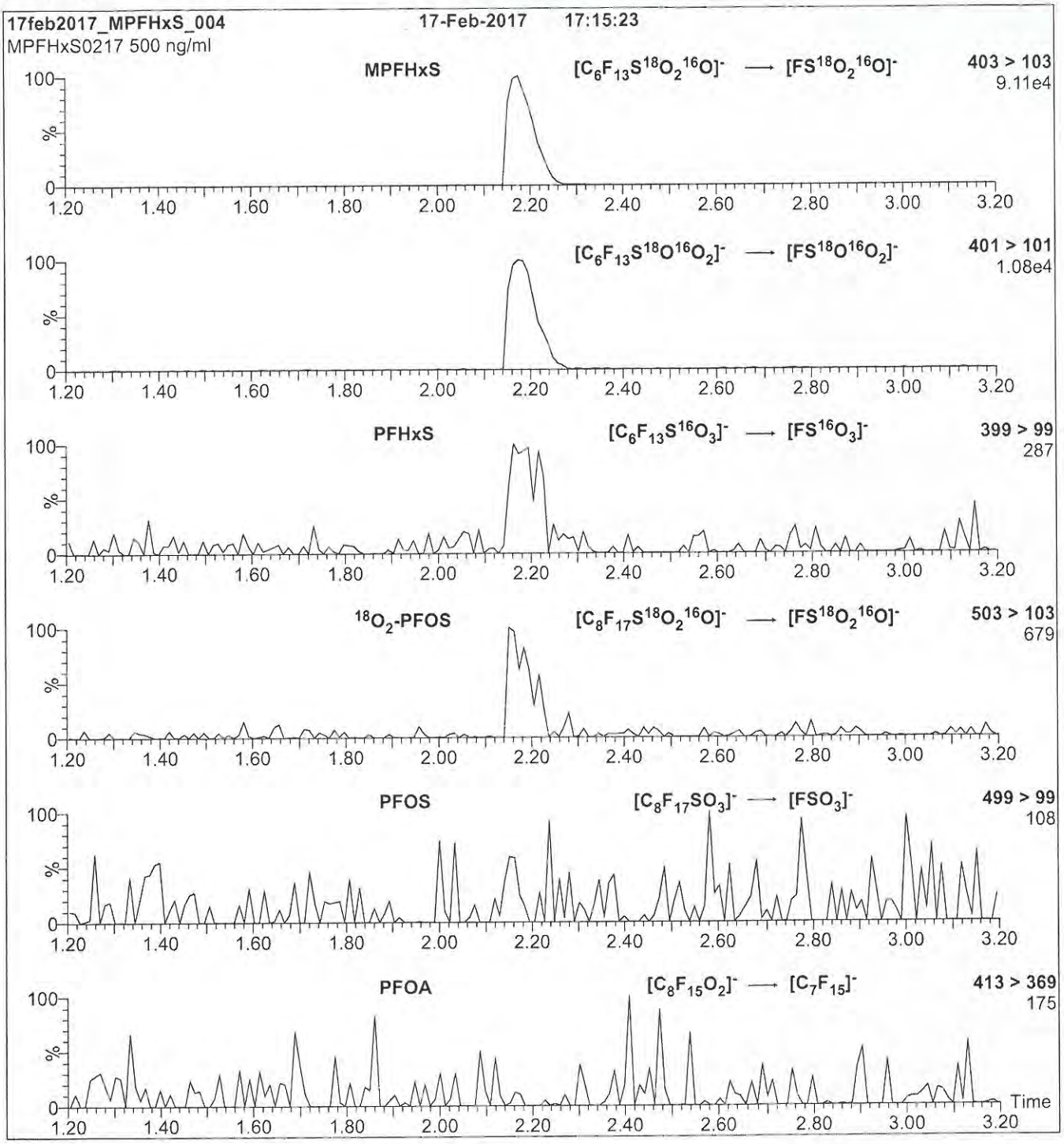
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1518

Figure 2: **MPFHxS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

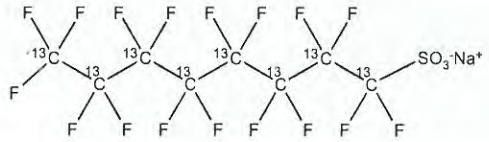
Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18B1520

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE:	M8PFOS	**LOT NUMBER:**	M8PFOS1117
COMPOUND:	Sodium perfluoro-1-[$^{13}C_8$]octanesulfonate		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_8F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	530.05
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (M8PFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	>99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.3% of sodium perfluoro-1-[$^{13}C_7$]heptanesulfonate ($^{13}C_7$-PFHpS) and ~ 0.8% of sodium perfluoro-1-[$^{13}C_4$]octanesulfonate (MPFOS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1520

INTENDED USE:

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CALA

ANAB ACCREDITED

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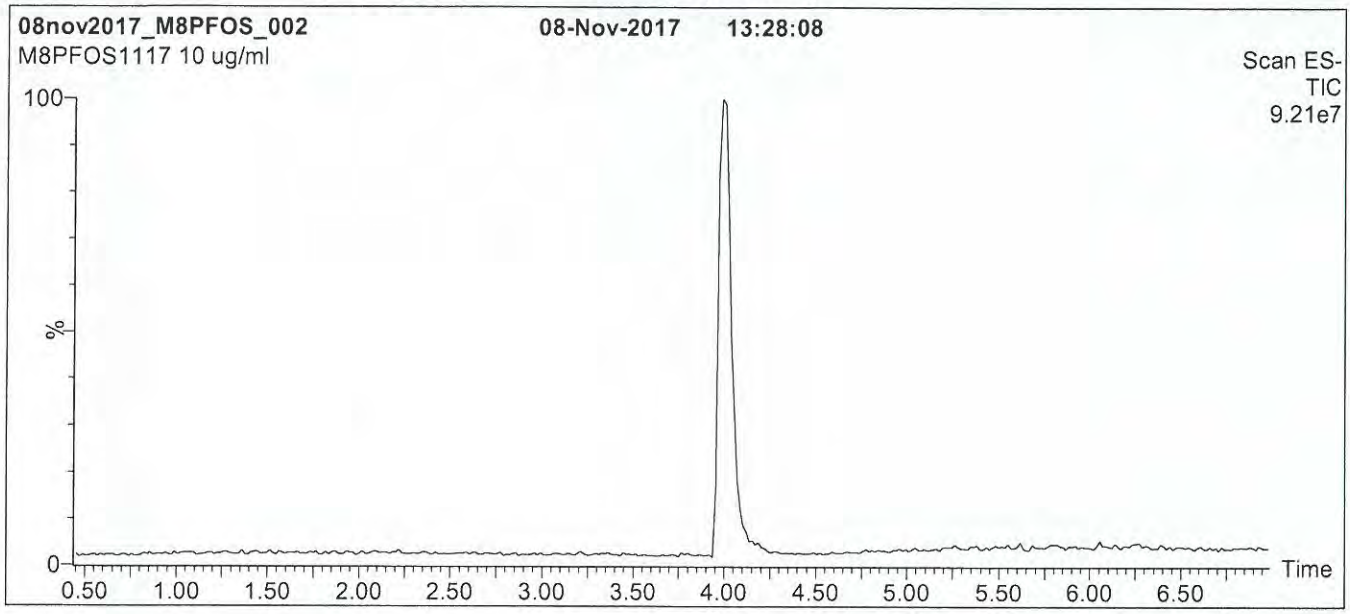
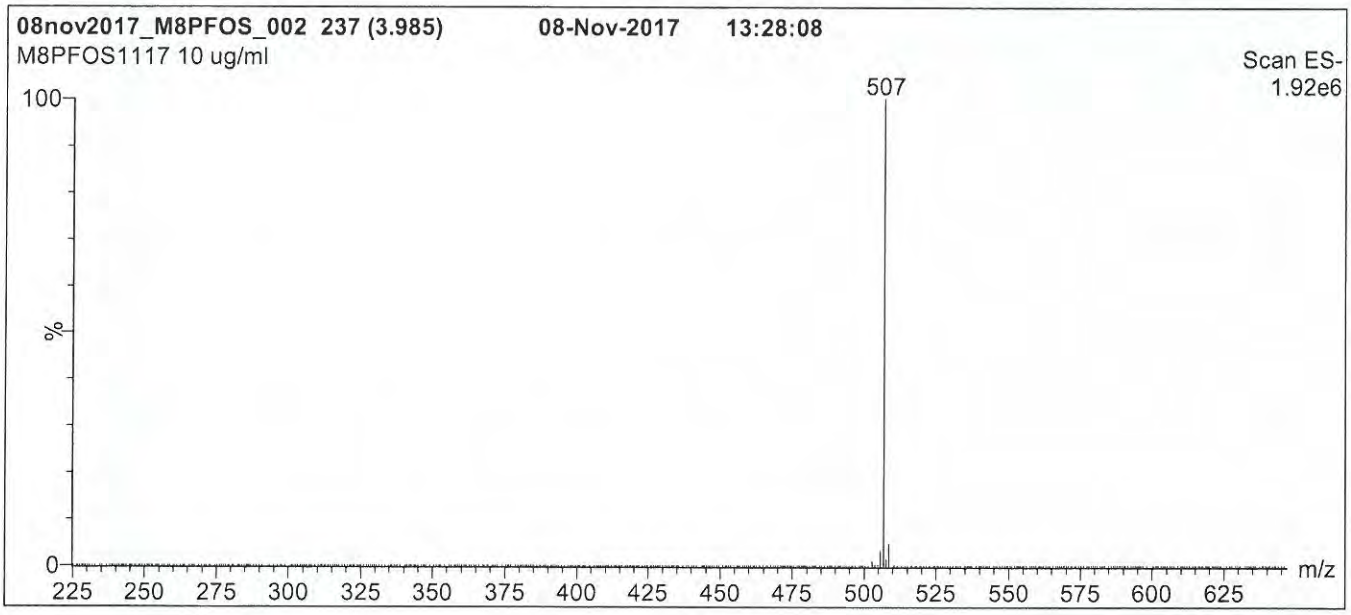
18B1520

Figure 1: **M8PFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

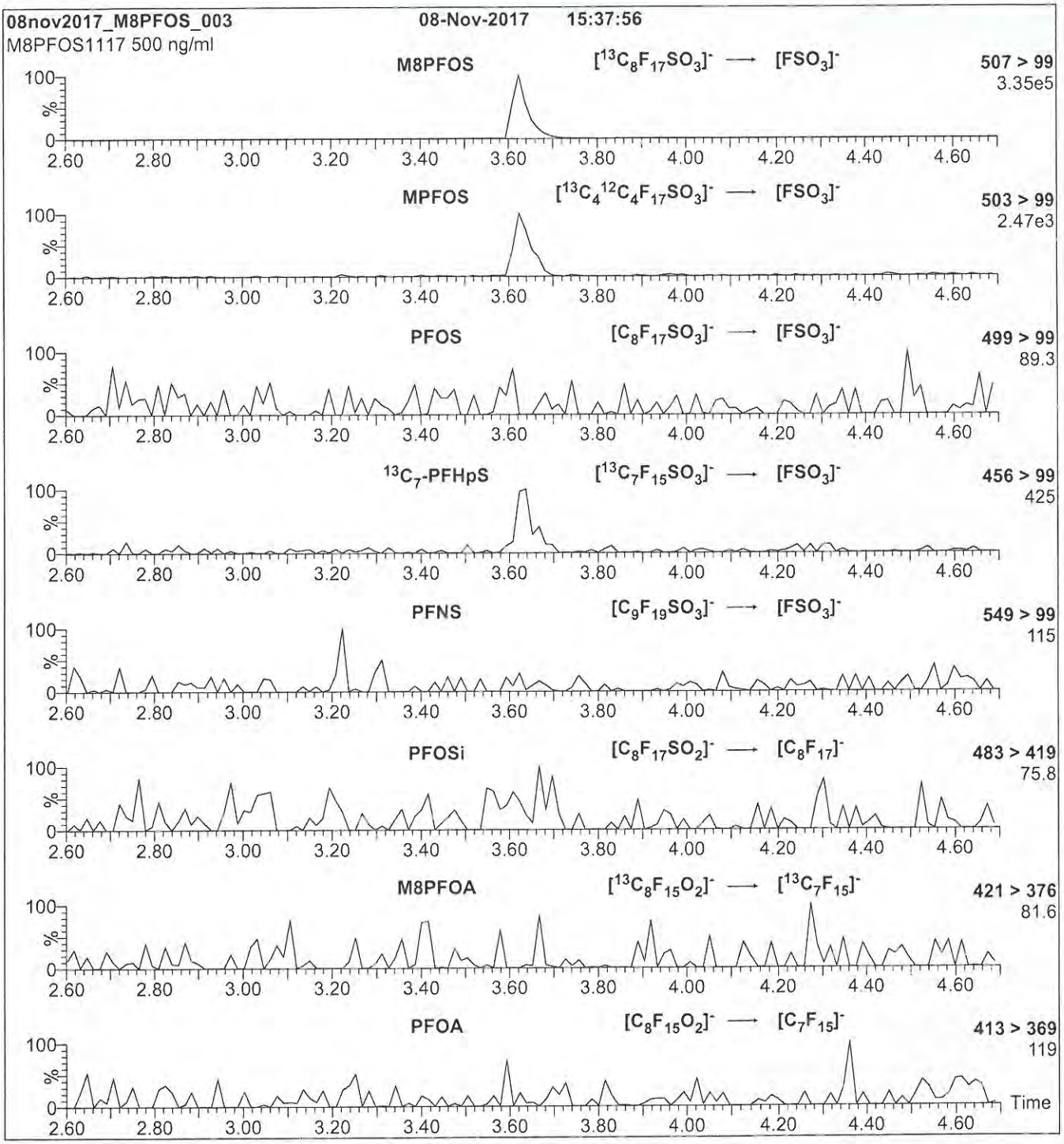
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1520

Figure 2: **M8PFOS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M8PFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 40

18B1525

WELLINGTON LABORATORIES

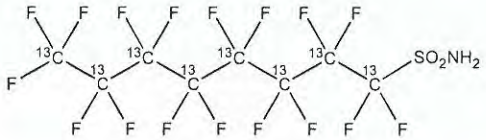
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8FOSA-I
COMPOUND: Perfluoro-1-[$^{13}C_8$]octanesulfonamide

LOT NUMBER: M8FOSA1017I

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	507.09
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	10/11/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/11/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 1.1% of perfluoro-1-[$^{13}C_4$]octanesulfonamide and ~ 0.01% of perfluoro-1-[$^{13}C_7$]heptanesulfonamide.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1525

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Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

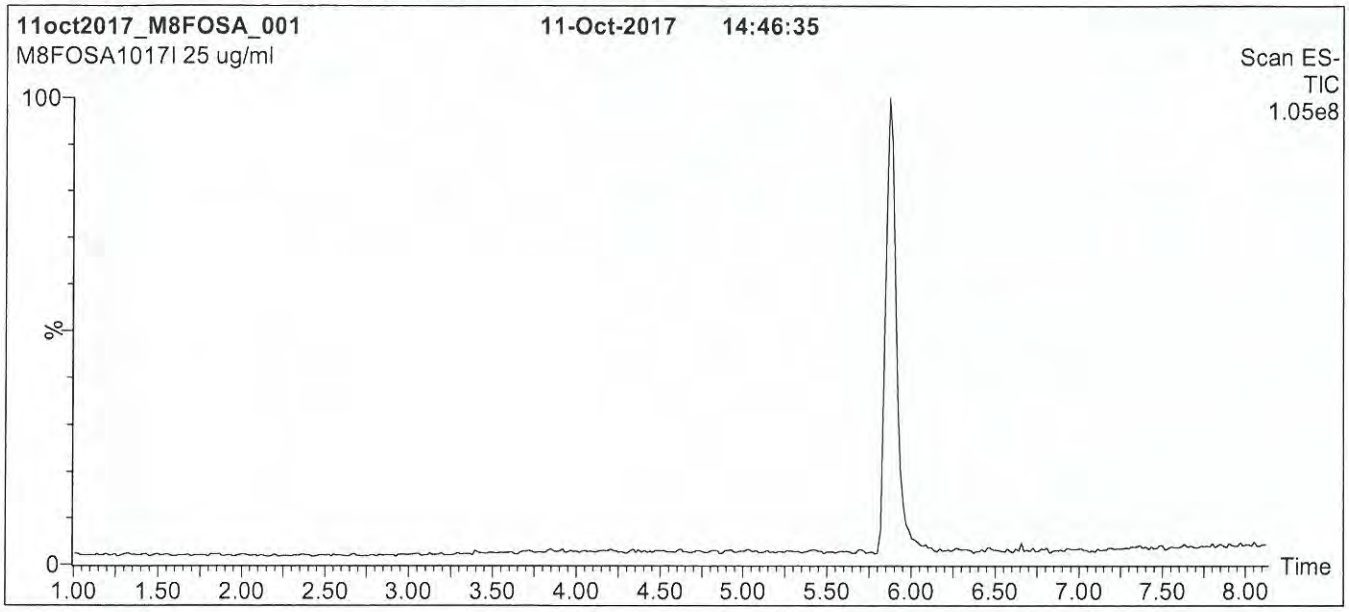
CALA

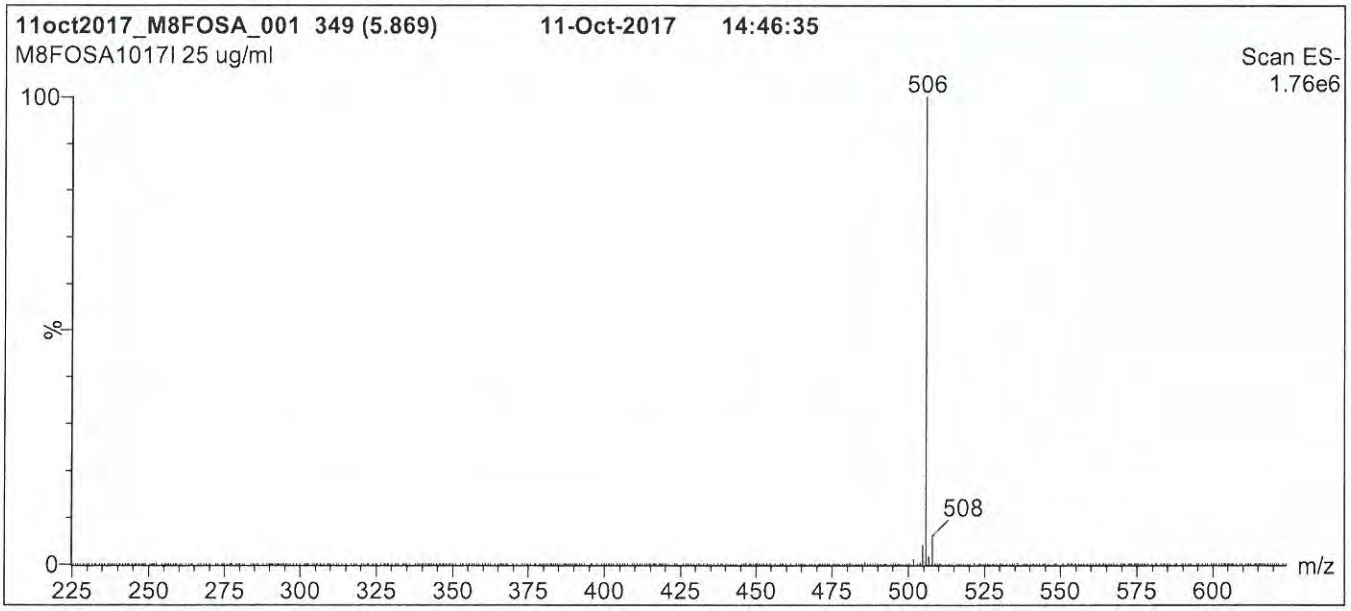
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1525

Figure 1: **M8FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

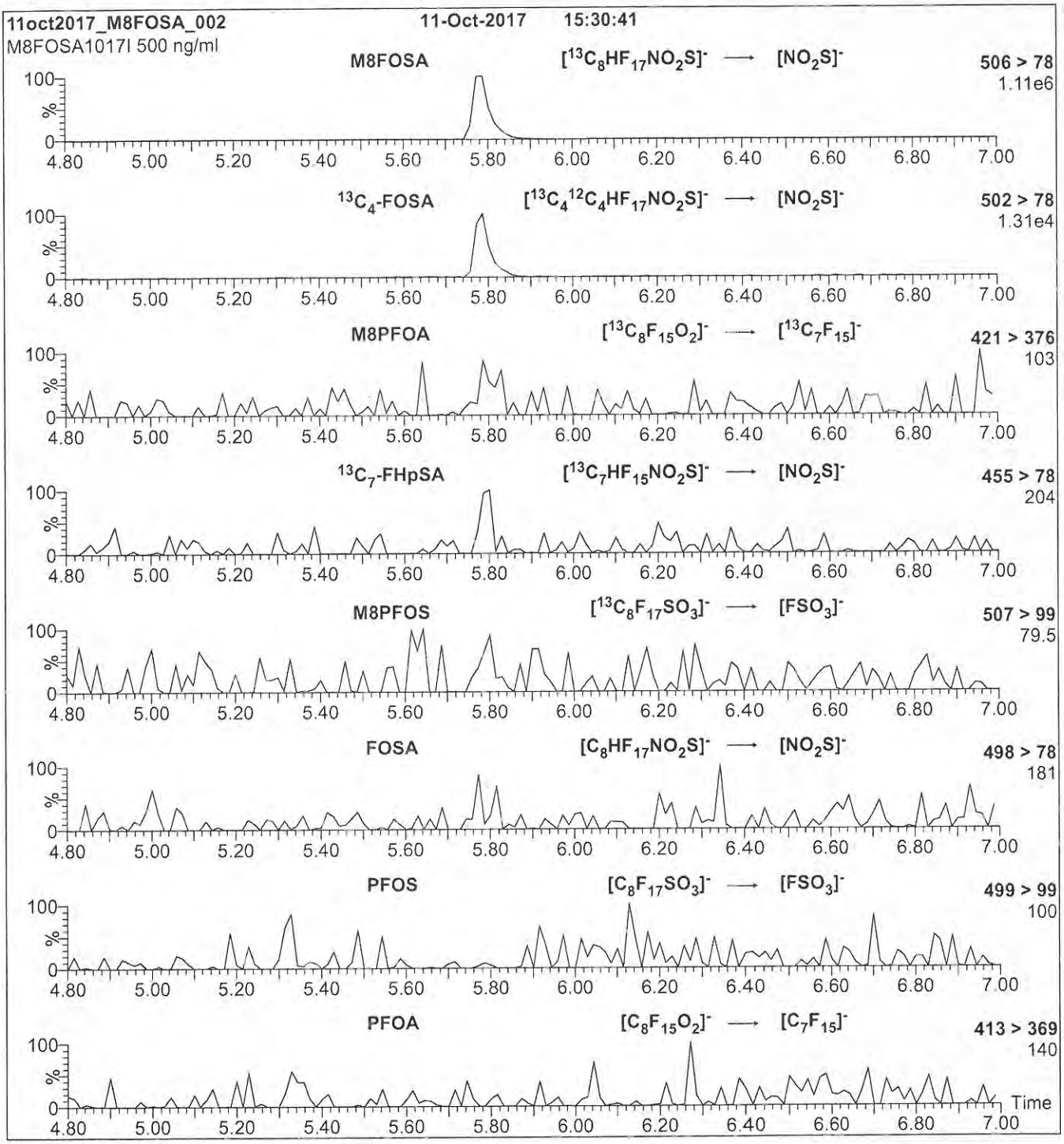
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1525

Figure 2: **M8FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M8FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18C910

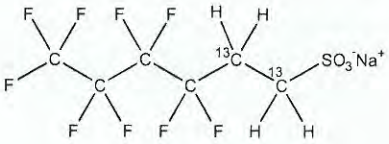
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M2-4:2FTS **LOT NUMBER:** M242FTS0817

COMPOUND: Sodium 1H,1H,2H,2H-perfluoro-[1,2-$^{13}C_2$]hexane sulfonate

STRUCTURE:



CAS #: Not available

MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_4H_4F_9SO_3Na$	**MOLECULAR WEIGHT:**	352.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	46.7 ± 2.3 µg/ml (M2-4:2FTS anion)		
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- The native 4:2FTS contains 4.22% of ^{34}S (due to natural isotopic abundance) therefore both native 4:2FTS and M2-4:2FTS will produce signals in the m/z 329 to m/z 309 channel during SRM analysis. We recommend using the m/z 329 to m/z 81 transition to monitor for M2-4:2FTS during quantitative analysis as it will be free of any native contribution (see Figure 2).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/29/2017 (mm/dd/yyyy)

B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801910

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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CALA

ANAB ACCREDITED

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18C0910

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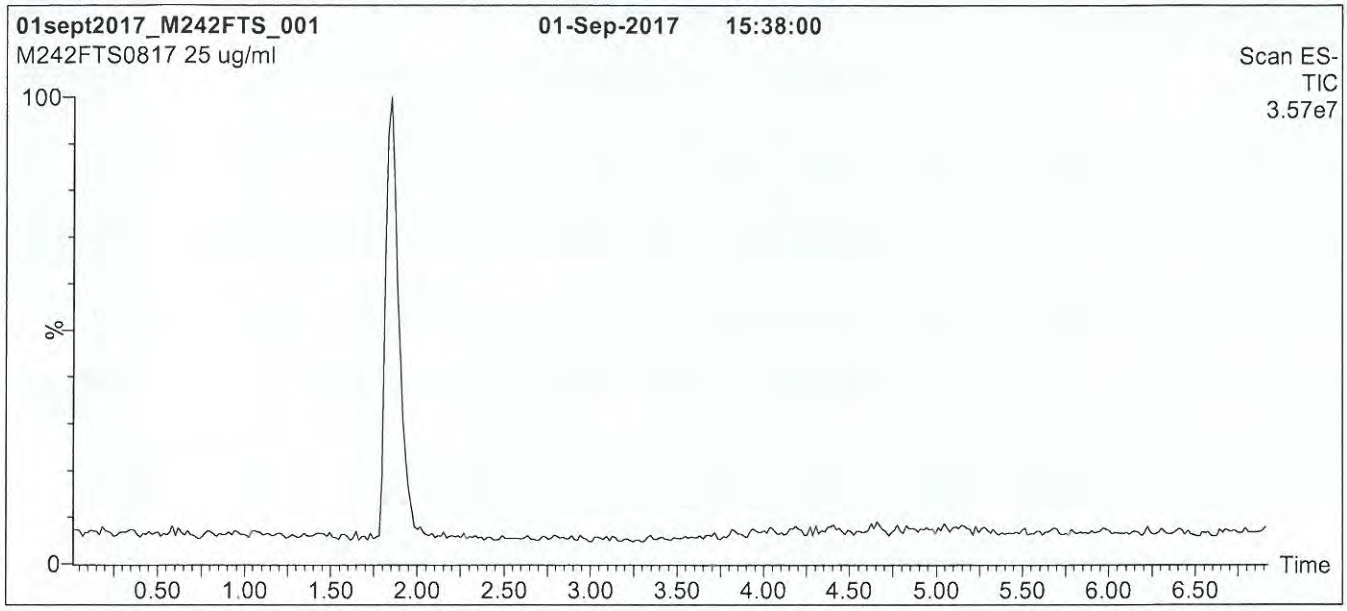
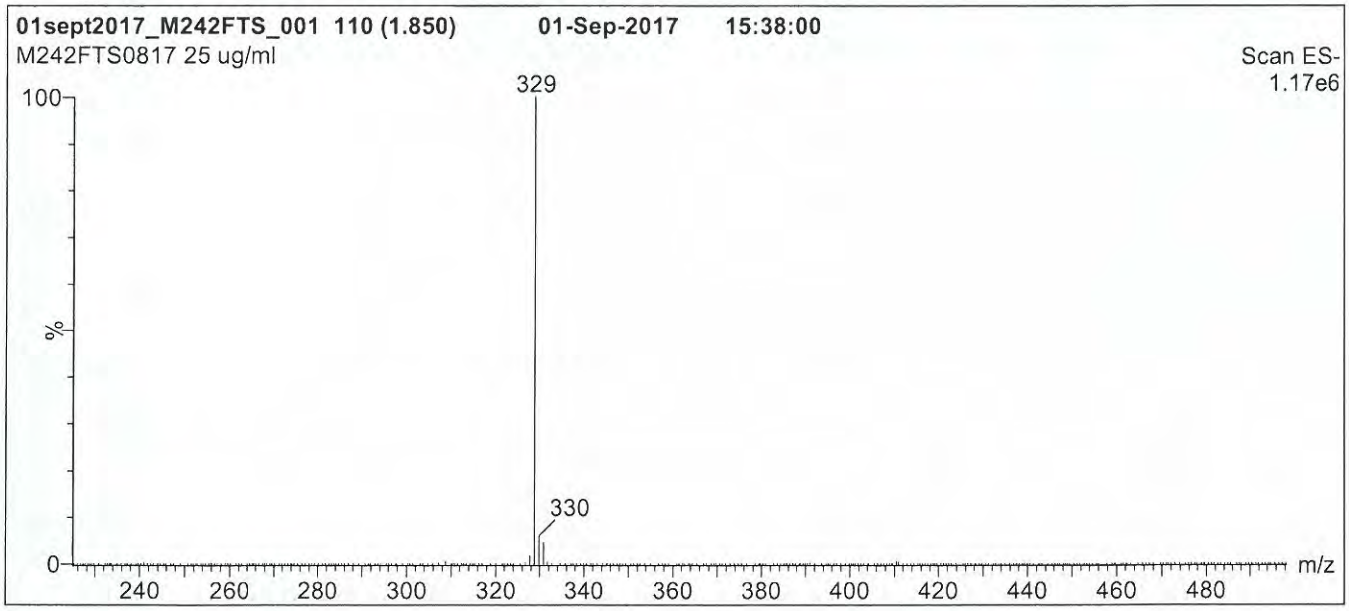




Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min
and hold for 1 min before returning
to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

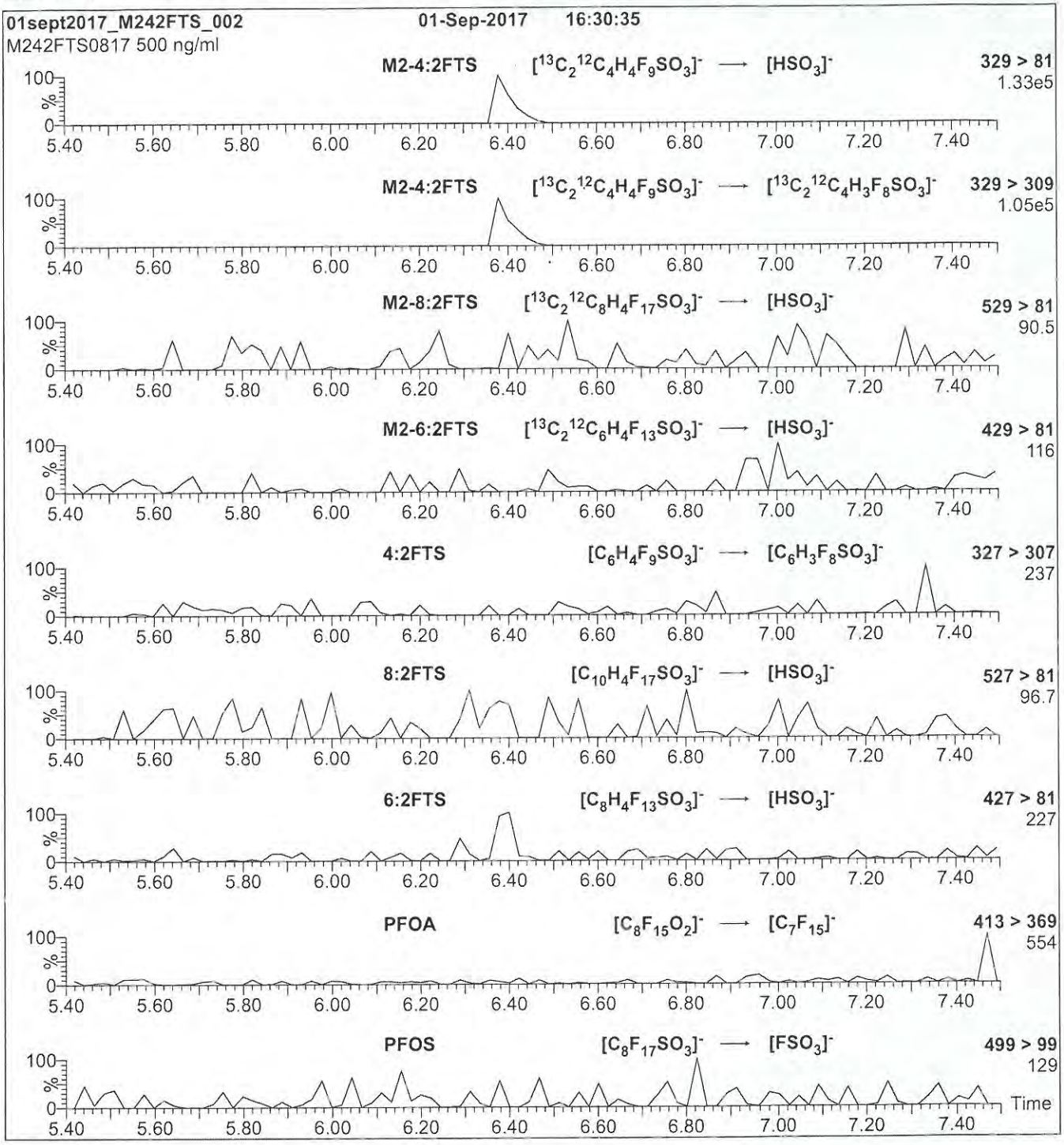
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C0910

Figure 2: **M2-4:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M2-4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 25

Analytical Standard Record

Vista Analytical Laboratory

18E0923

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18C2711	PFDoA	27-Mar-18	** Vendor **	29-May-22	0.4
18C2712	PFBA	27-Mar-18	** Vendor **	14-Dec-22	0.4
18C2713	PFPeA	27-Mar-18	** Vendor **	14-Jun-22	0.4
18C2714	PFHxA	27-Mar-18	** Vendor **	27-Sep-22	0.4
18C2715	PFDA	27-Mar-18	** Vendor **	14-Dec-22	0.4
18C2716	PFUdA	27-Mar-18	** Vendor **	21-Sep-22	0.4
18C2717	PFTrDA	27-Mar-18	** Vendor **	02-May-22	0.4
18C2718	PFHpA	27-Mar-18	** Vendor **	27-Sep-22	0.4
18C2719	PFOA	27-Mar-18	** Vendor **	27-Sep-22	0.4
18C2720	PFNA	27-Mar-18	** Vendor **	20-Jul-22	0.4
18C2721	PFTeDA	27-Mar-18	** Vendor **	21-Sep-22	0.4
18C2722	PFHxDA	27-Mar-18	** Vendor **	13-Jul-22	0.4
18C2723	PFODA	27-Mar-18	** Vendor **	13-Jul-22	0.4
18C2724	br-PFHxSK	27-Mar-18	** Vendor **	04-Jan-22	0.44
18C2725	br-PFOSK anion	27-Mar-18	** Vendor **	12-Jan-22	0.431
18C2726	L-PFBS	27-Mar-18	** Vendor **	21-Sep-22	0.454
18C2727	L-PFPeS	27-Mar-18	** Vendor **	11-Jan-22	0.428
18C2728	L-PFHpS	27-Mar-18	** Vendor **	01-Sep-22	0.42
18C2729	L-PFNS	27-Mar-18	** Vendor **	27-Sep-22	0.418
18C2730	L-PFDS	27-Mar-18	** Vendor **	08-Nov-22	0.415
18C2731	4:2 FTS	27-Mar-18	** Vendor **	12-Dec-21	0.43
18C2732	6:2FTS	27-Mar-18	** Vendor **	20-Apr-22	0.422
18C2733	8:2FTS	27-Mar-18	** Vendor **	24-Jan-23	0.418
18C2734	FOSA-I	27-Mar-18	** Vendor **	01-Sep-22	0.4
18C2737	N-MeFOSA-M	27-Mar-18	** Vendor **	05-Jul-22	2
18C2738	N-EtFOSA-M	27-Mar-18	** Vendor **	05-Jul-22	2
18C2739	N-MeFOSE-M	27-Mar-18	** Vendor **	24-Apr-22	2
18C2740	N-EtFOSE-M	27-Mar-18	** Vendor **	24-Apr-22	2
18D1306	br-NMeFOSAA	13-Apr-18	** Vendor **	17-Jan-23	0.4
18D1307	br-NEtFOSAA	13-Apr-18	** Vendor **	17-Jan-23	0.4

Description:	PFC NS Stock	Expires:	10-May-20
Standard Type:	Analyte Spike	Prepared:	10-May-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	31-May-18 14:02 by AEW

PFOS and PFHxS linear and branched components
As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.

Analyte	CAS Number	Concentration	Units
180517M1-4			

QC OPR Tester for New Spikes. Run on May 17, 2018. GRB

L-PFOA	1	ug/mL
L-PFTrDA	1	ug/mL
L-PFHpA	1	ug/mL

Analytical Standard Record

Vista Analytical Laboratory

18E0923

Description:	PFC NS Stock	Expires:	10-May-20
Standard Type:	Analyte Spike	Prepared:	10-May-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	31-May-18 14:02 by AEW

PFOS and PFHxS linear and branched components
As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.
180517M1-4
QC OPR Tester for New Spikes. Run on May 17, 2018. GRB

Analyte	CAS Number	Concentration	Units
L-PFHpS		1	ug/mL
L-PFHxA		1	ug/mL
L-PFHxDA		1	ug/mL
L-PFHxS		0.812	ug/mL
L-PFDoA		1	ug/mL
L-PFNS	68259-12-1	1	ug/mL
L-PFDA		1	ug/mL
L-PFODA		1	ug/mL
L-PFOS		0.789	ug/mL
L-PFOSA		1	ug/mL
L-PFPeA		1	ug/mL
L-PFPeS	2706-91-4	1	ug/mL
4:2 FTS	757124-72-4	1	ug/mL
L-PFNA		1	ug/mL
L-4:2 FTS	75124-72-4	1	ug/mL
6:2 FTS	27619-97-2	1	ug/mL
8:2 FTS	39108-34-4	1	ug/mL
Br-EtFOSAA		0.224	ug/mL
Br-MeFOSAA		0.24	ug/mL
Br-PFHxS	3871-99-6	0.189	ug/mL
EtFOSA	4151-50-2	5	ug/mL
L-PFDS		1	ug/mL
EtFOSE	1691-99-2	5	ug/mL
L-PFUnA		1	ug/mL
L-6:2 FTS		1	ug/mL
L-8:2FTS		1	ug/mL
L-EtFOSAA	2991-50-6	1	ug/mL
L-MeFOSAA	2355-31-9	1	ug/mL
L-PFBA		1	ug/mL
L-PFBS		1	ug/mL
EtFOSAA	2991-50-6	1	ug/mL
Total EtFOSAA		1	ug/mL
L-PFTeDA		1	ug/mL

Analytical Standard Record

Vista Analytical Laboratory

18E0923

Description:	PFC NS Stock	Expires:	10-May-20
Standard Type:	Analyte Spike	Prepared:	10-May-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	20	Department:	LCMS
Vials:	1	Last Edit:	31-May-18 14:02 by AEW

PFOS and PFHxS linear and branched components
As of 5/27/18, MeFOSAA and EtFOSAA include Linear and Branched.
180517M1-4
QC OPR Tester for New Spikes. Run on May 17, 2018. GRB

Analyte	CAS Number	Concentration	Units
PFOSA	754-91-6	1	ug/mL
PFPeA	2706-90-3	1	ug/mL
PFPeS	2706-91-4	1	ug/mL
PFTeDA	376-06-7	1	ug/mL
PFTrDA	72629-94-8	1	ug/mL
PFODA	16517-11-6	1	ug/mL
Total 6:2 FTS		1	ug/mL
PFOA	335-67-1	1	ug/mL
Total MeFOSAA		1	ug/mL
Total PFDS		1	ug/mL
Total PFHpS		1	ug/mL
Total PFHxS		1	ug/mL
Total PFOA		1	ug/mL
Total PFOS		1	ug/mL
PFUnA	2058-94-8	1	ug/mL
PFHpA	375-85-9	1	ug/mL
MeFOSA	31506-32-8	5	ug/mL
MeFOSAA	2355-31-9	1	ug/mL
MeFOSE	24448-09-7	5	ug/mL
PFBA	375-22-4	1	ug/mL
PFBS	375-73-5	1	ug/mL
PFDA	335-76-2	1	ug/mL
PFOS	1763-23-1	1	ug/mL
PFDS	335-77-3	1	ug/mL
Total PFUnA		1	ug/mL
PFHpS	375-92-8	1	ug/mL
PFHxA	307-24-4	1	ug/mL
PFHxDA	67905-19-5	1	ug/mL
PFHxS	355-46-4	1	ug/mL
PFNA	375-95-1	1	ug/mL
PFNS	68259-12-1	1	ug/mL
PFDoA	307-55-1	1	ug/mL

18C2711

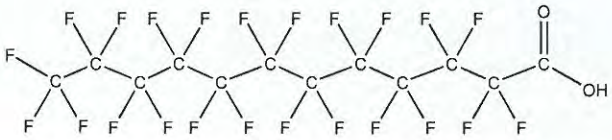
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDoA
COMPOUND: Perfluoro-n-dodecanoic acid
LOT NUMBER: PFDoA0517

STRUCTURE:

CAS #: 307-55-1



MOLECULAR FORMULA: $C_{12}HF_{23}O_2$
MOLECULAR WEIGHT: 614.10
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/29/2017
EXPIRY DATE: (mm/dd/yyyy) 05/29/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/30/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2711

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

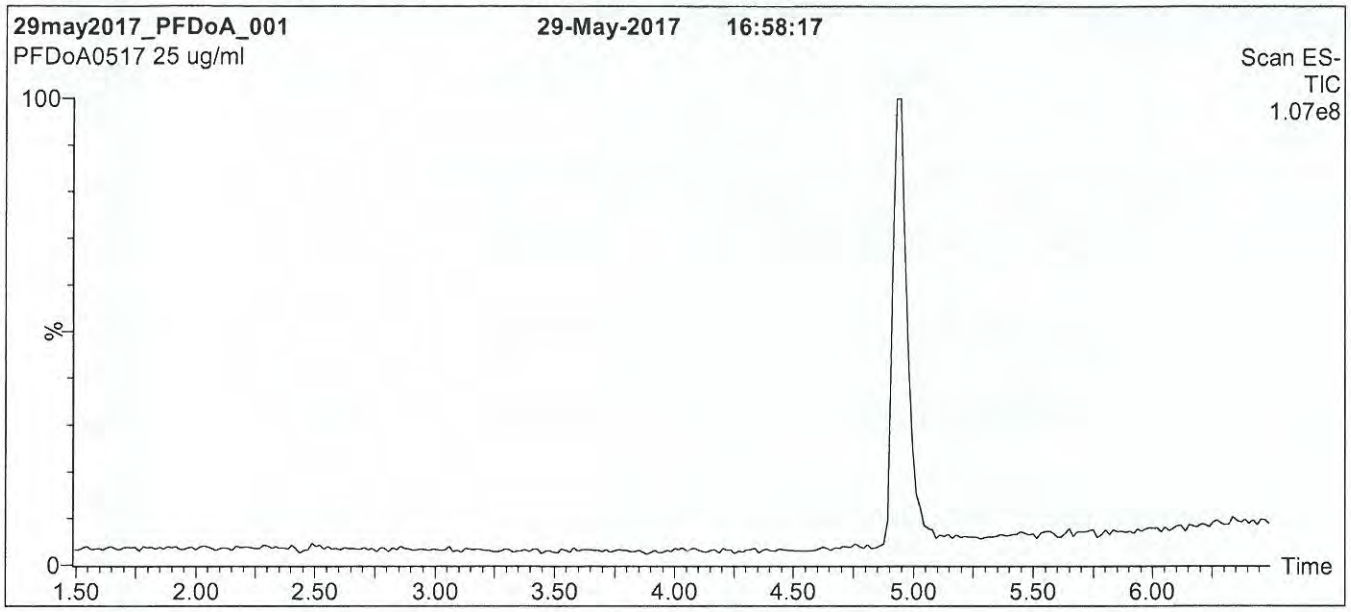
CALA Testing Accreditation No. A 1226

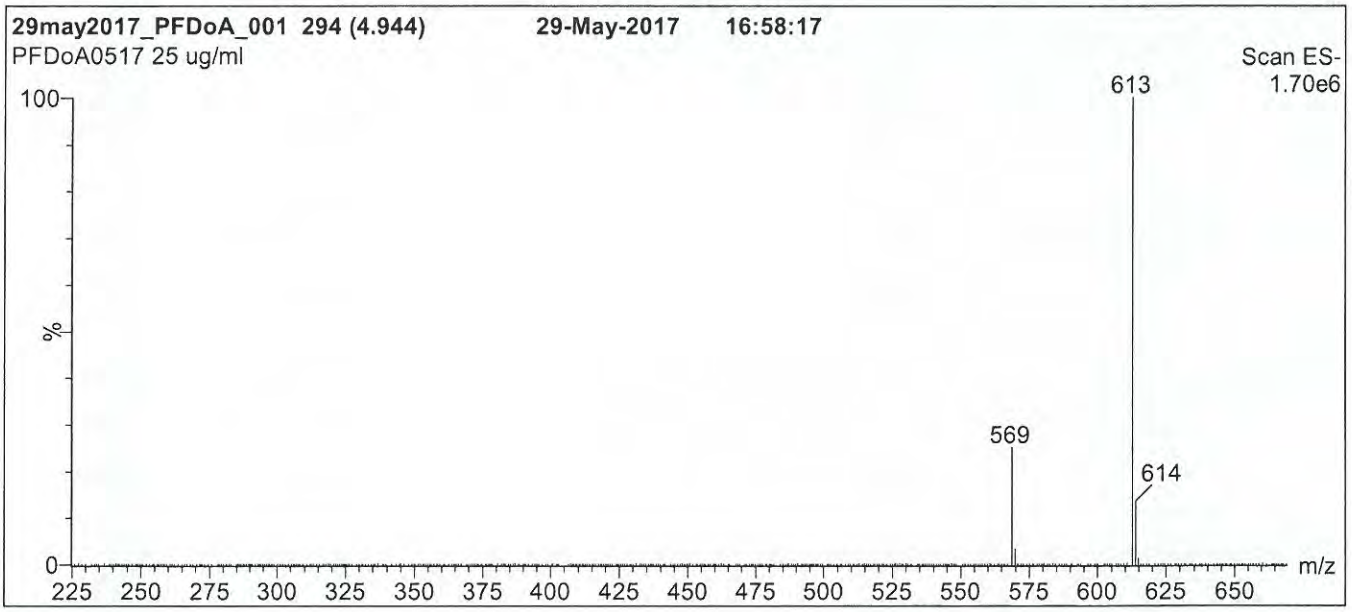
ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2711

Figure 1: **PFDoA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

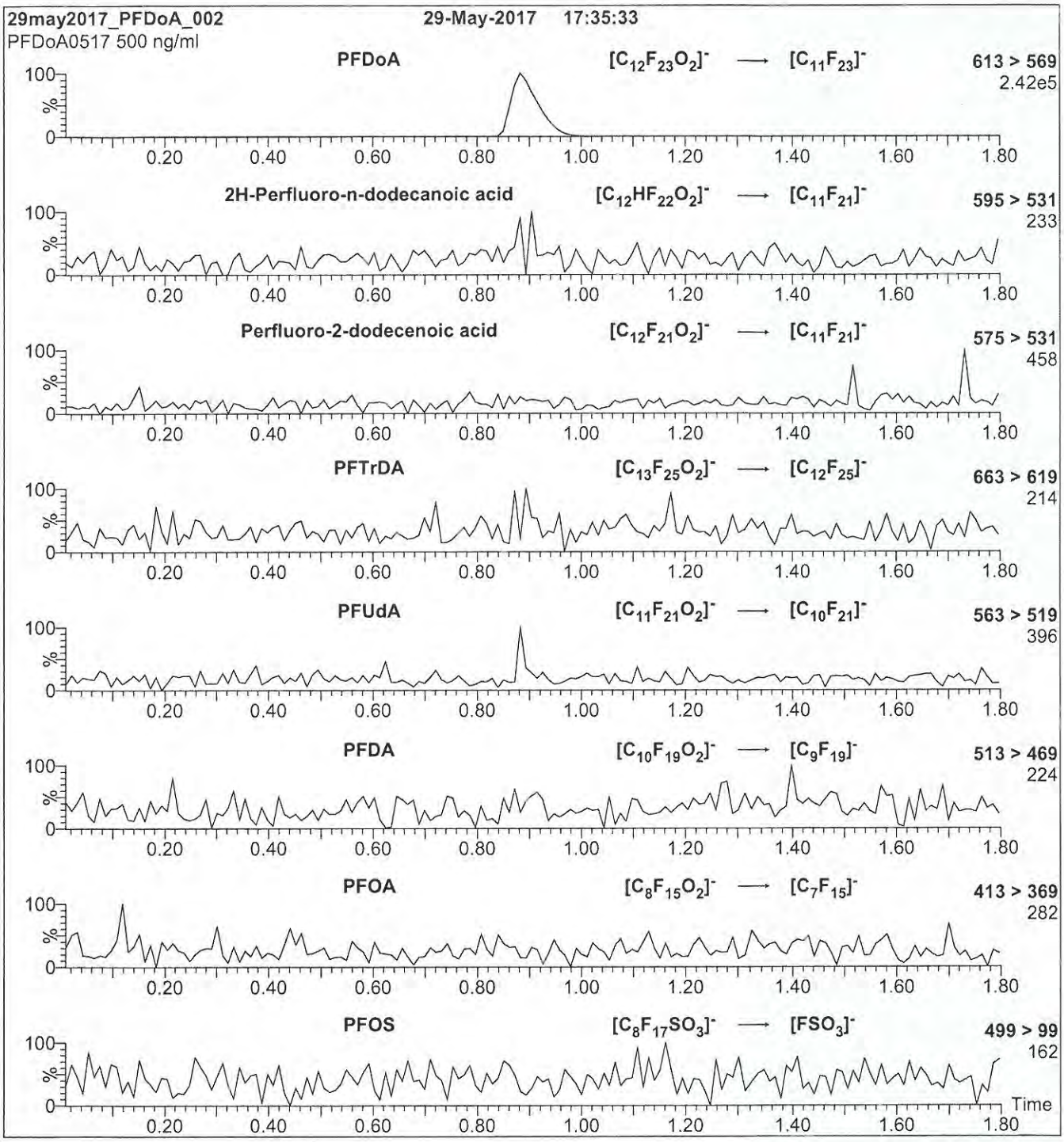
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 20.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2711

Figure 2: **PFDoA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDoA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 13

18C2712

WELLINGTON LABORATORIES

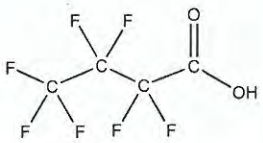
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFBA
COMPOUND: Perfluoro-n-butanoic acid

LOT NUMBER: PFBA1217

STRUCTURE:

CAS #: 375-22-4



MOLECULAR FORMULA: $C_4HF_7O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 214.04
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/14/2017
EXPIRY DATE: (mm/dd/yyyy) 12/14/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2712

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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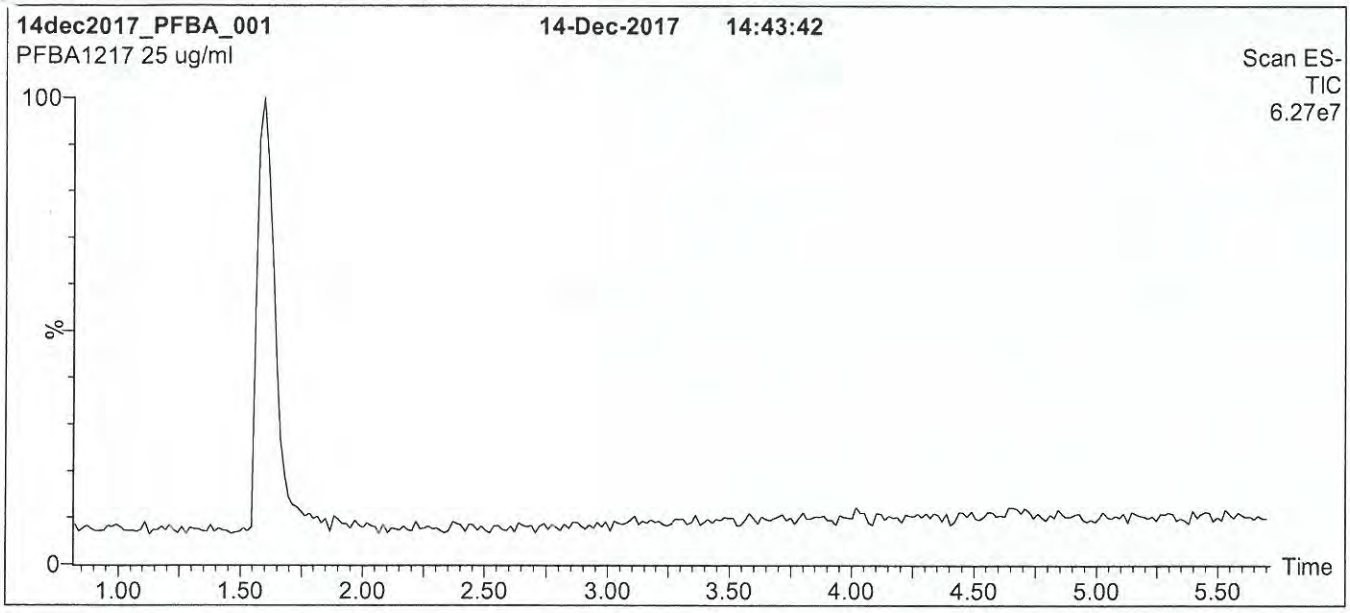
CALA Testing

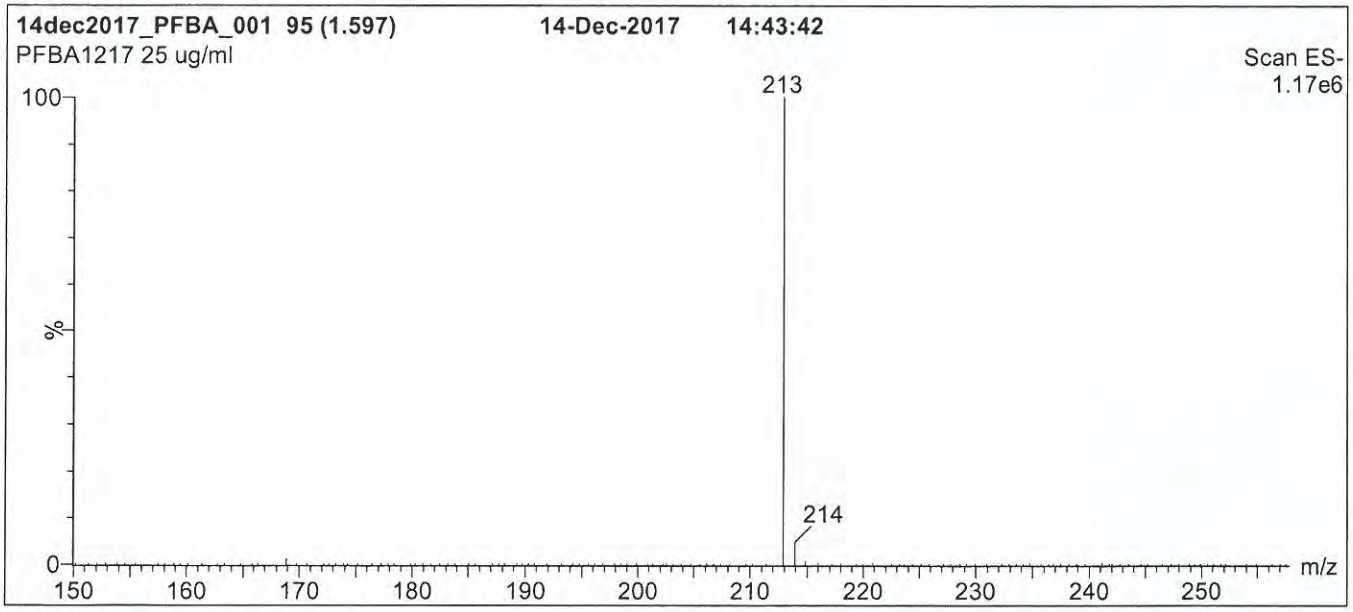
ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2712

Figure 1: **PFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

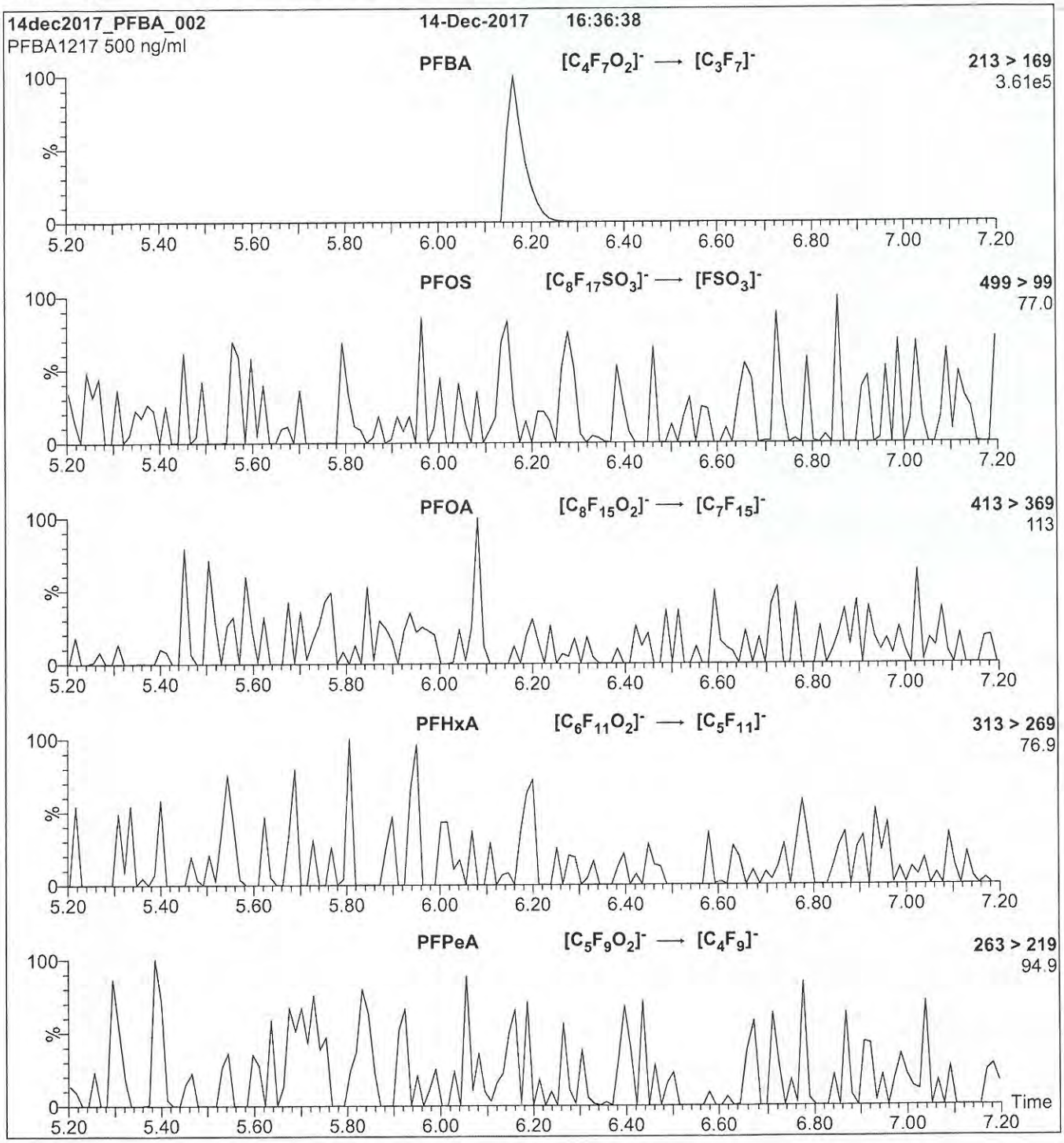
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2712

Figure 2: **PFBA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 10

18C2713

WELLINGTON LABORATORIES

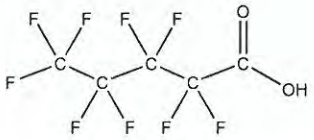
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFPeA
COMPOUND: Perfluoro-n-pentanoic acid

LOT NUMBER: PFPeA0617

STRUCTURE:

CAS #: 2706-90-3



MOLECULAR FORMULA: $C_5HF_9O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 264.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 06/14/2017
EXPIRY DATE: (mm/dd/yyyy) 06/14/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.3% of Perfluoro-n-heptanoic acid (PFHpA) and ~ 0.2% of $C_5H_2F_8O_2$ (hydrido - derivative) as measured by ^{19}F NMR.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 06/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C273

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

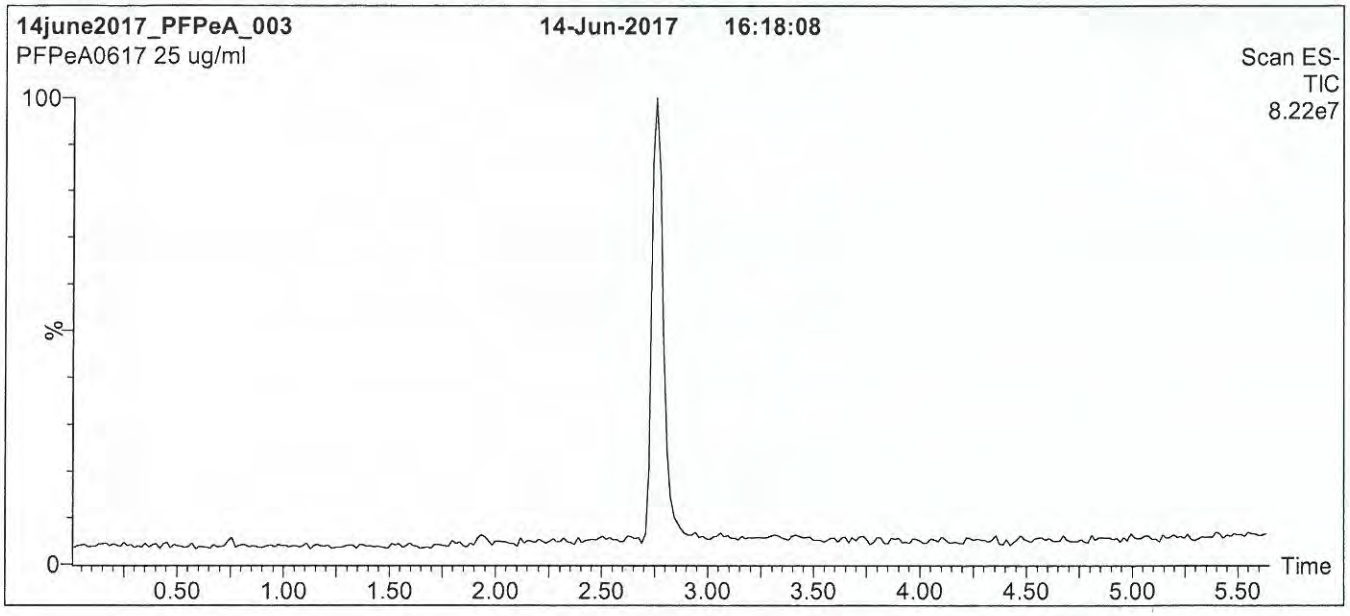
CALA Testing

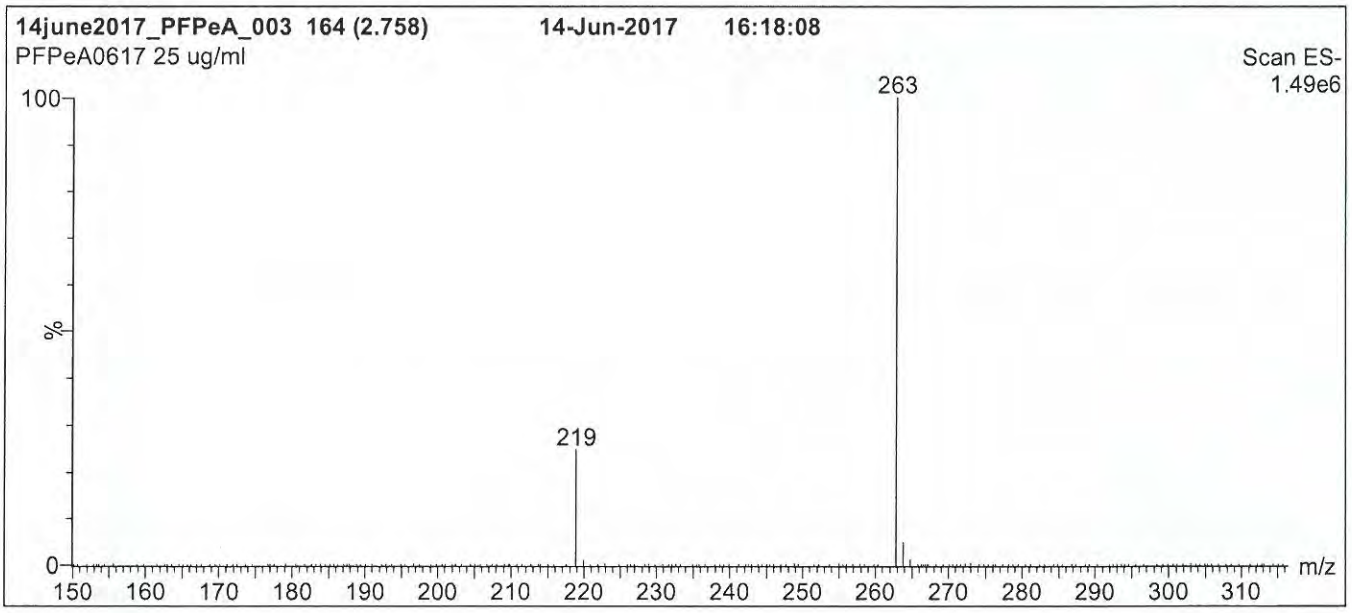
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

182713

Figure 1: **PFPeA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

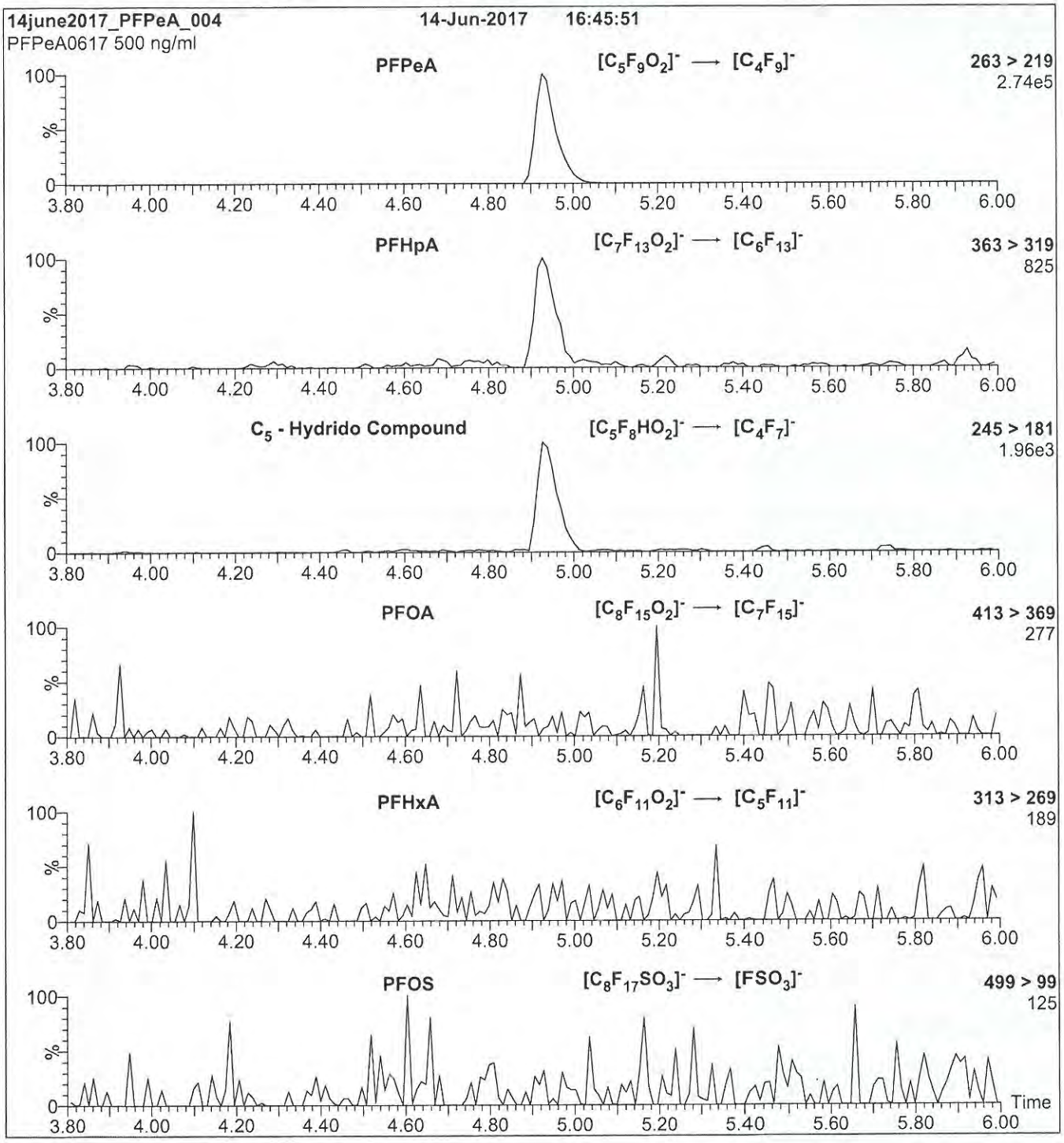
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18C2713

Figure 2: **PFPeA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFPeA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.62e-3
Collision Energy (eV) = 9

18C2714

WELLINGTON LABORATORIES

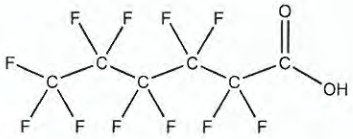
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxA
COMPOUND: Perfluoro-n-hexanoic acid

LOT NUMBER: PFHxA0917

STRUCTURE:

CAS #: 307-24-4



MOLECULAR FORMULA: $C_6HF_{11}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 314.05
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/27/2017
EXPIRY DATE: (mm/dd/yyyy) 09/27/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 1.0% of branched isomers.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/01/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2714

INTENDED USE:

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HAZARDS:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED Reference Material Producer

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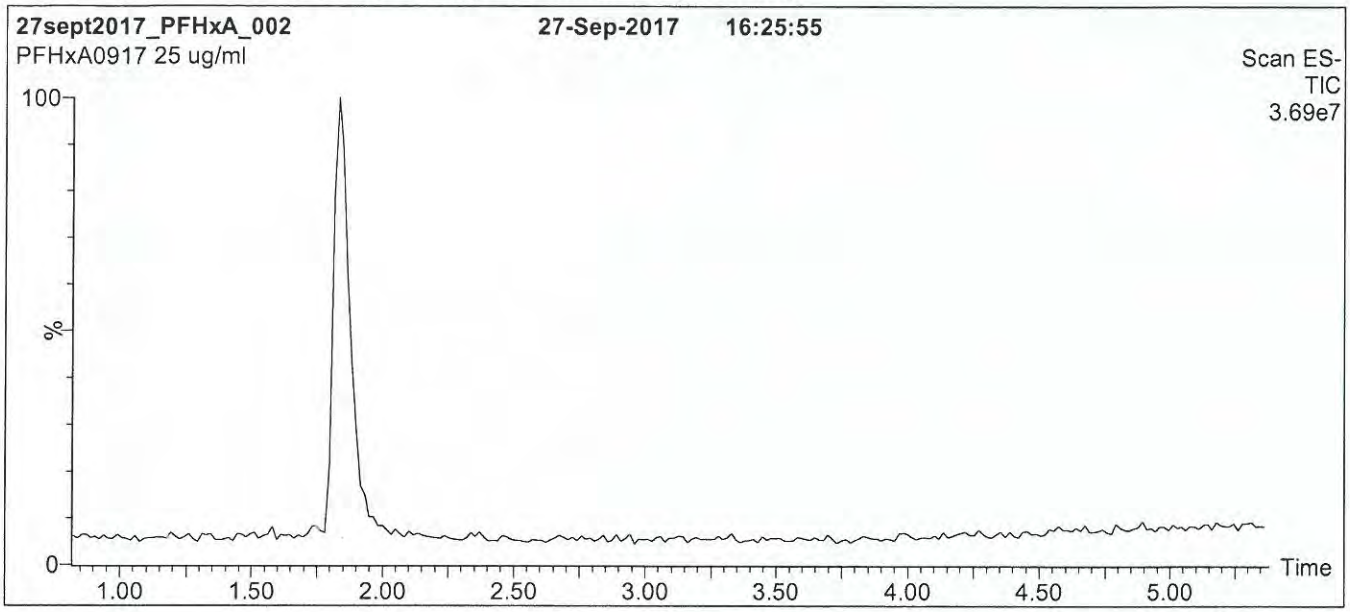
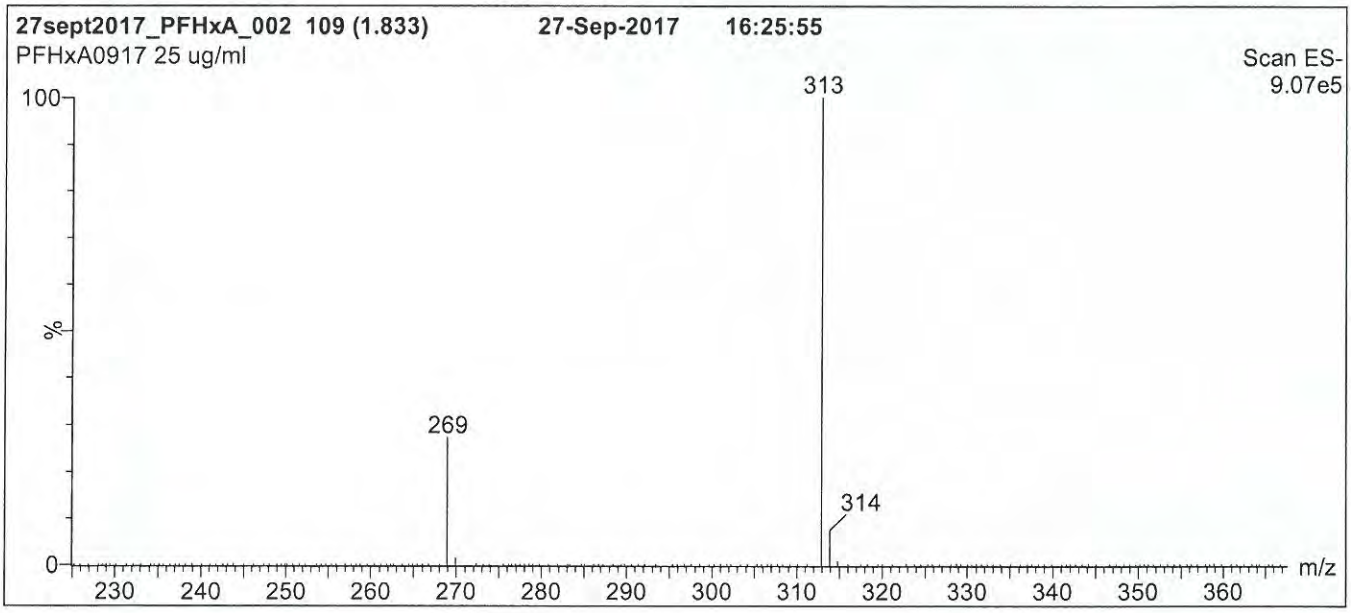
18C2714

Figure 1: **PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

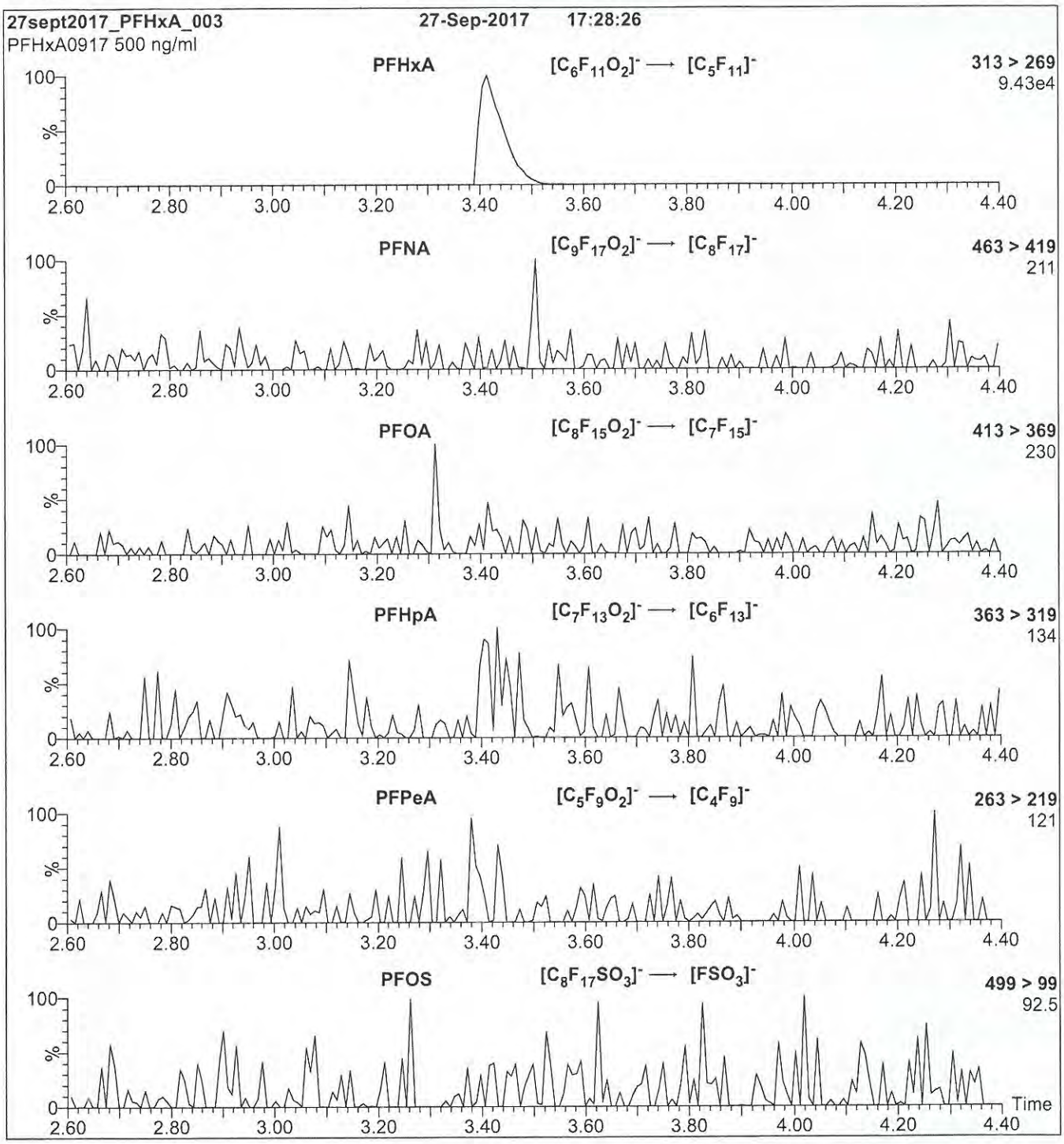
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2714

Figure 2: **PFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 10

18C2715

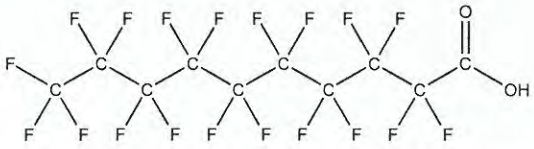
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFDA
COMPOUND: Perfluoro-n-decanoic acid
LOT NUMBER: PFDA1217

STRUCTURE:

CAS #: 335-76-2



MOLECULAR FORMULA: $C_{10}HF_{19}O_2$
MOLECULAR WEIGHT: 514.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/14/2017
EXPIRY DATE: (mm/dd/yyyy) 12/14/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of perfluoro-n-nonanoic acid (PFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 12/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1802715

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

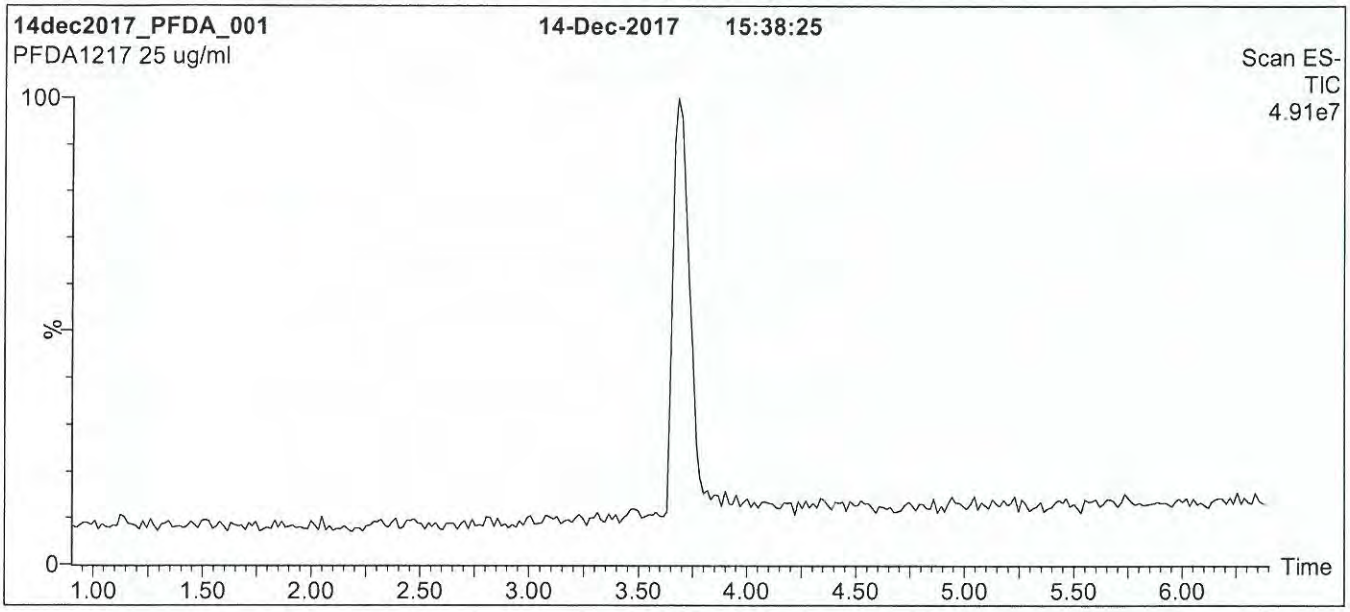
CALA Testing Accreditation No. A 1226

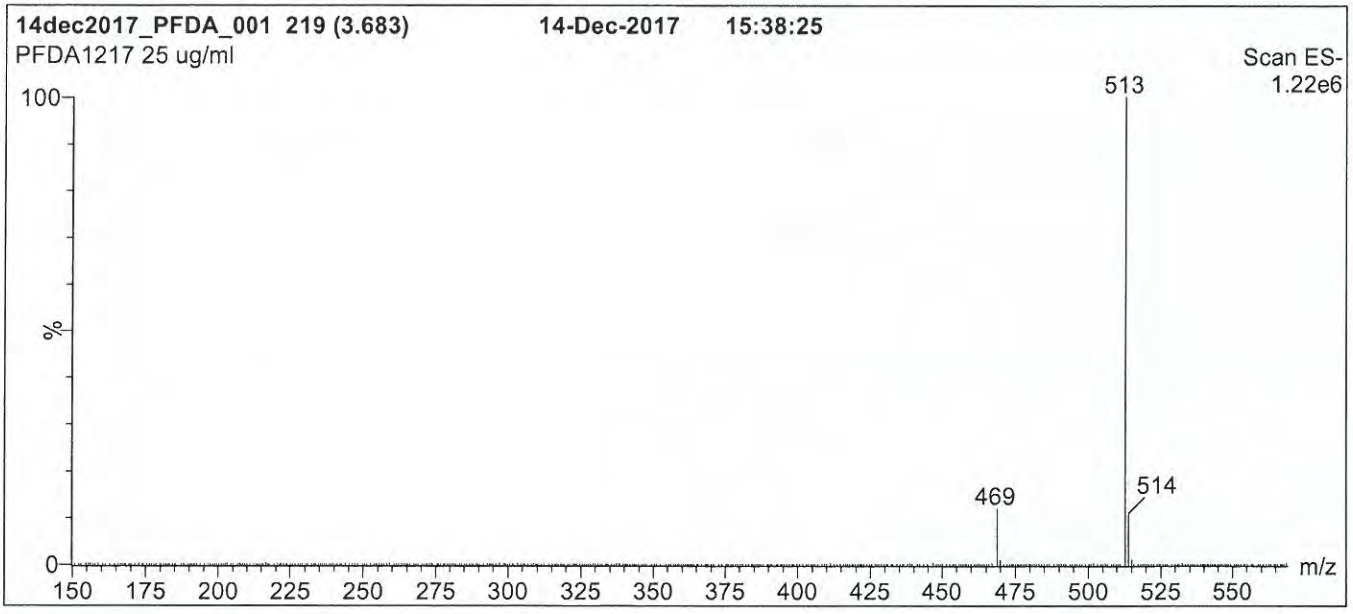
ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

1802715

Figure 1: **PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

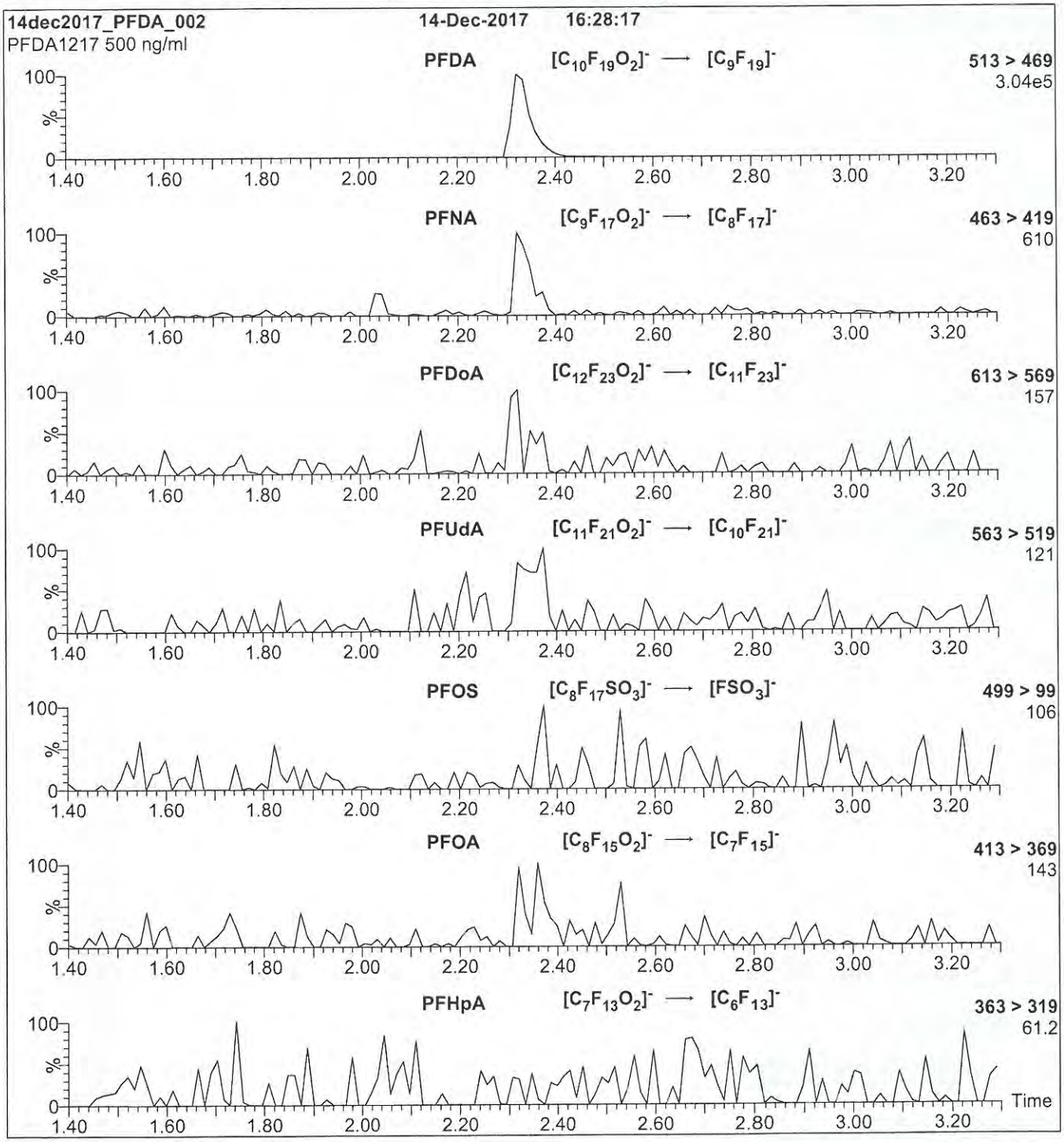
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2715

Figure 2: **PFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 13

18C2716

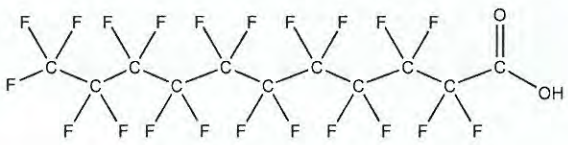
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFUdA
COMPOUND: Perfluoro-n-undecanoic acid
LOT NUMBER: PFUdA0917

STRUCTURE:

CAS #: 2058-94-8



MOLECULAR FORMULA: $C_{11}HF_{21}O_2$
MOLECULAR WEIGHT: 564.09
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/21/2017
EXPIRY DATE: (mm/dd/yyyy) 09/21/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2716

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA Testing Accreditation No. A1226

ANAB ACCREDITED Reference Material Producer

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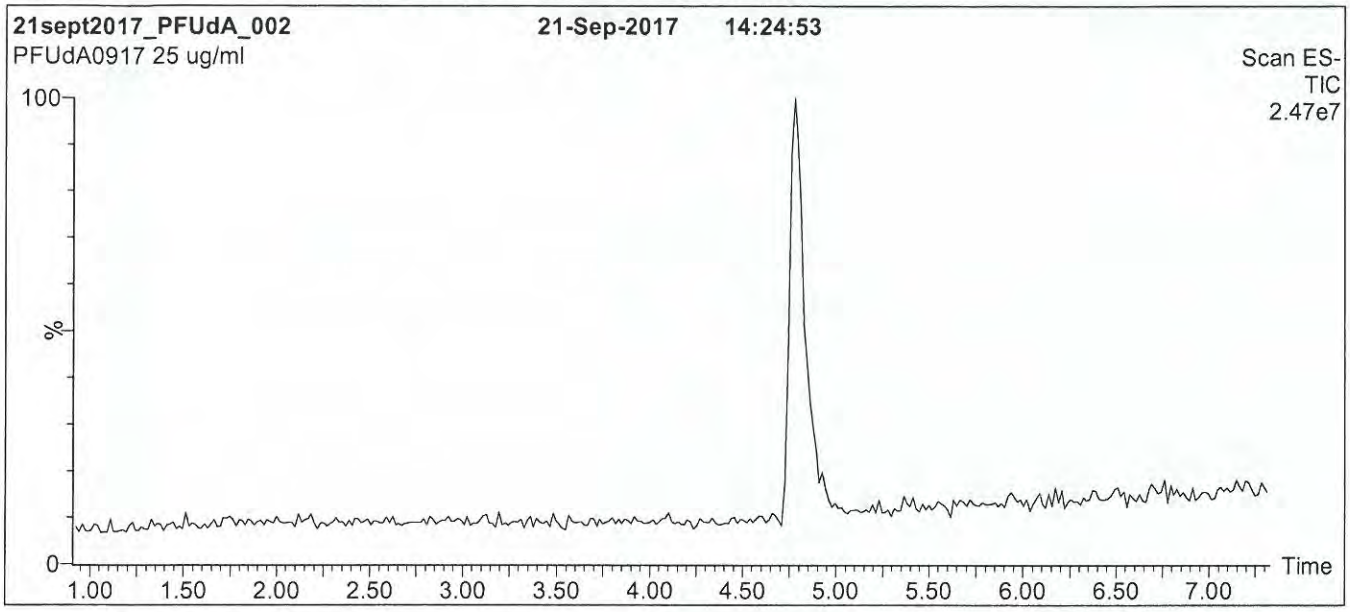
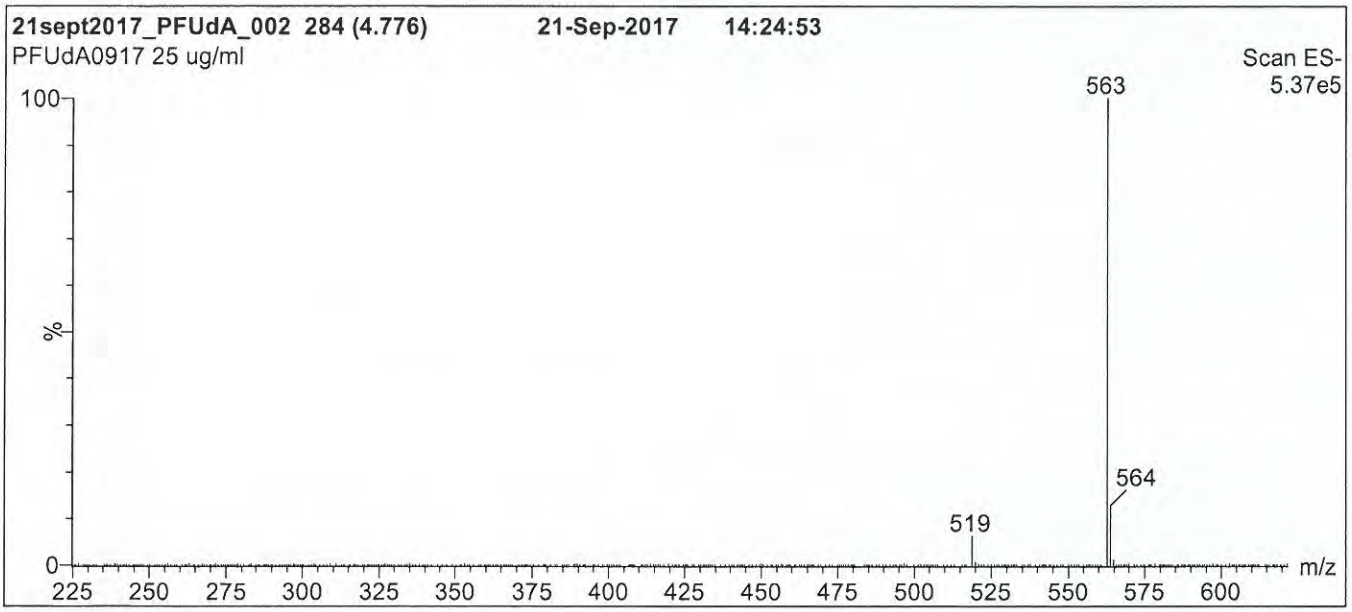
18C2716

Figure 1: **PFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

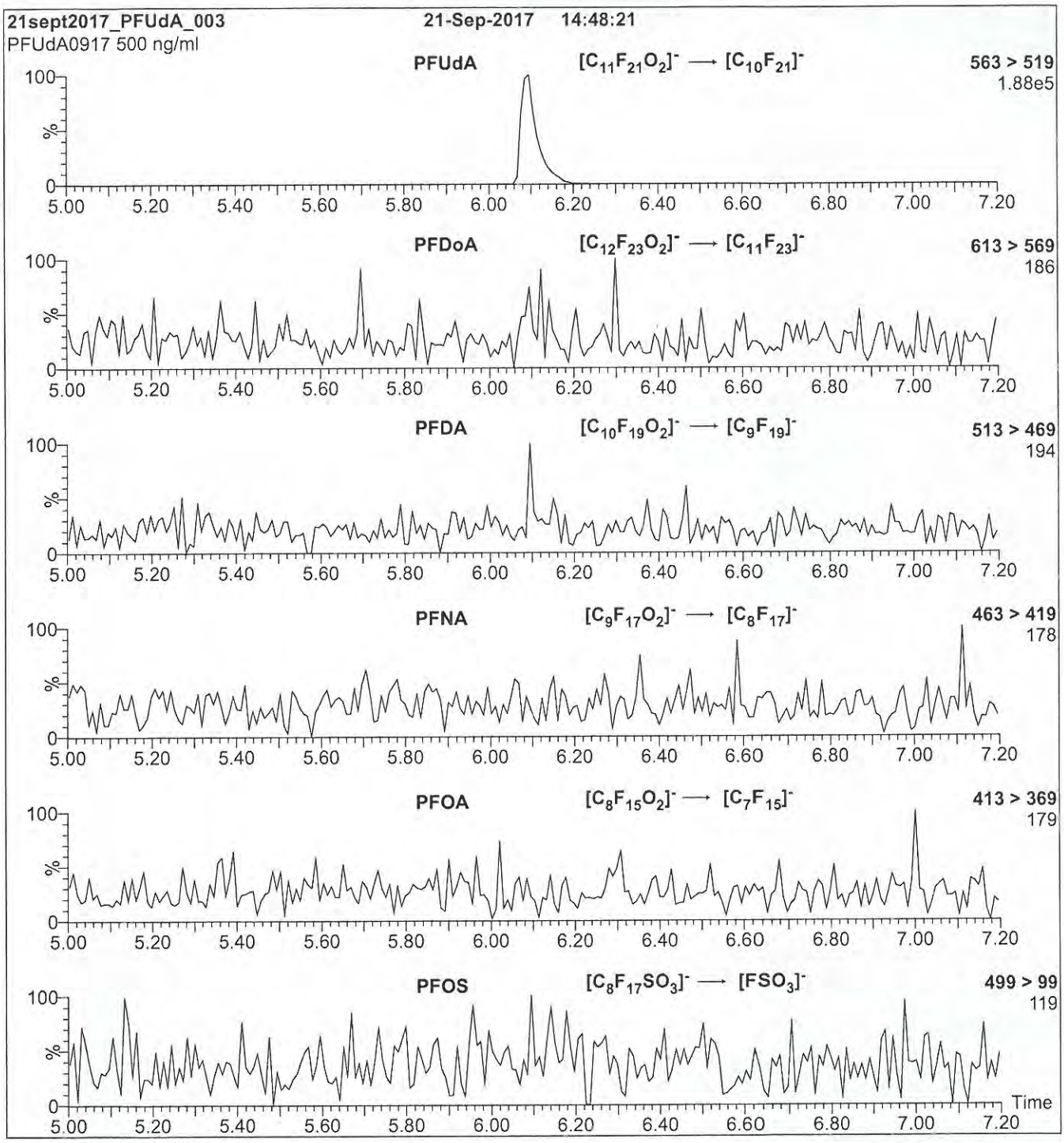
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

18C2716

Figure 2: **PFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

18C2717

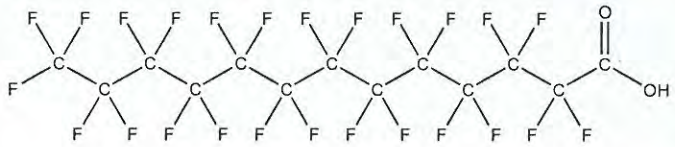
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFTrDA
COMPOUND: Perfluoro-n-tridecanoic acid
LOT NUMBER: PFTrDA0517

STRUCTURE:

CAS #: 72629-94-8



MOLECULAR FORMULA: $C_{13}HF_{25}O_2$
MOLECULAR WEIGHT: 664.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/02/2017
EXPIRY DATE: (mm/dd/yyyy) 05/02/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of PFUdA ($C_{11}HF_{21}O_2$), ~ 0.4% of PFDoA ($C_{12}HF_{23}O_2$), and ~ 0.1% of PFTeDA ($C_{14}HF_{27}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim, General Manager
Date: 05/04/2017 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2717

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TRACEABILITY:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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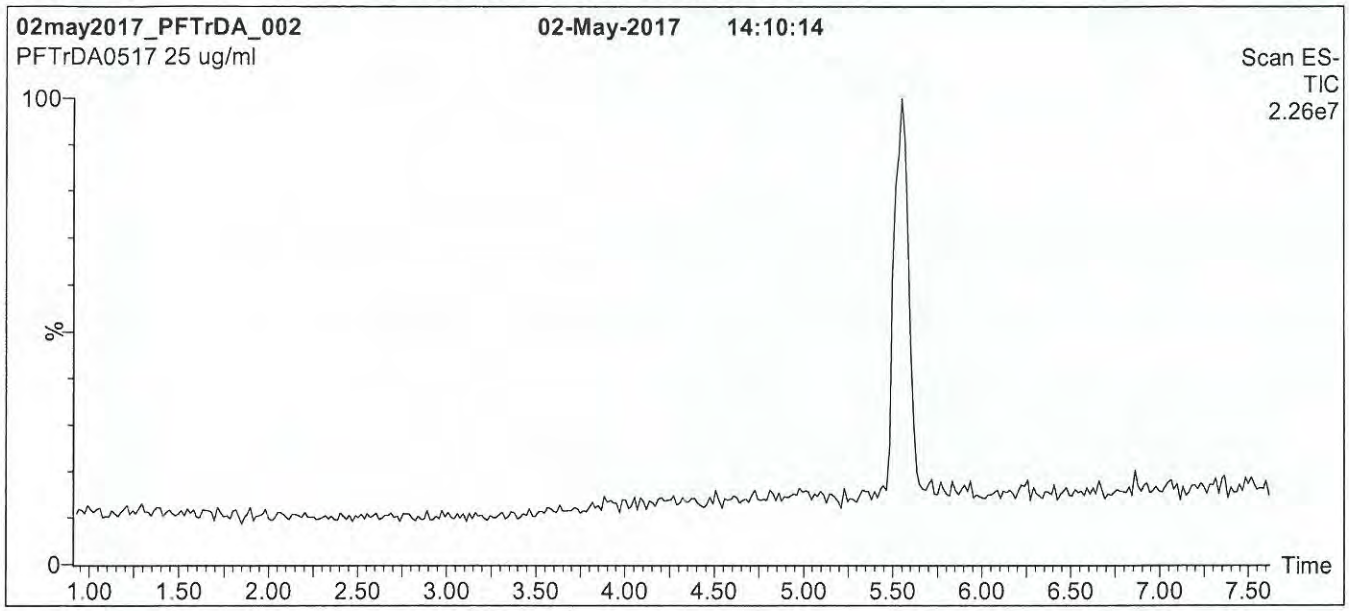
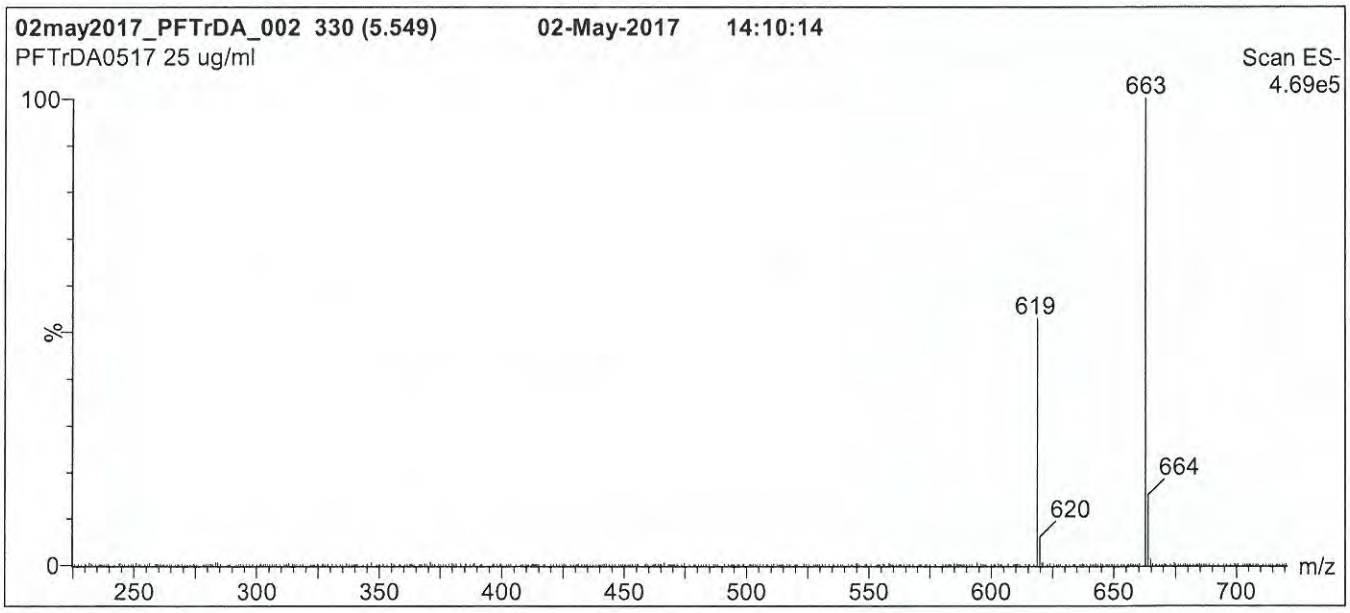
18C2717

Figure 1: **PFTrDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

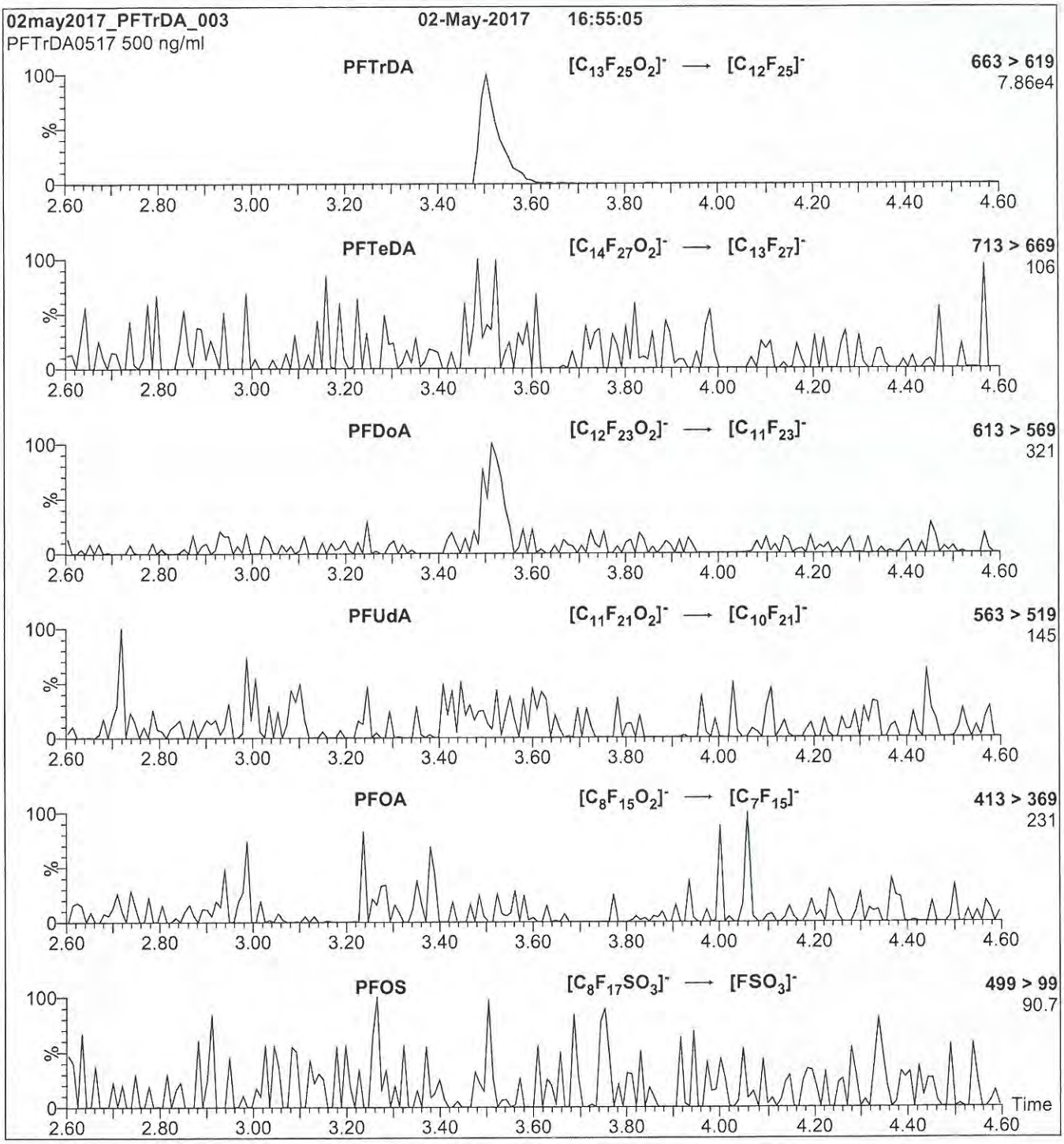
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 22.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 650

18C2717

Figure 2: **PFTrDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTrDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.17e-3
Collision Energy (eV) = 15

18C2718

WELLINGTON LABORATORIES

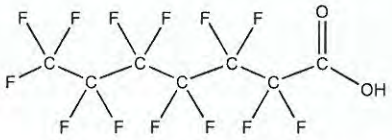
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHpA
COMPOUND: Perfluoro-n-heptanoic acid

LOT NUMBER: PFHpA0917

STRUCTURE:

CAS #: 375-85-9



MOLECULAR FORMULA: $C_7HF_{13}O_2$
CONCENTRATION: 50 ± 2.5 µg/ml

MOLECULAR WEIGHT: 364.06
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/27/2017
EXPIRY DATE: (mm/dd/yyyy) 09/27/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/29/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2718

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

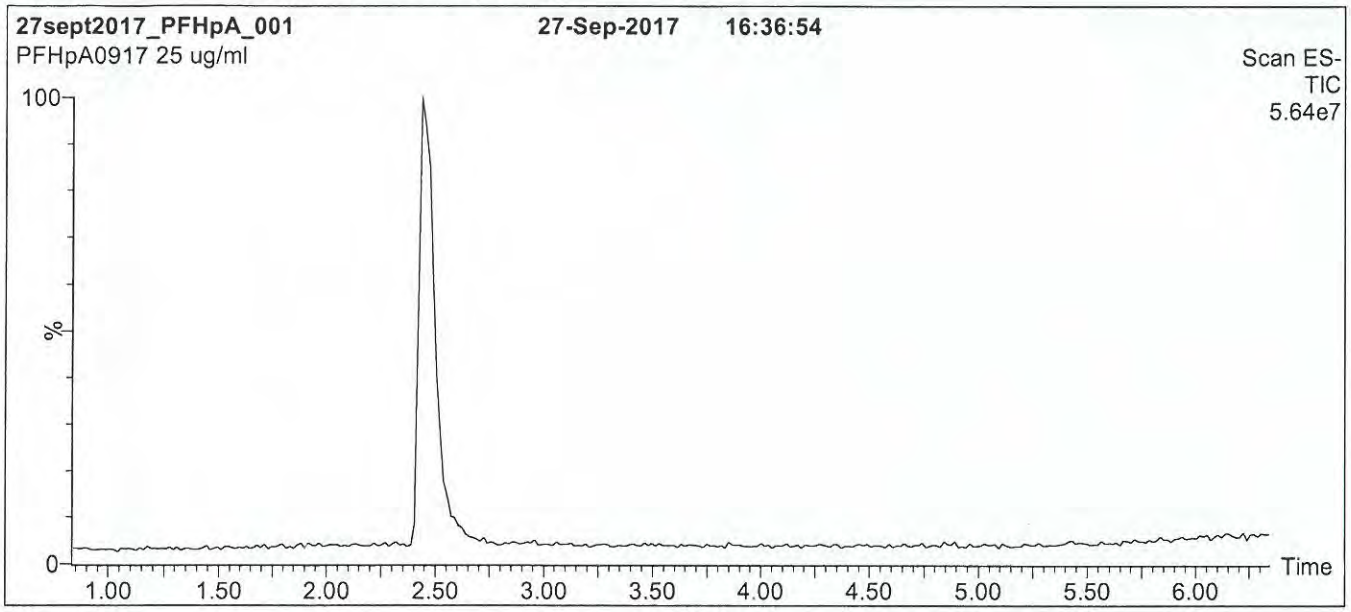
CALA Testing Accreditation No. A 1226

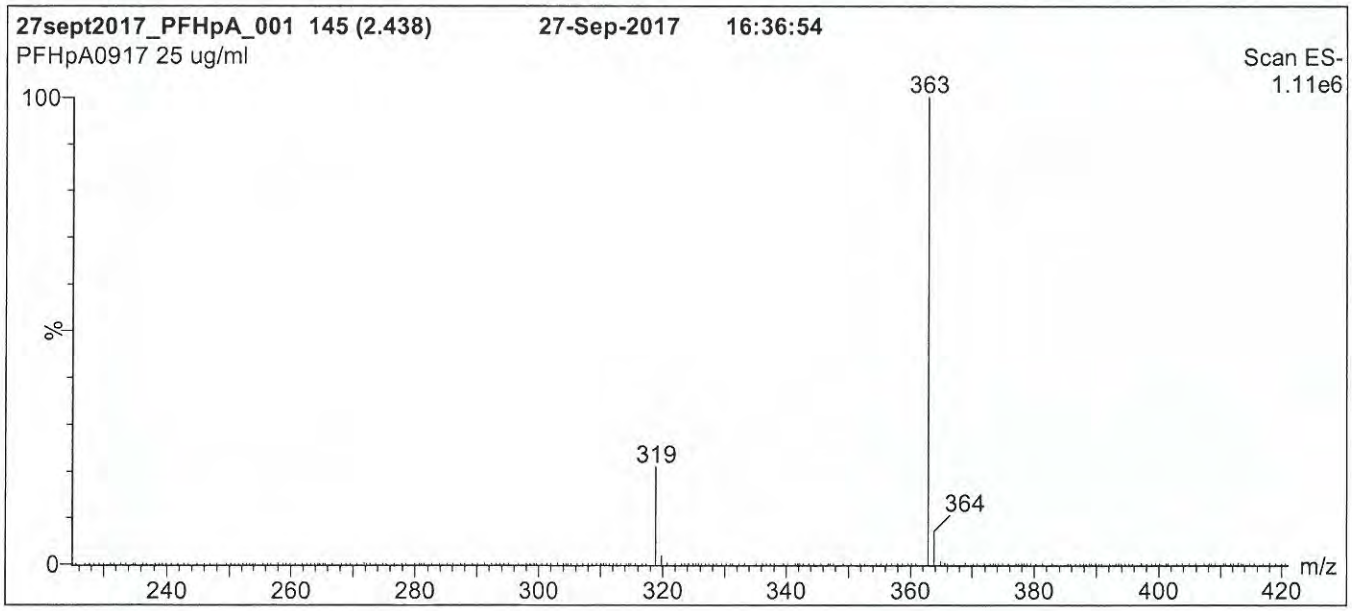
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2718

Figure 1: **PFHpA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

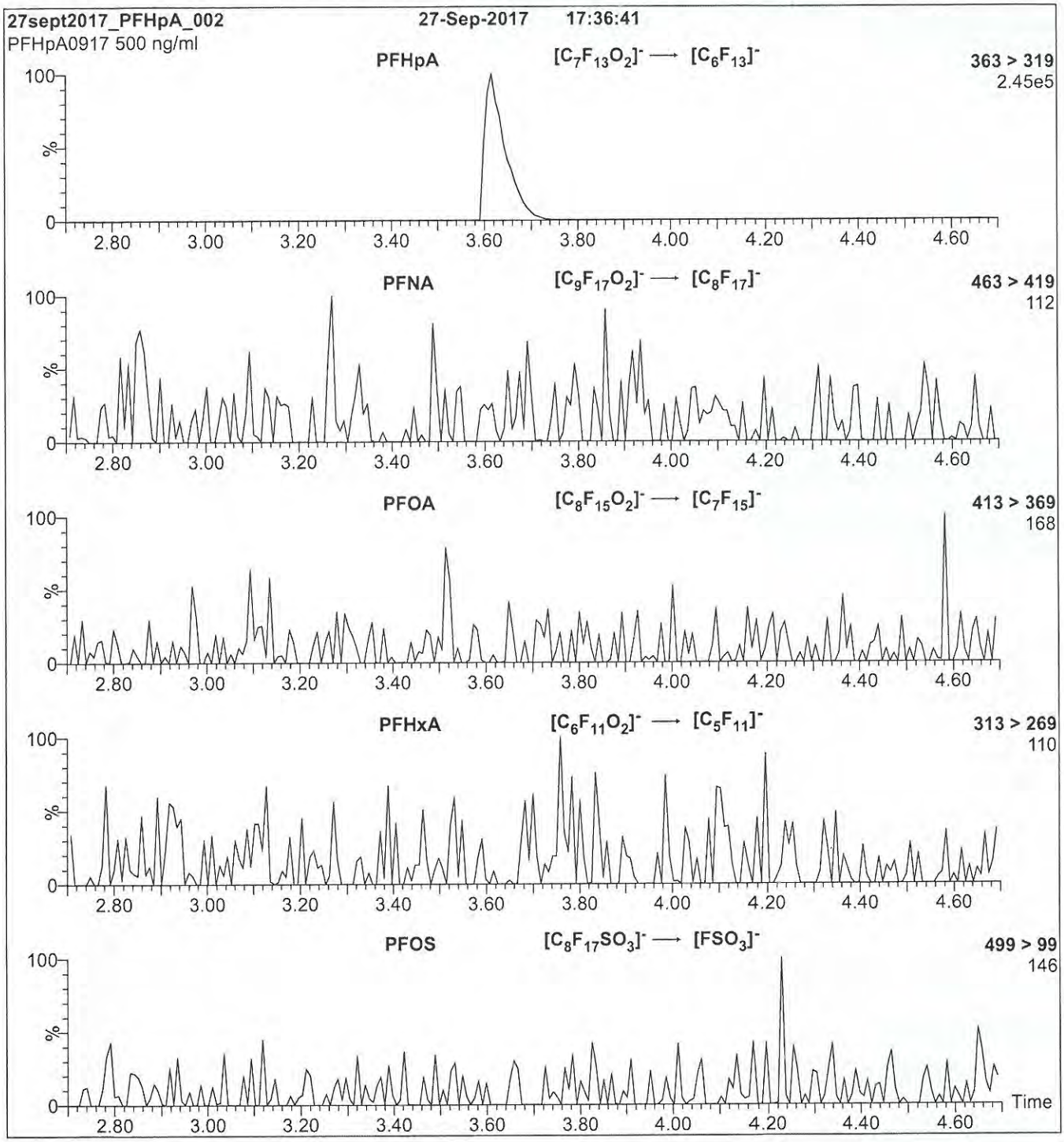
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2718

Figure 2: **PFHpA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHpA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 11

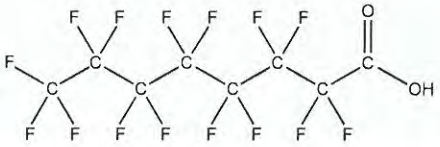
18C2719

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFOA
COMPOUND: Perfluoro-n-octanoic acid
LOT NUMBER: PFOA0917

STRUCTURE:
CAS #: 335-67-1



MOLECULAR FORMULA: $C_8HF_{15}O_2$
MOLECULAR WEIGHT: 414.07
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/27/2017
EXPIRY DATE: (mm/dd/yyyy) 09/27/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/28/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2719

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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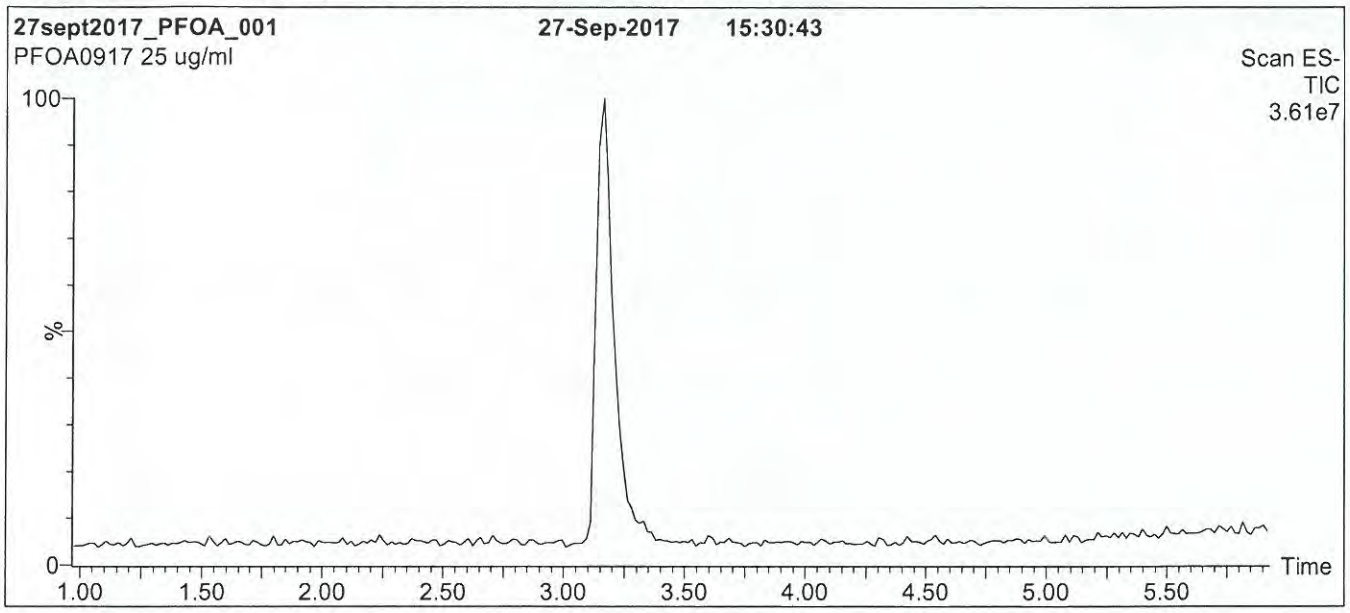
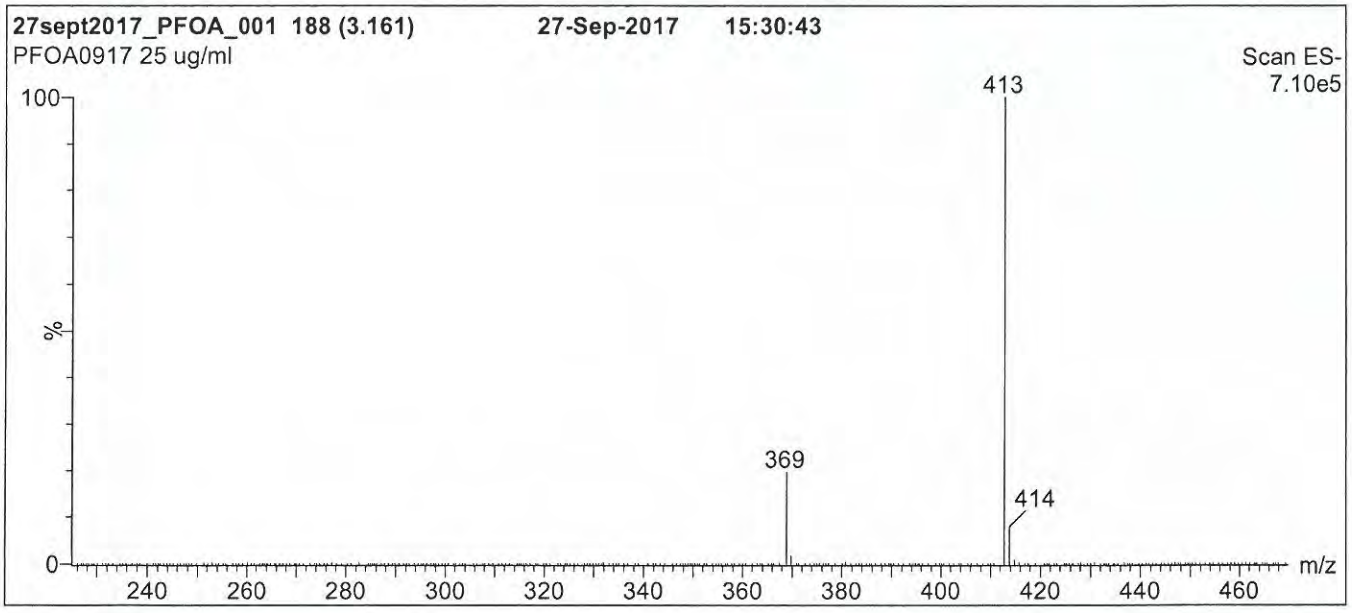
18C2719

Figure 1: **PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

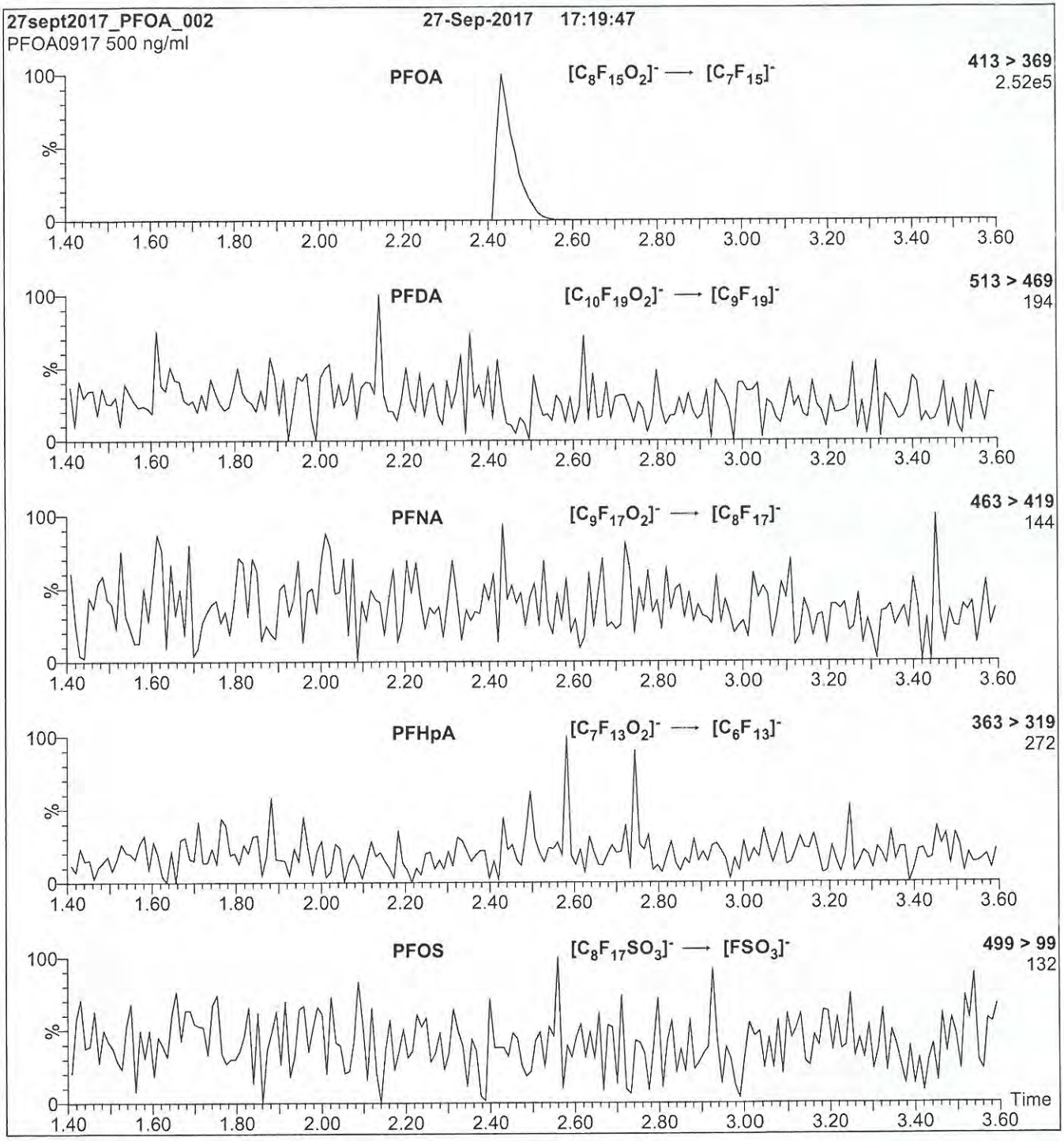
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2719

Figure 2: **PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 11

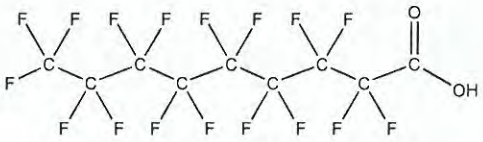
18C2720

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFNA
COMPOUND: Perfluoro-n-nonanoic acid
LOT NUMBER: PFNA0717

STRUCTURE:
CAS #: 375-95-1



MOLECULAR FORMULA: $C_9HF_{17}O_2$
MOLECULAR WEIGHT: 464.08
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/20/2017
EXPIRY DATE: (mm/dd/yyyy) 07/20/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.1% of perfluoro-n-octanoic acid (PFOA), < 0.1% of perfluoro-n-heptanoic acid (PFHpA), and < 0.1% of perfluoro-n-undecanoic acid (PFUdA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/24/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2720

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CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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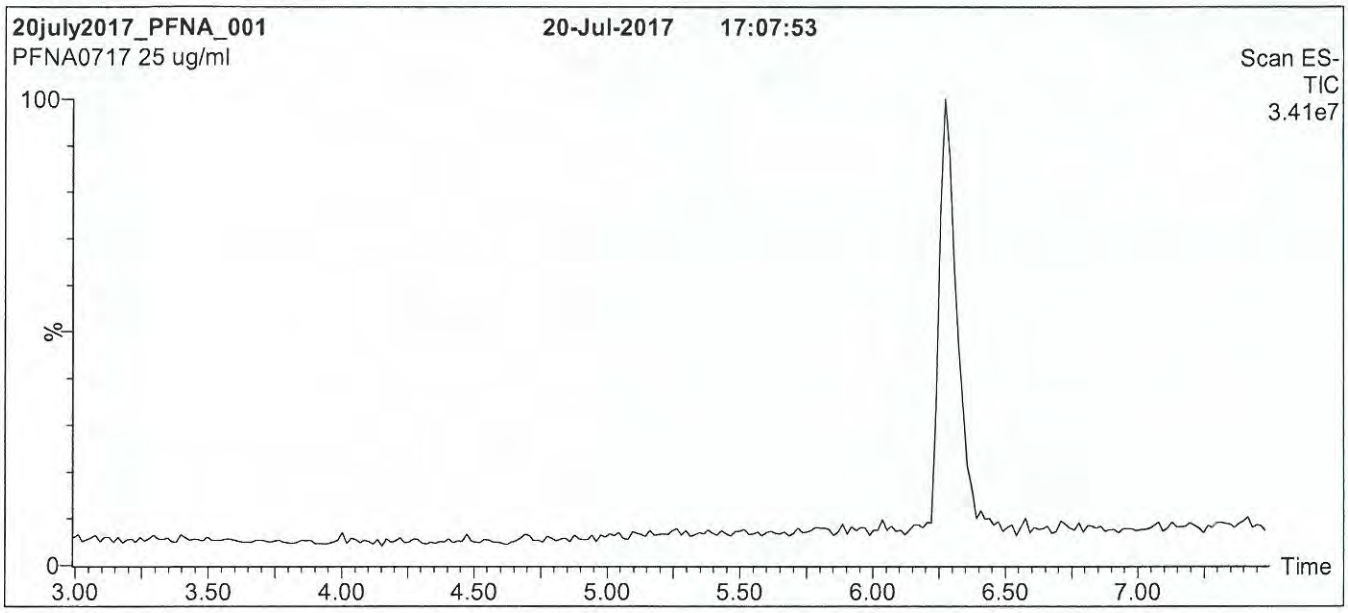
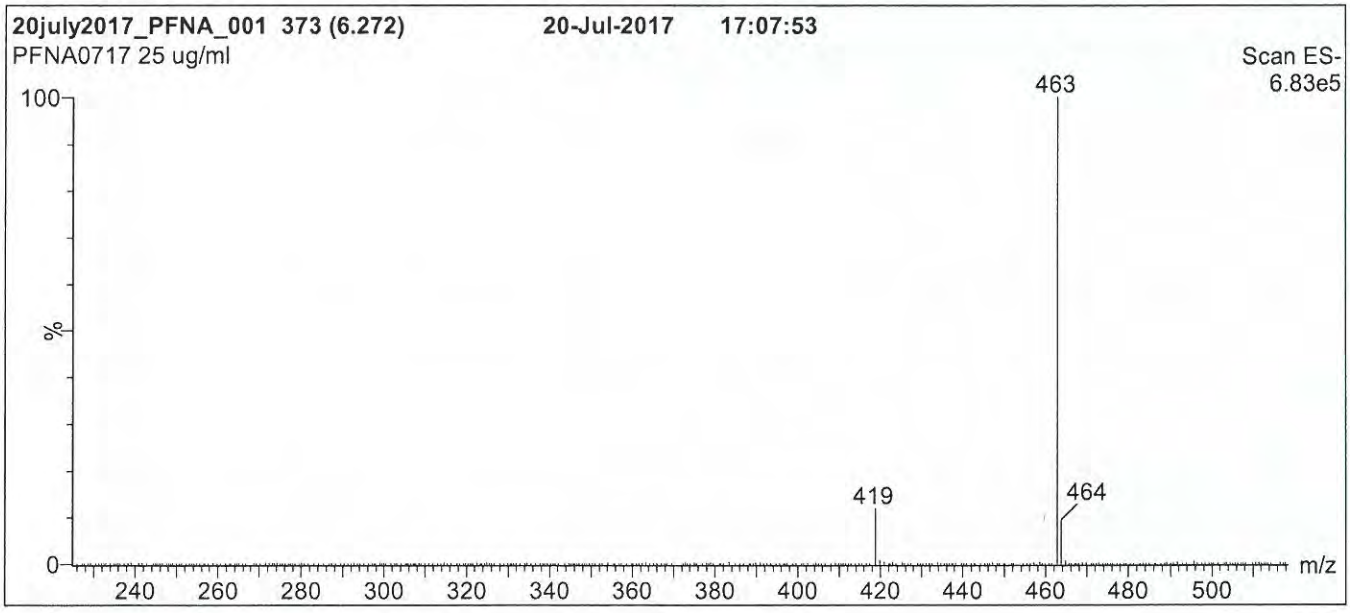
18C2720

Figure 1: **PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Hold for 1 min. Ramp to 90% organic over 7 min and hold for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

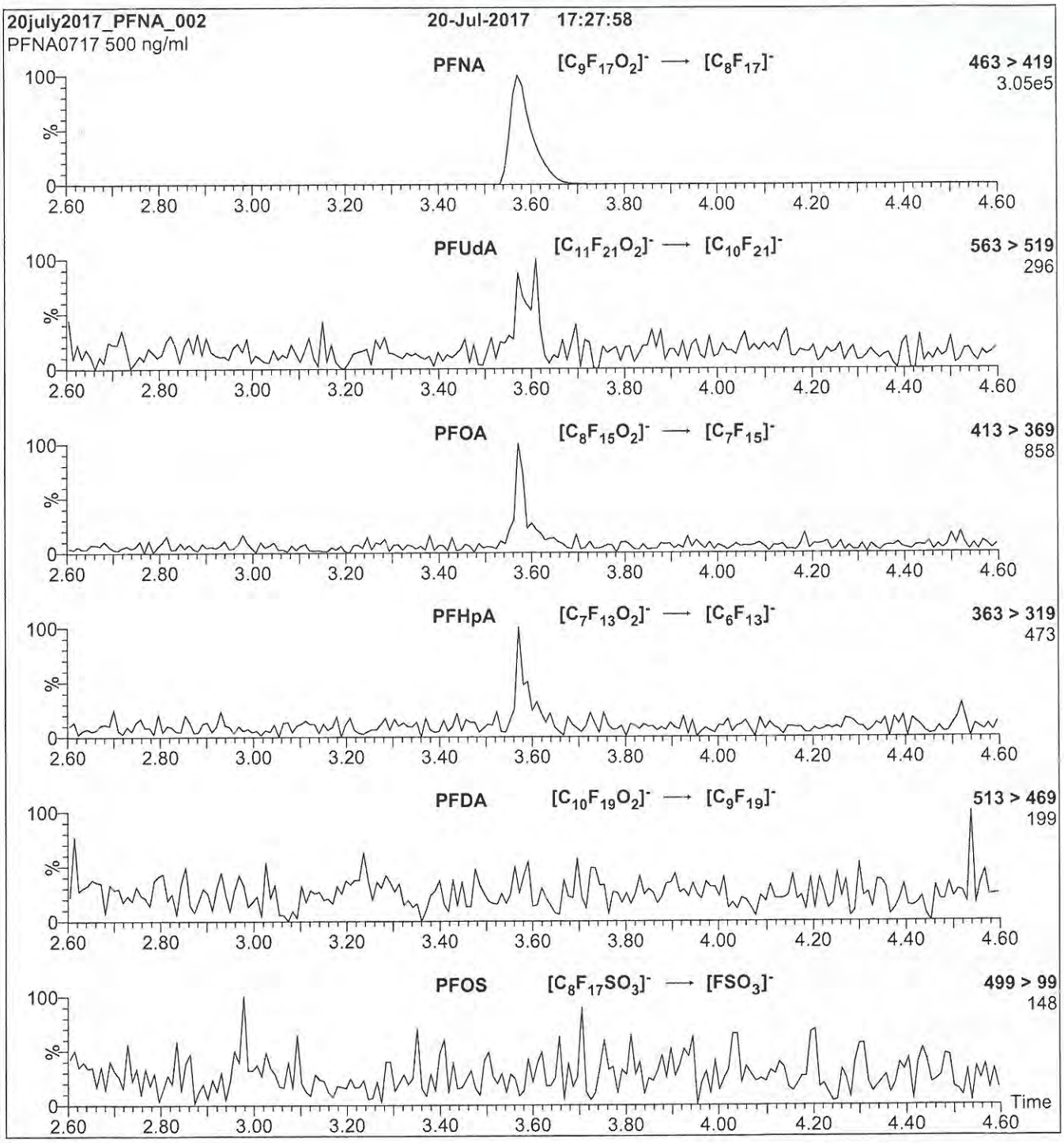
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2720

Figure 2: **PFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 11

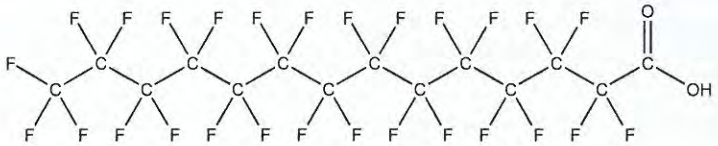
18C2721

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFTeDA
COMPOUND: Perfluoro-n-tetradecanoic acid
LOT NUMBER: PFTeDA0917

STRUCTURE:
CAS #: 376-06-7



MOLECULAR FORMULA: $C_{14}HF_{27}O_2$
MOLECULAR WEIGHT: 714.11
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 09/21/2017
EXPIRY DATE: (mm/dd/yyyy) 09/21/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.2% of PFDoA ($C_{12}HF_{23}O_2$) and ~ 0.2% of PFPeDA ($C_{15}HF_{29}O_2$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/21/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18C2721

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

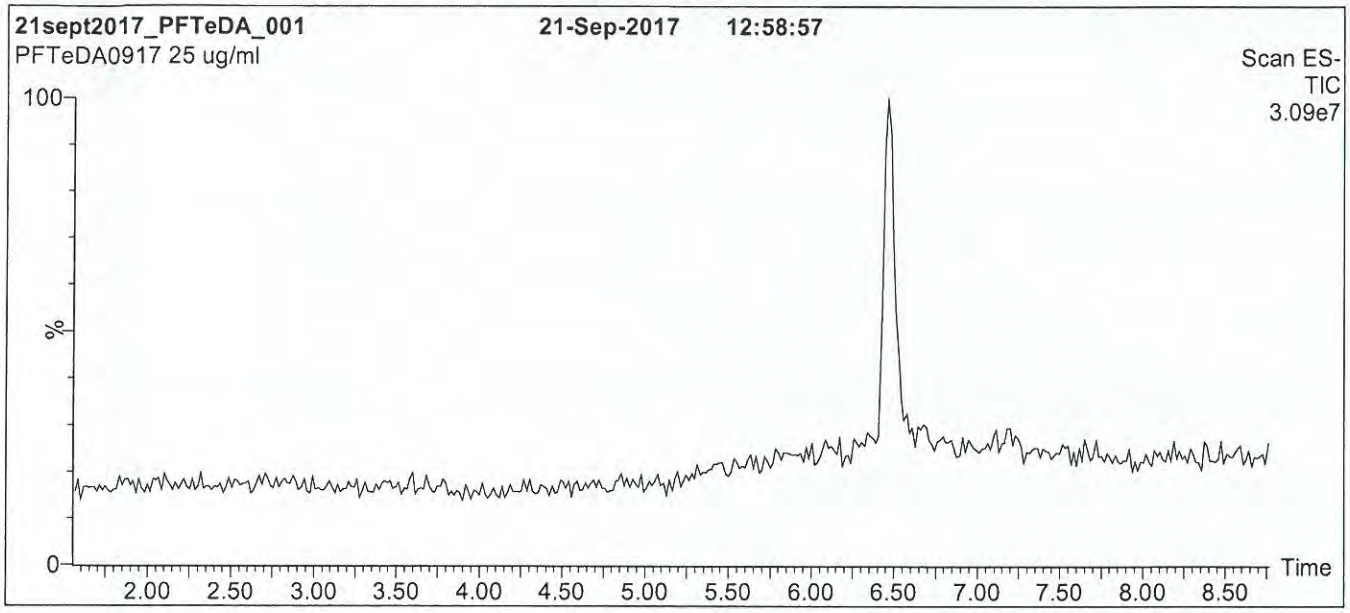
CALA

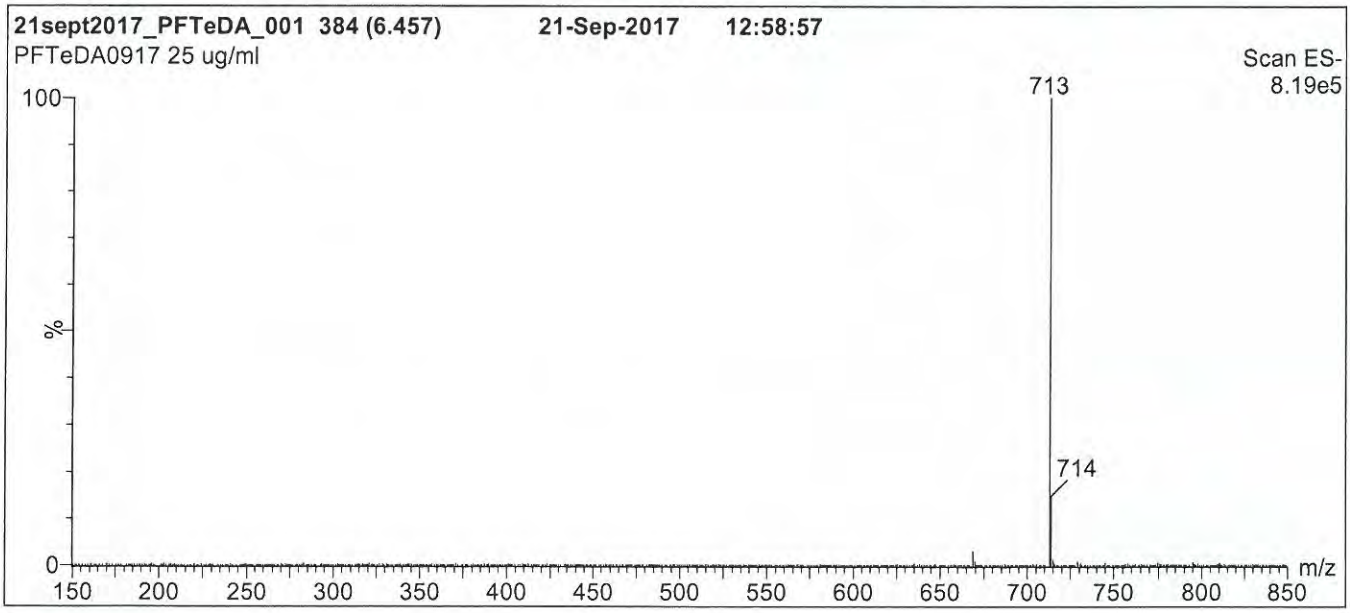
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2721

Figure 1: **PFTeDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

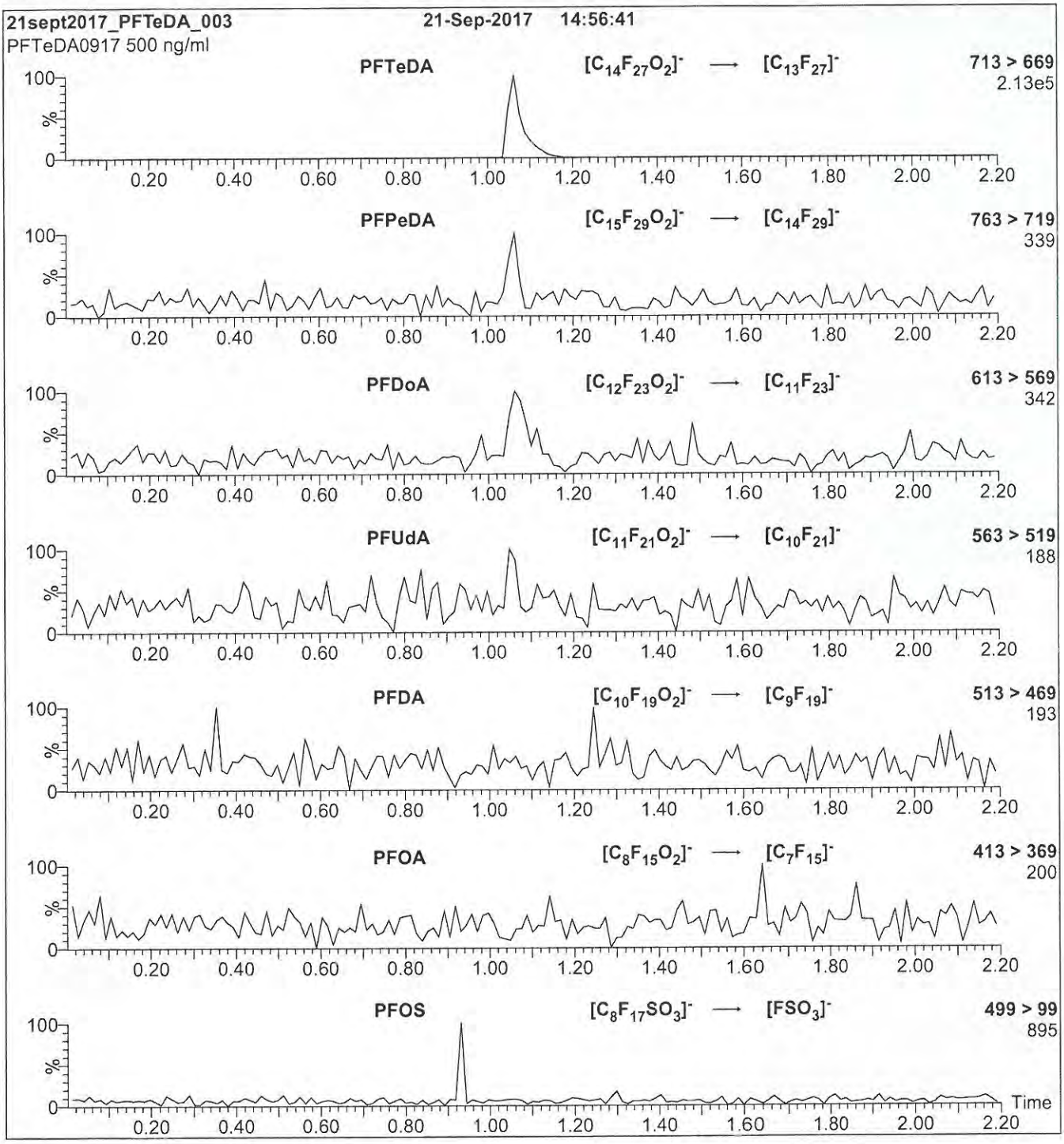
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18C2721

Figure 2: **PFTeDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFTeDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 14

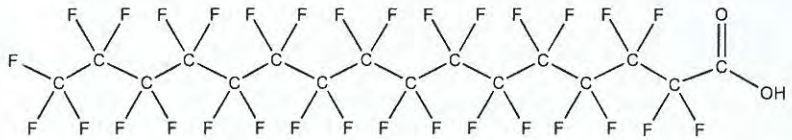
18C2722

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: PFHxDA
COMPOUND: Perfluoro-n-hexadecanoic acid
LOT NUMBER: PFHxDA0717

STRUCTURE:
CAS #: 67905-19-5



MOLECULAR FORMULA: $C_{16}HF_{31}O_2$
MOLECULAR WEIGHT: 814.13
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/13/2017
EXPIRY DATE: (mm/dd/yyyy) 07/13/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 08/04/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1802722

INTENDED USE:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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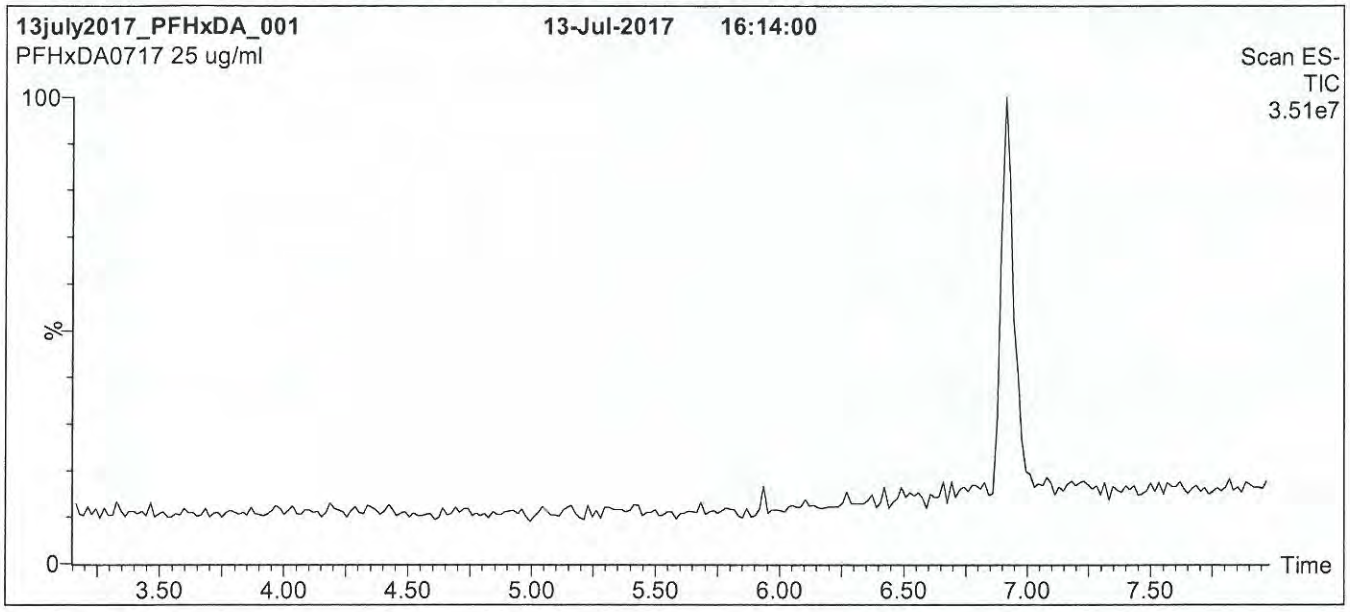
CALA Testing Accreditation No. A 1226

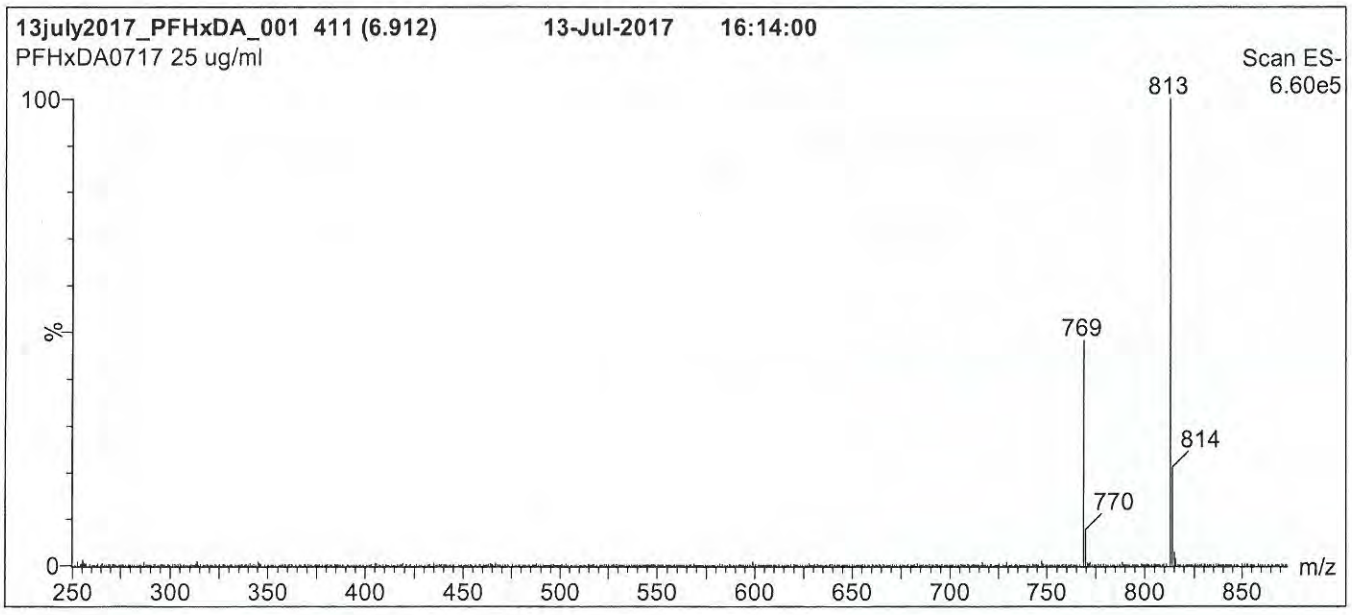
ANAB ACCREDITED Accredited to ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2722

Figure 1: **PFHxDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

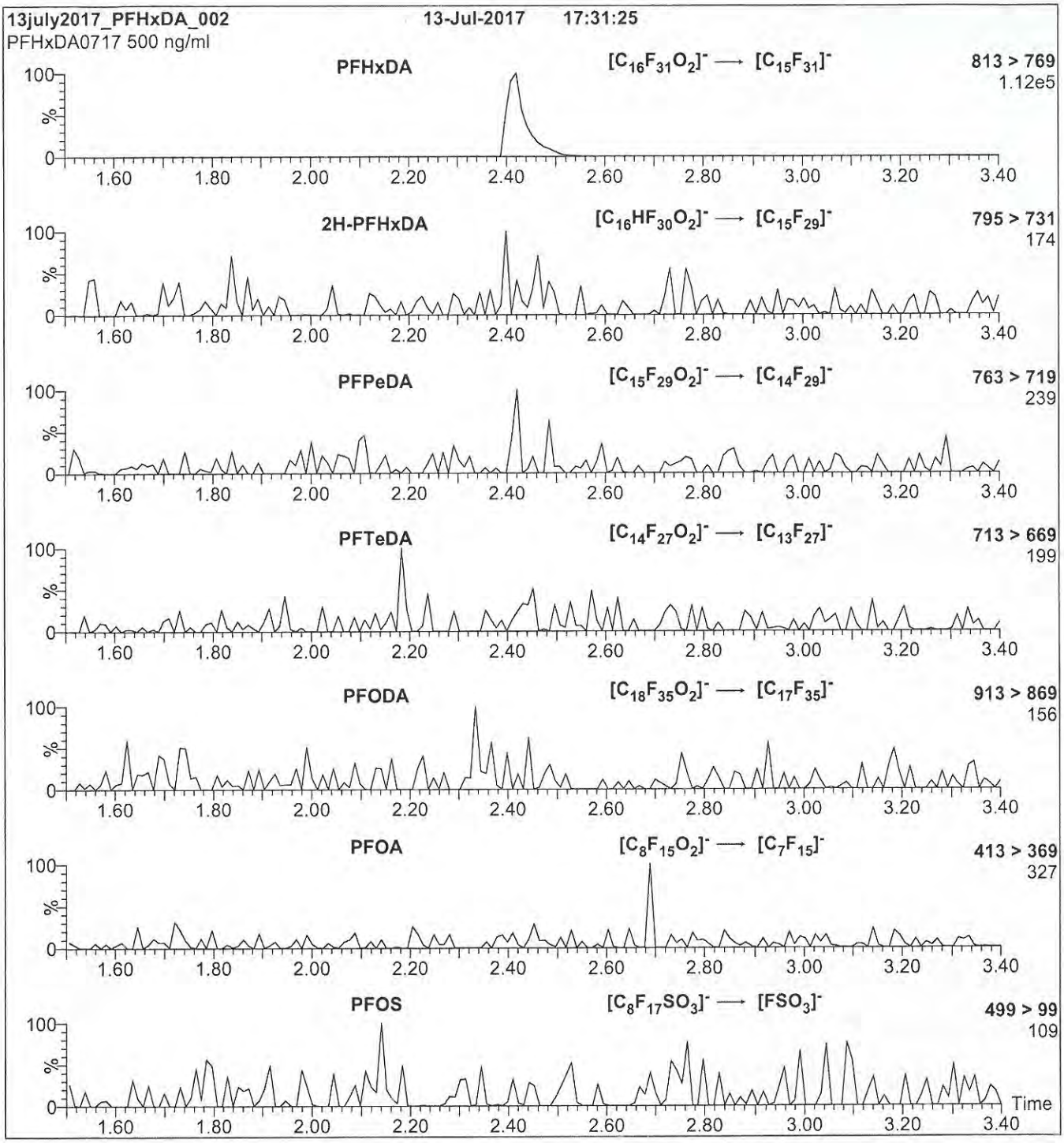
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18C2722

Figure 2: **PFHxDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFHxDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.13e-3
Collision Energy (eV) = 15

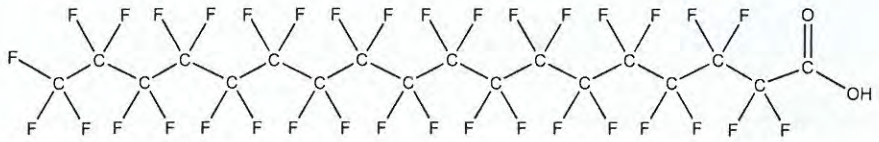
18C2723

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: PFODA
COMPOUND: Perfluoro-n-octadecanoic acid
LOT NUMBER: PFODA0717

STRUCTURE:
CAS #: 16517-11-6



MOLECULAR FORMULA: $C_{18}HF_{35}O_2$
MOLECULAR WEIGHT: 914.14
CONCENTRATION: 50 ± 2.5 µg/ml
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/13/2017
EXPIRY DATE: (mm/dd/yyyy) 07/13/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2723

INTENDED USE:

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where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED Reference Material Producer

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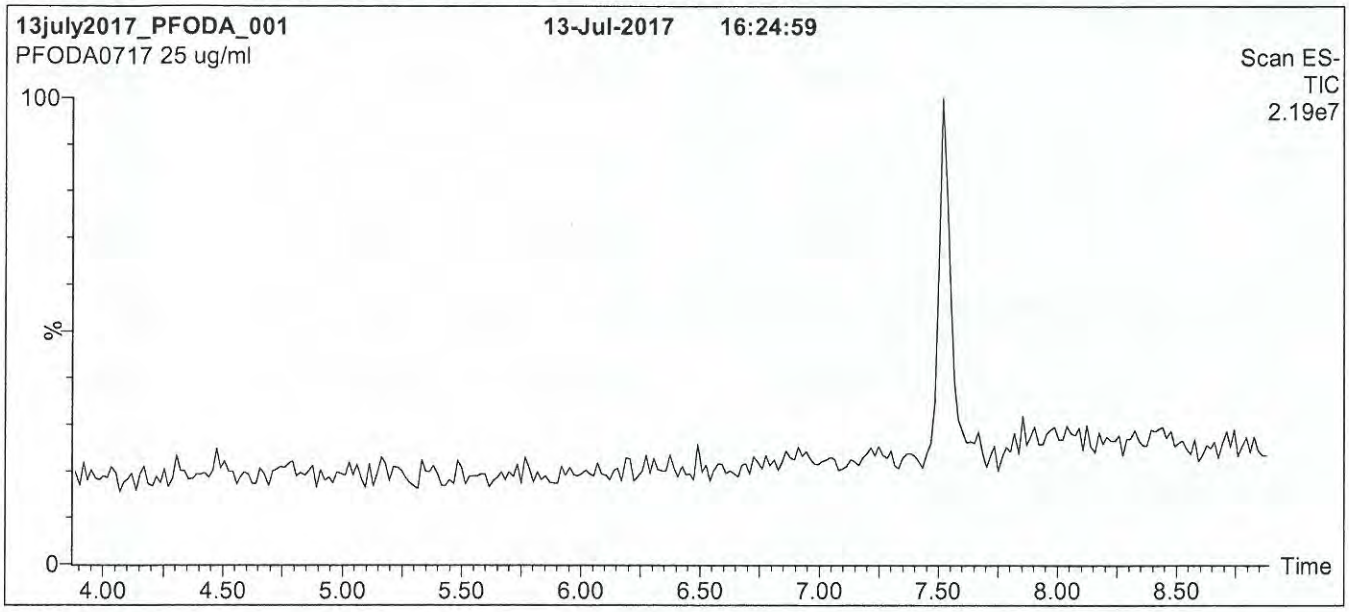
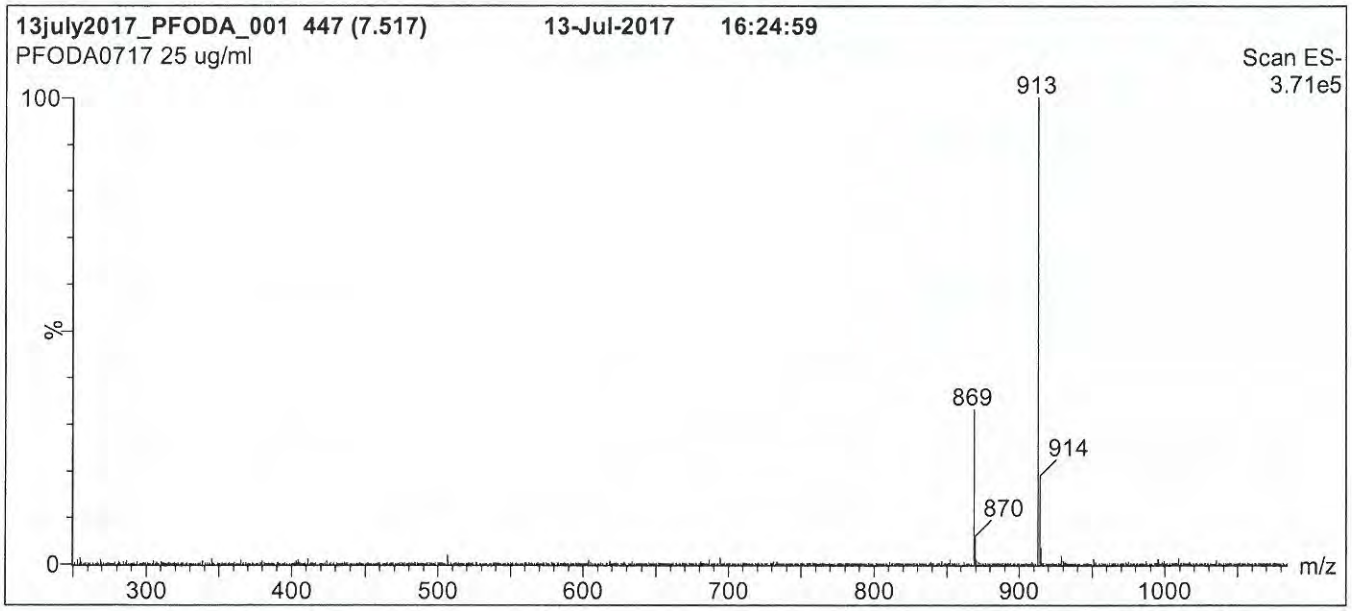
18C2723

Figure 1: **PFODA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

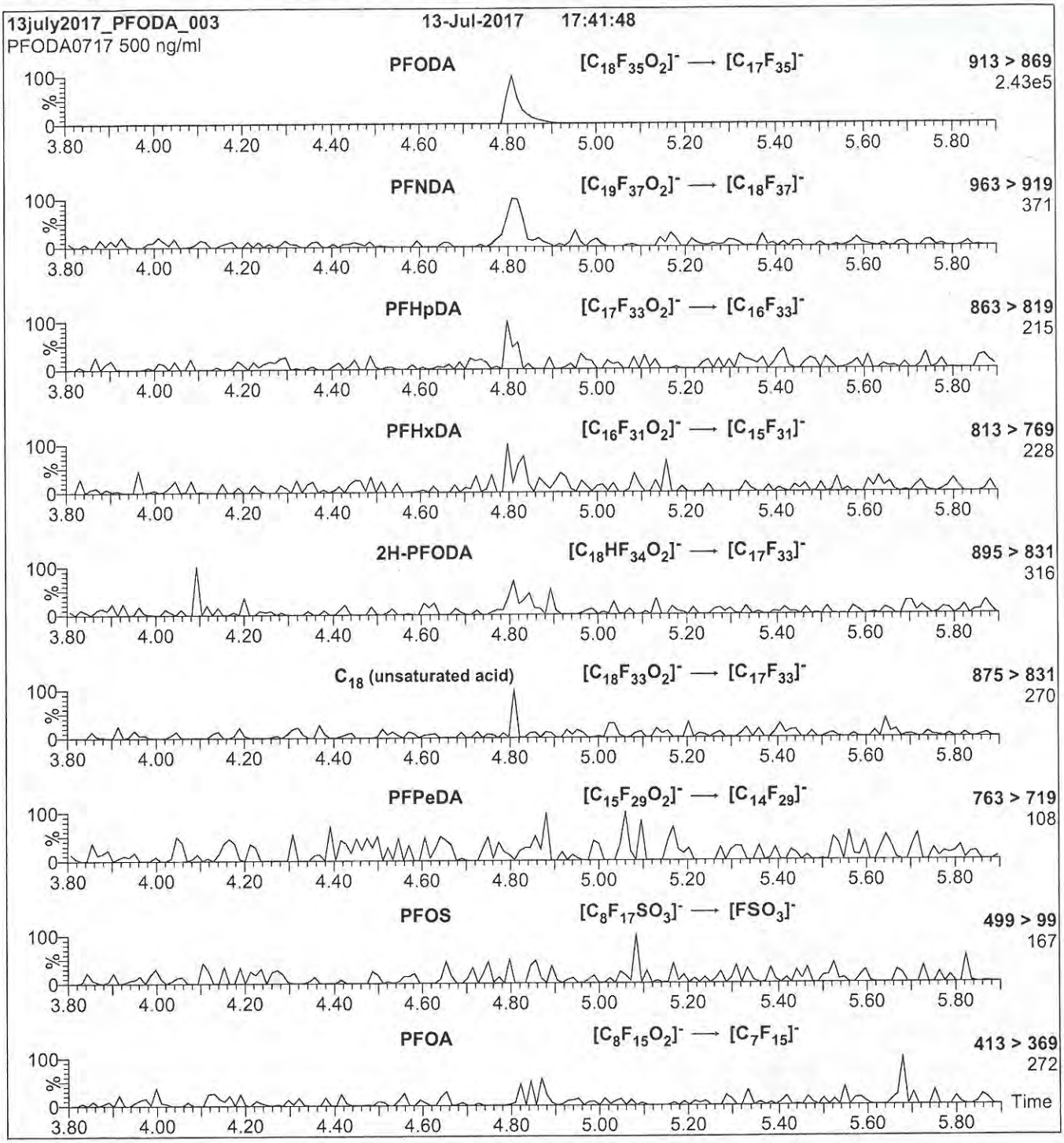
MS Parameters

Experiment: Full Scan (250 - 1250 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2723

Figure 2: **PFODA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml PFODA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 15

18C2724

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFHxSK

Potassium Perfluorohexanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFHxSK
LOT NUMBER:	brPFHxSK0117
CONCENTRATION:	50.0 ± 2.5 µg/ml (total potassium salt)
	45.5 ± 2.3 µg/ml (total PFHxS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	01/03/2017
LAST TESTED: (mm/dd/yyyy)	01/04/2017
EXPIRY DATE: (mm/dd/yyyy)	01/04/2022
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorohexanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the identified isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.5% of perfluoro-1-pentanesulfonate and ~ 0.2% of perfluoro-1-octanesulfonate.
- CAS#: 3871-99-6 (for linear isomer; potassium salt).

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Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2724

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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1802724

Table A: **br-PFHxSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

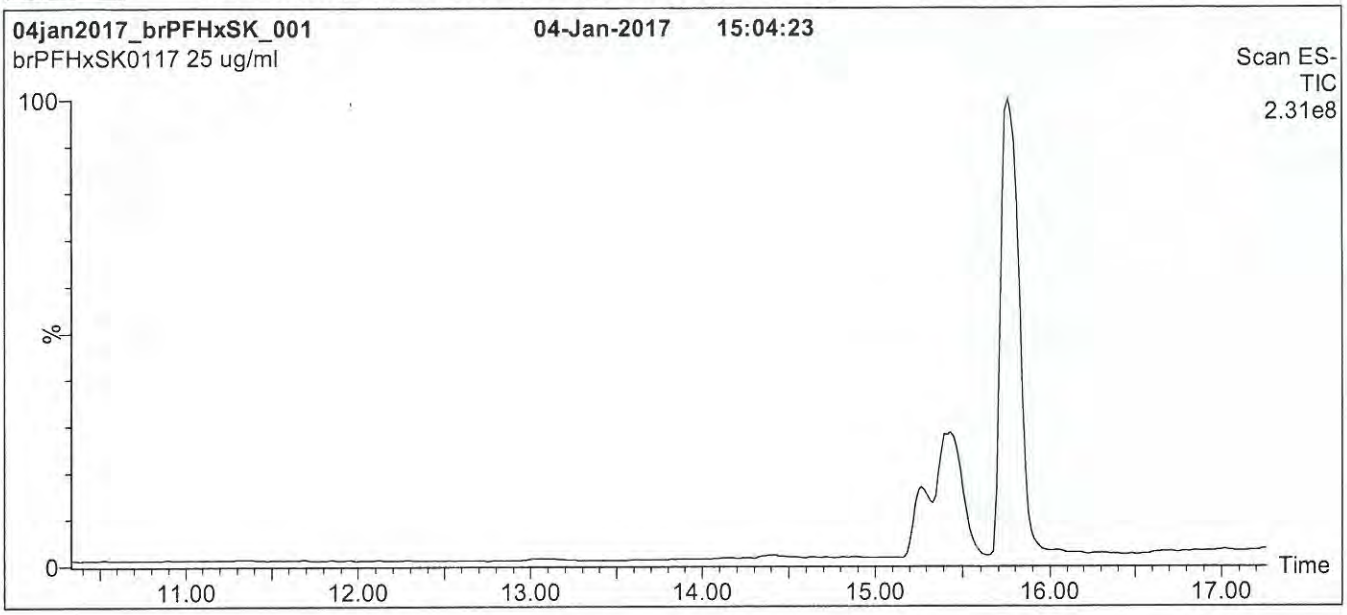
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-hexanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	81.1
2	Potassium 1-trifluoromethylperfluoropentanesulfonate**	$CF_3CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	2.9
3	Potassium 2-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	1.4
4	Potassium 3-trifluoromethylperfluoropentanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	5.0
5	Potassium 4-trifluoromethylperfluoropentanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	8.9
6	Potassium 3,3-di(trifluoromethyl)perfluorobutanesulfonate	$CF_3C(CF_3)CF_2CF_2SO_3^-K^+$	0.2
7	Other Unidentified Isomers		0.5

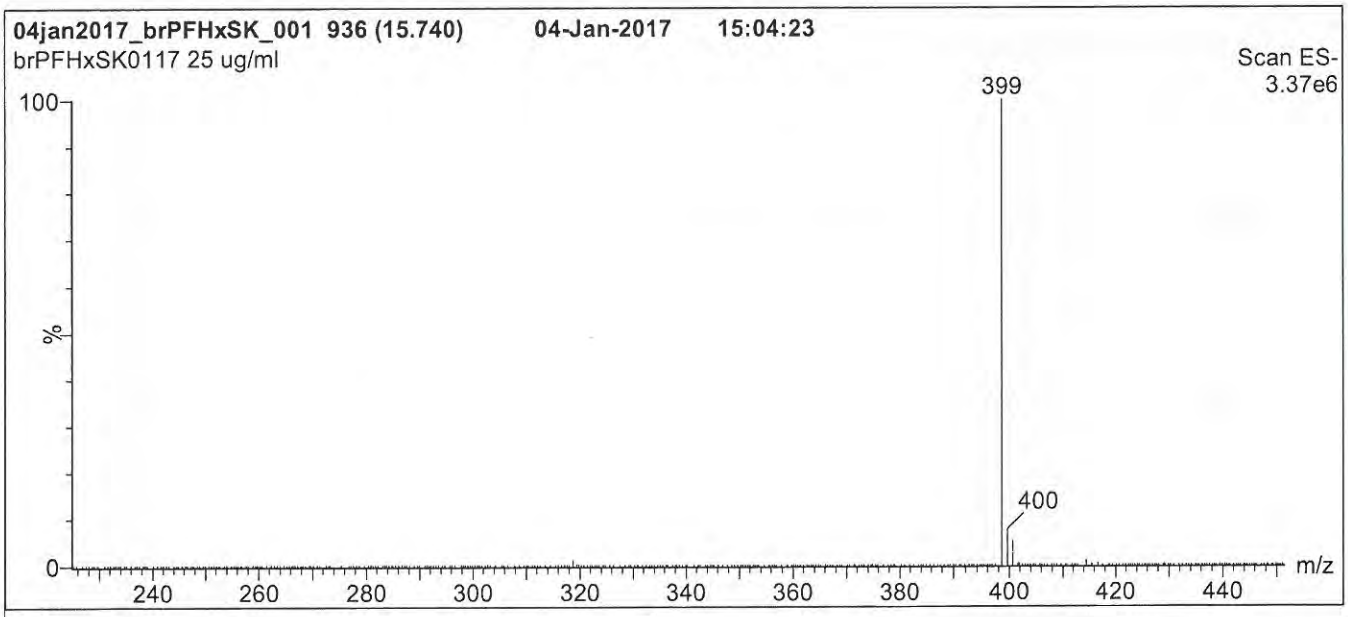
* Percent of total perfluorohexanesulfonate isomers only.
** Systematic Name: Potassium perfluorohexane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 01/20/2017 (mm/dd/yyyy)

18C2724

Figure 1: **br-PFHxSK; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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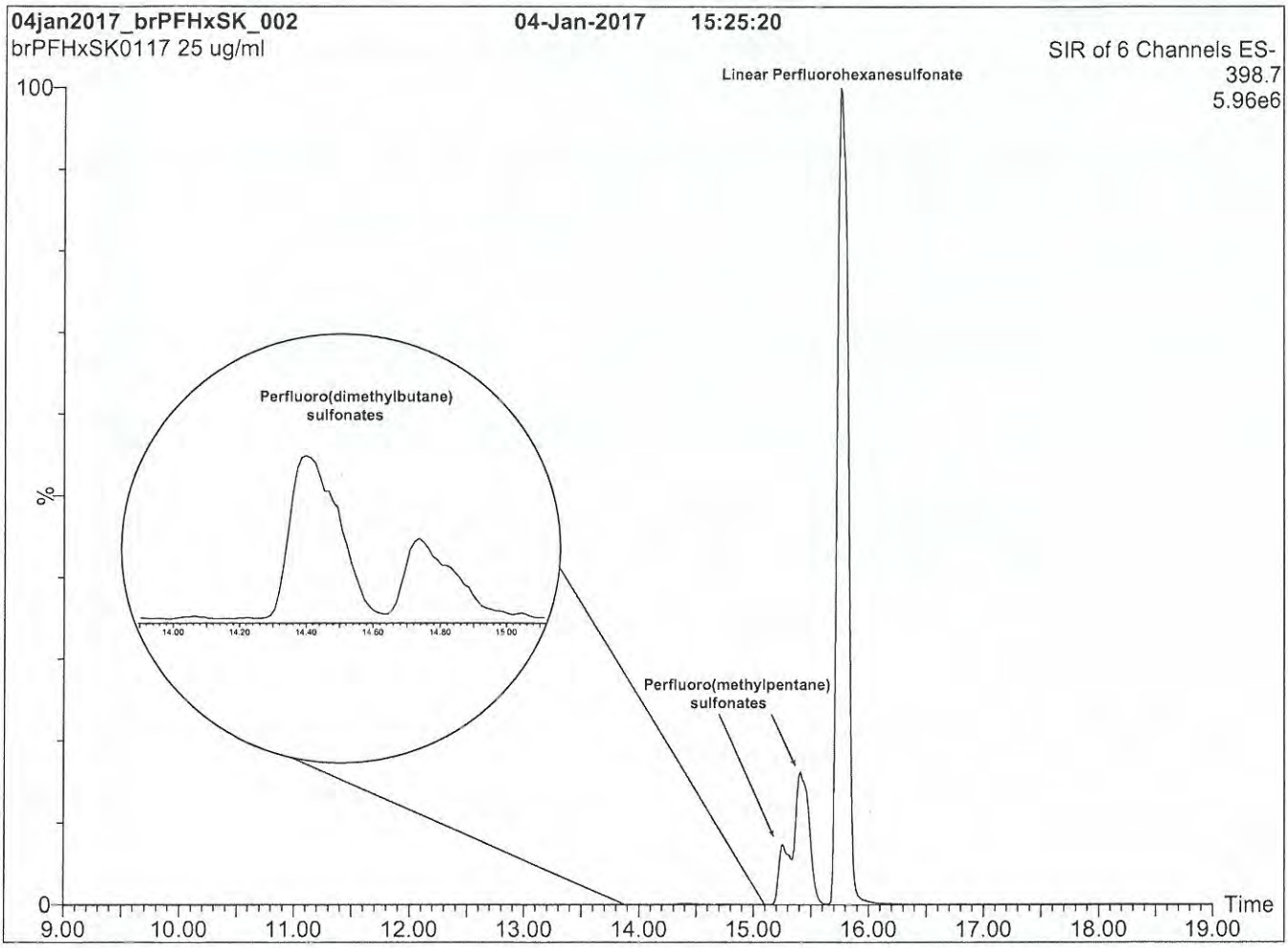
Figure 2: **br-PFHxSK; LC/MS Data (SIR)**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 20% (80:20 MeOH:ACN) / 80% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 50% organic over 14 min. Ramp to 90% organic over 3 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 20 min

Flow: 300 µl/min

MS Parameters

Experiment: SIR (6 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = variable (15-62)
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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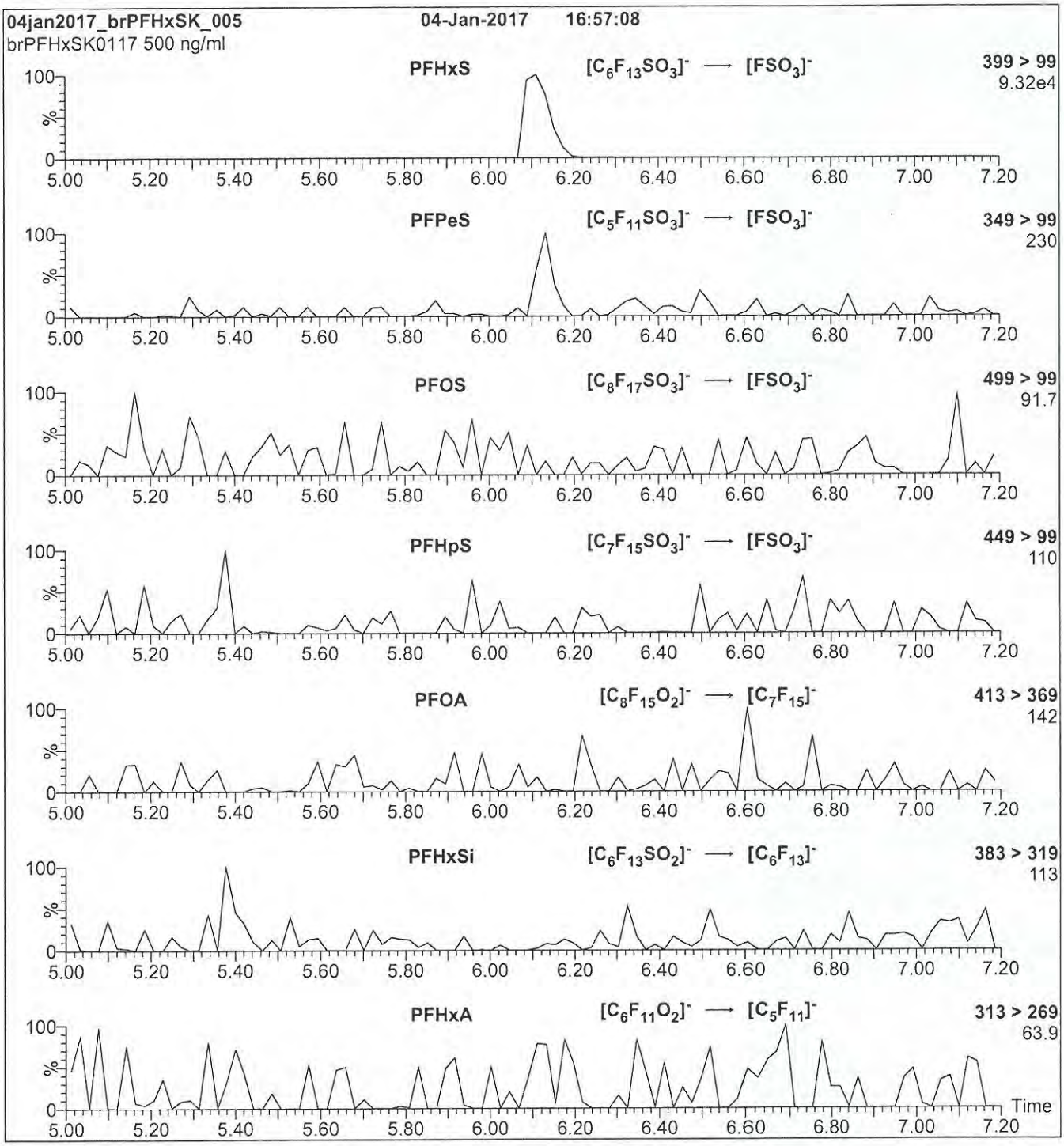
Figure 3: **br-PFHxSK; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml br-PFHxSK)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 30

18C2725

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-PFOSK

Potassium Perfluorooctanesulfonate Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-PFOSK
LOT NUMBER:	brPFOSK0117
CONCENTRATION:	50 ± 2.5 µg/ml (total potassium salt)
	46.4 ± 2.3 µg/ml (total PFOS anion)
SOLVENT(S):	Methanol
DATE PREPARED: (mm/dd/yyyy)	01/09/2017
LAST TESTED: (mm/dd/yyyy)	01/12/2017
EXPIRY DATE: (mm/dd/yyyy)	01/12/2022
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compounds it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA Testing

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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1802725

Table A: **br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

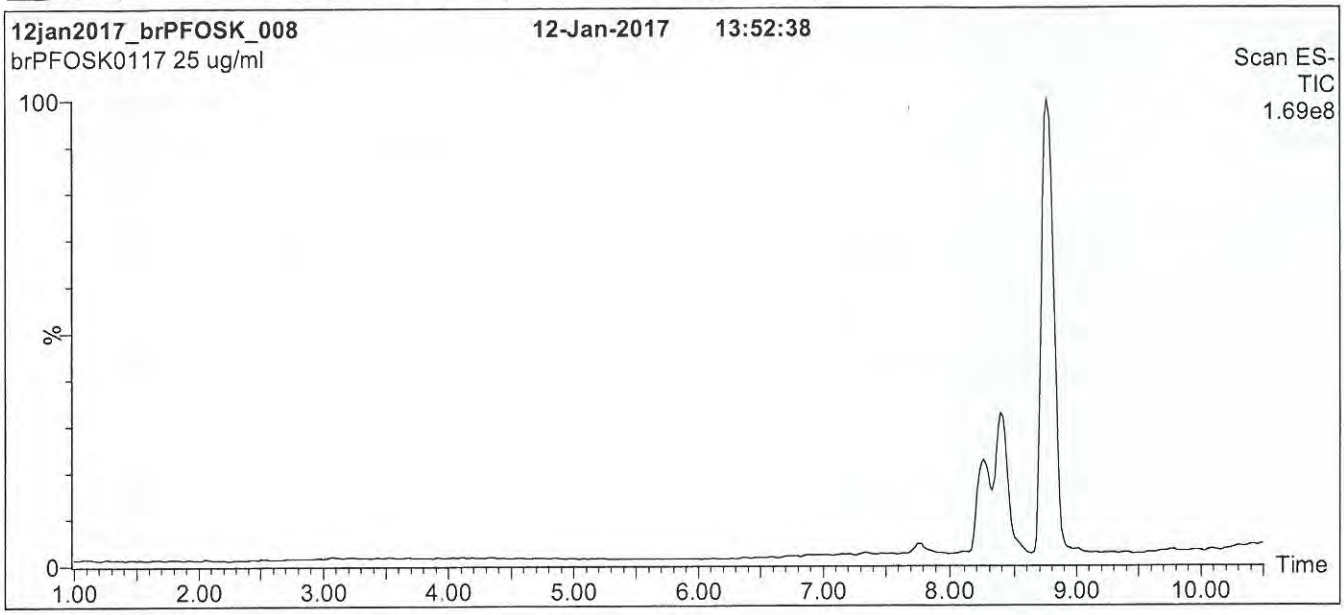
Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	Potassium perfluoro-1-octanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$CF_3CF_2CF_2CF_2CF_2CF_2CF(CF_3)SO_3^-K^+$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF_2CF(CF_3)CF_2SO_3^-K^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF_2CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$CF_3CF_2CF(CF_3)CF_2CF_2CF_2CF_2SO_3^-K^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2CF_2CF_2SO_3^-K^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3C(CF_3)_2CF_2CF_2CF_2SO_3^-K^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF_2C(CF_3)_2CF_2CF_2SO_3^-K^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF_2CF_2CF_2SO_3^-K^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$CF_3CF(CF_3)CF_2CF(CF_3)CF_2CF_2SO_3^-K^+$	0.07

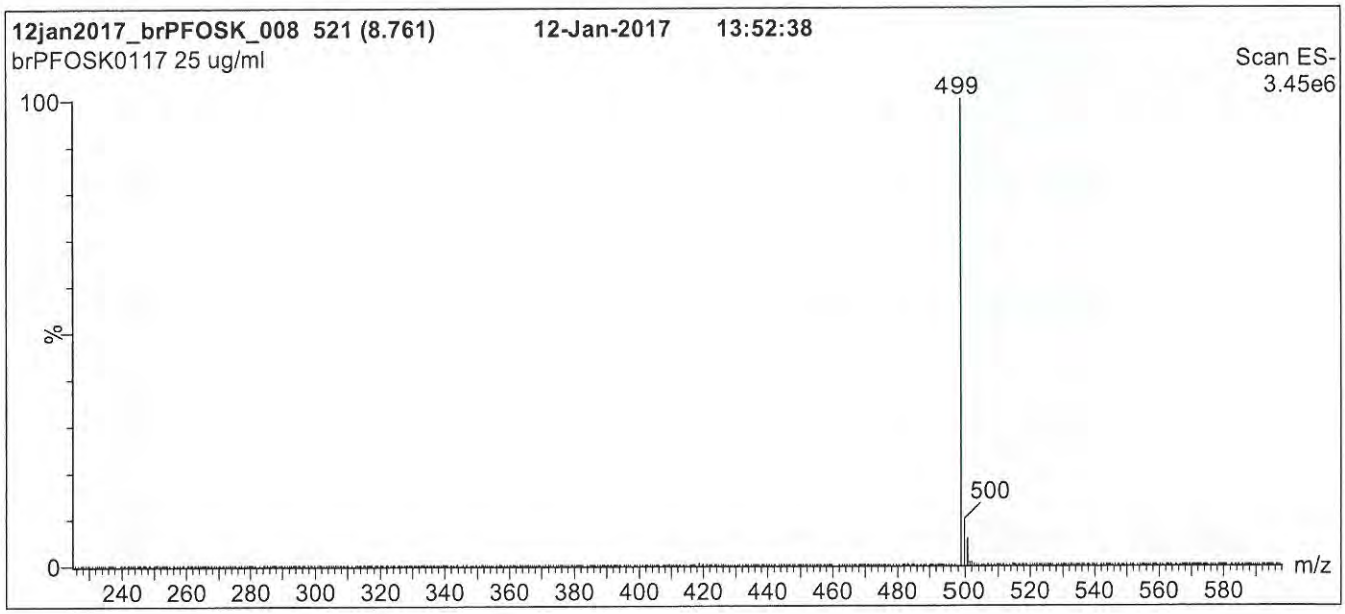
* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By: B.G. Chittim **Date:** 01/20/2017 (mm/dd/yyyy)

18C2725

Figure 1: **br-PFOSK; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% (80:20 MeOH:ACN) / 55% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 12 min and hold for 2 min.
Return to initial conditions over 0.5 min.
Time: 16 min

Flow: 300 µl/min

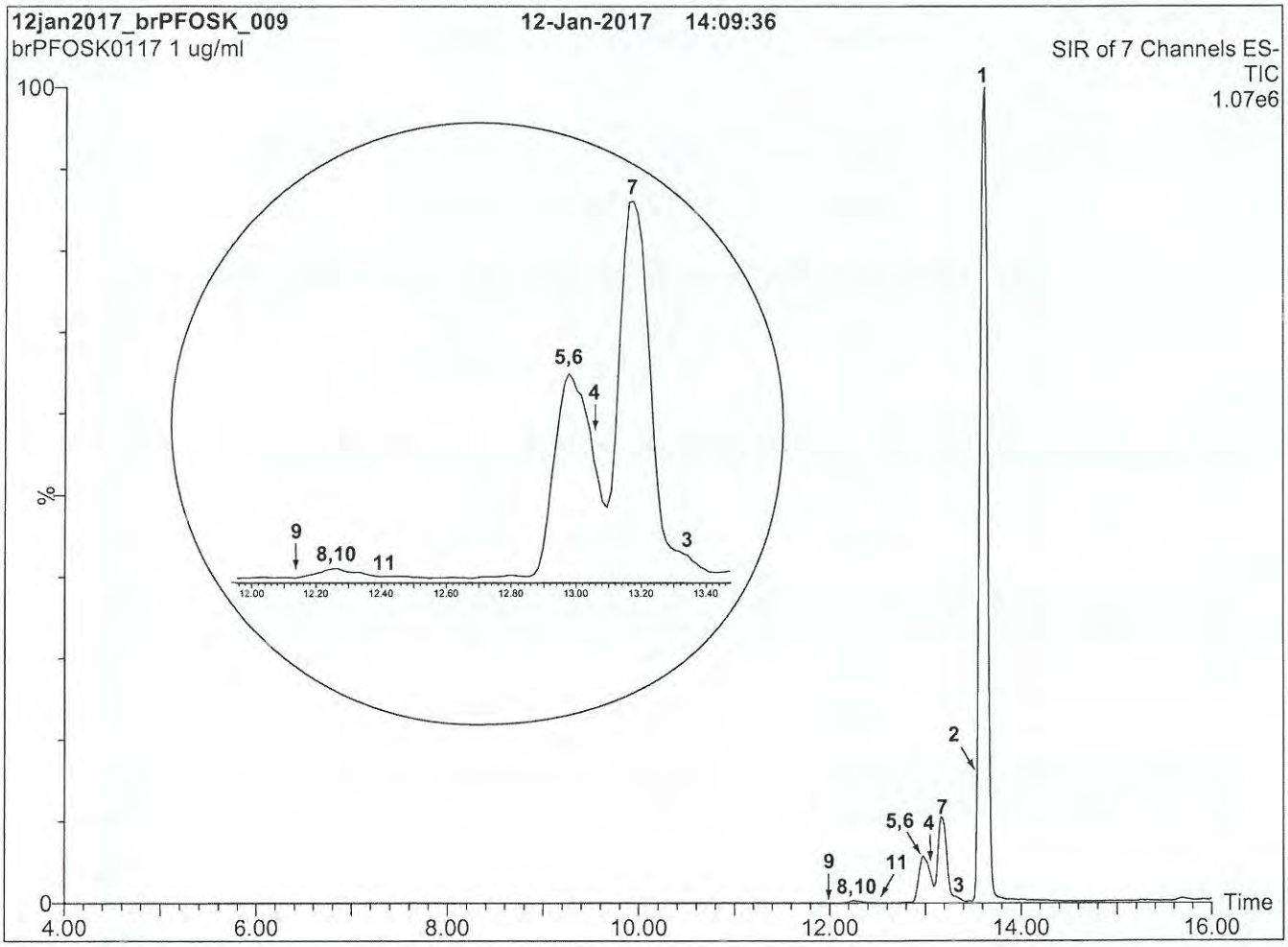
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2725

Figure 2: **br-PFOSK; LC/MS Data (SIR)**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP_{18} (1.7 µm, 2.1 x 100 mm)

Injection: 1.0 µg/ml of br-PFOSK

Mobile Phase: Gradient
45% (80:20 MeOH:ACN) / 55% H_2O (both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 15 min and hold for 3 min.
Return to initial conditions over 1 min.
Time: 20 min

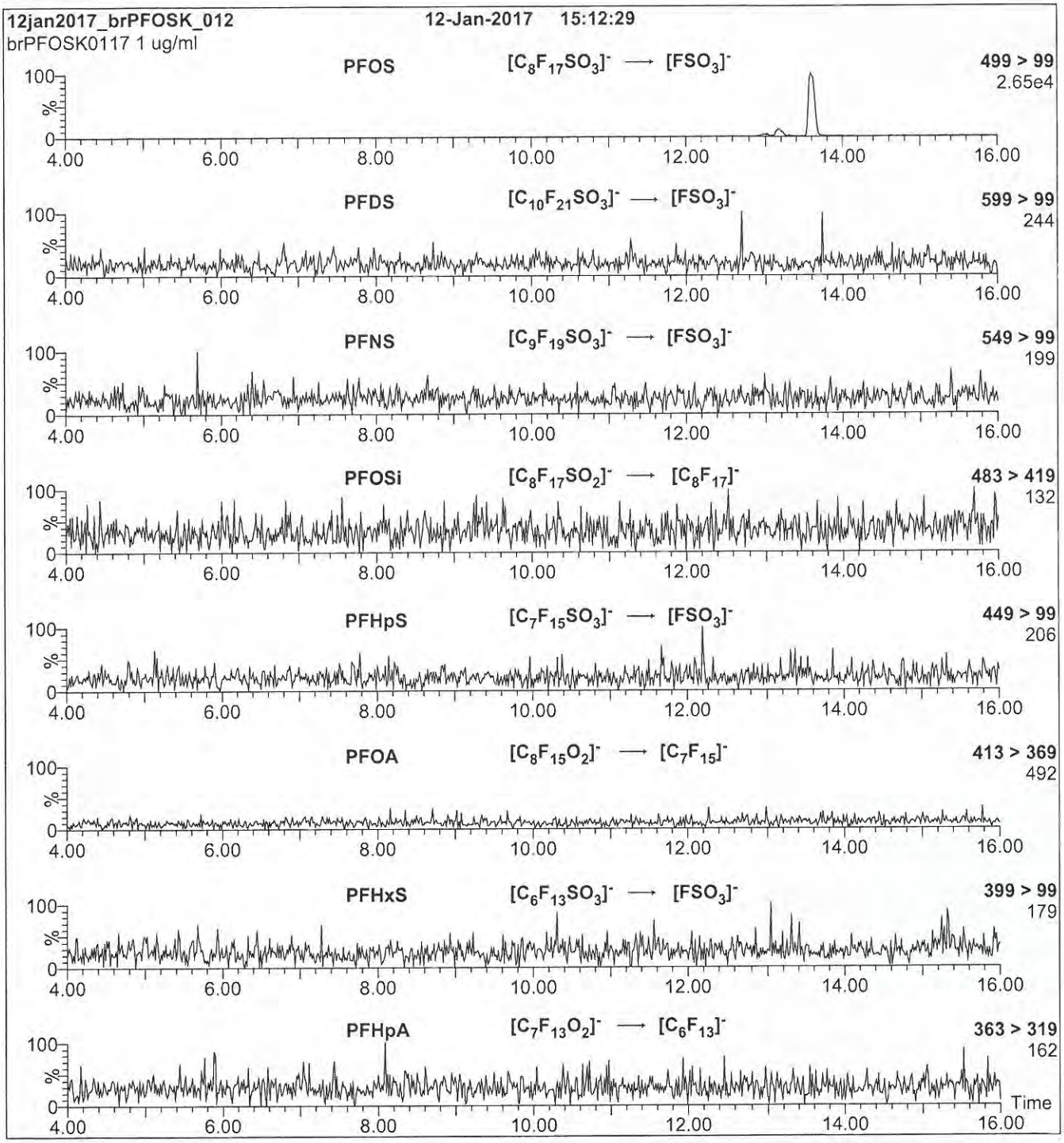
Flow: 300 µl/min

MS Conditions:

SIR (ES^-)
Source = 110 °C
Desolvation = 325 °C
Cone Voltage = 60V

18C2725

Figure 3: **br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 11-50 (variable)

18C2726

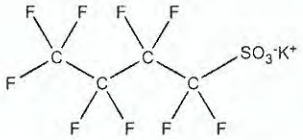
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFBS
COMPOUND: Potassium perfluoro-1-butanesulfonate
LOT NUMBER: LPFBS0917

STRUCTURE:

CAS #: 29420-49-3



MOLECULAR FORMULA:	$C_4F_9SO_3K$	**MOLECULAR WEIGHT:**	338.19
CONCENTRATION:	50.0 ± 2.5 µg/ml (K salt) 44.2 ± 2.2 µg/ml (PFBS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/21/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/21/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/22/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

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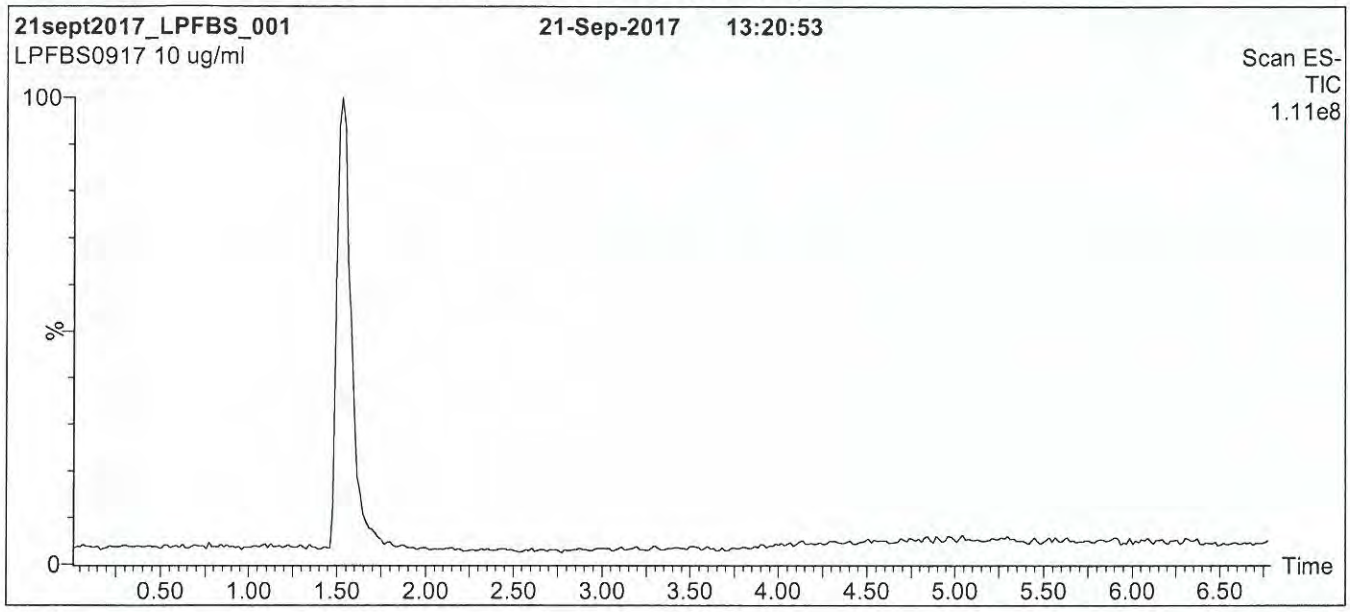
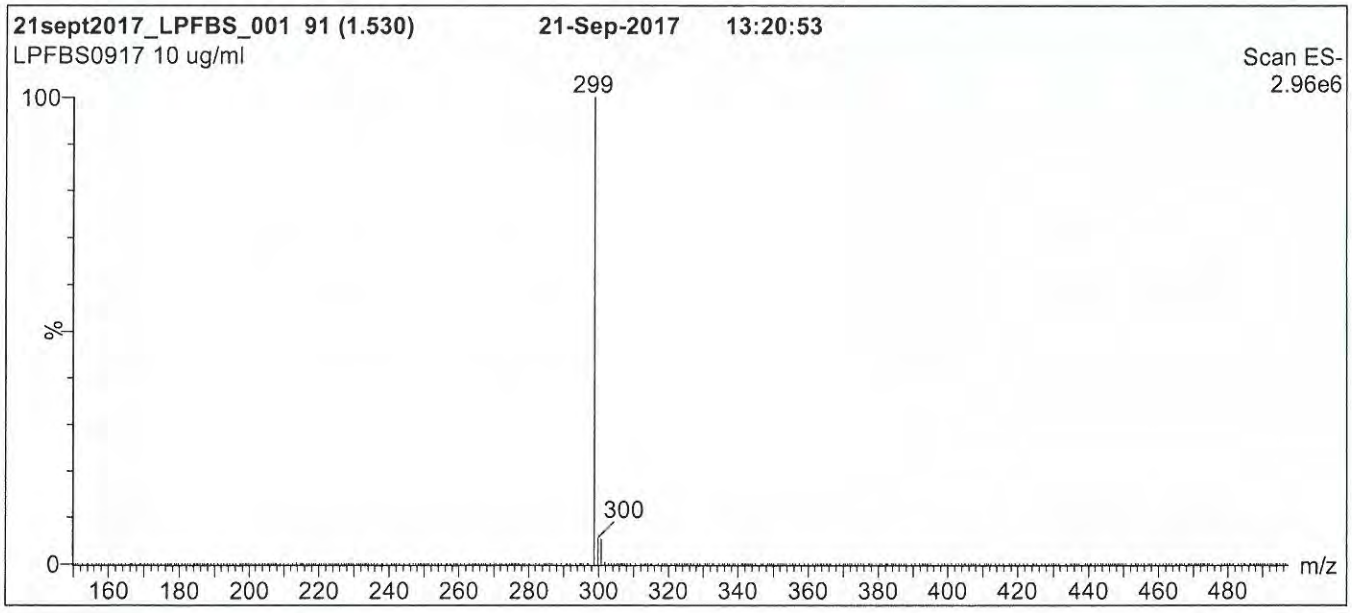
For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2726

Figure 1: **L-PFBS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

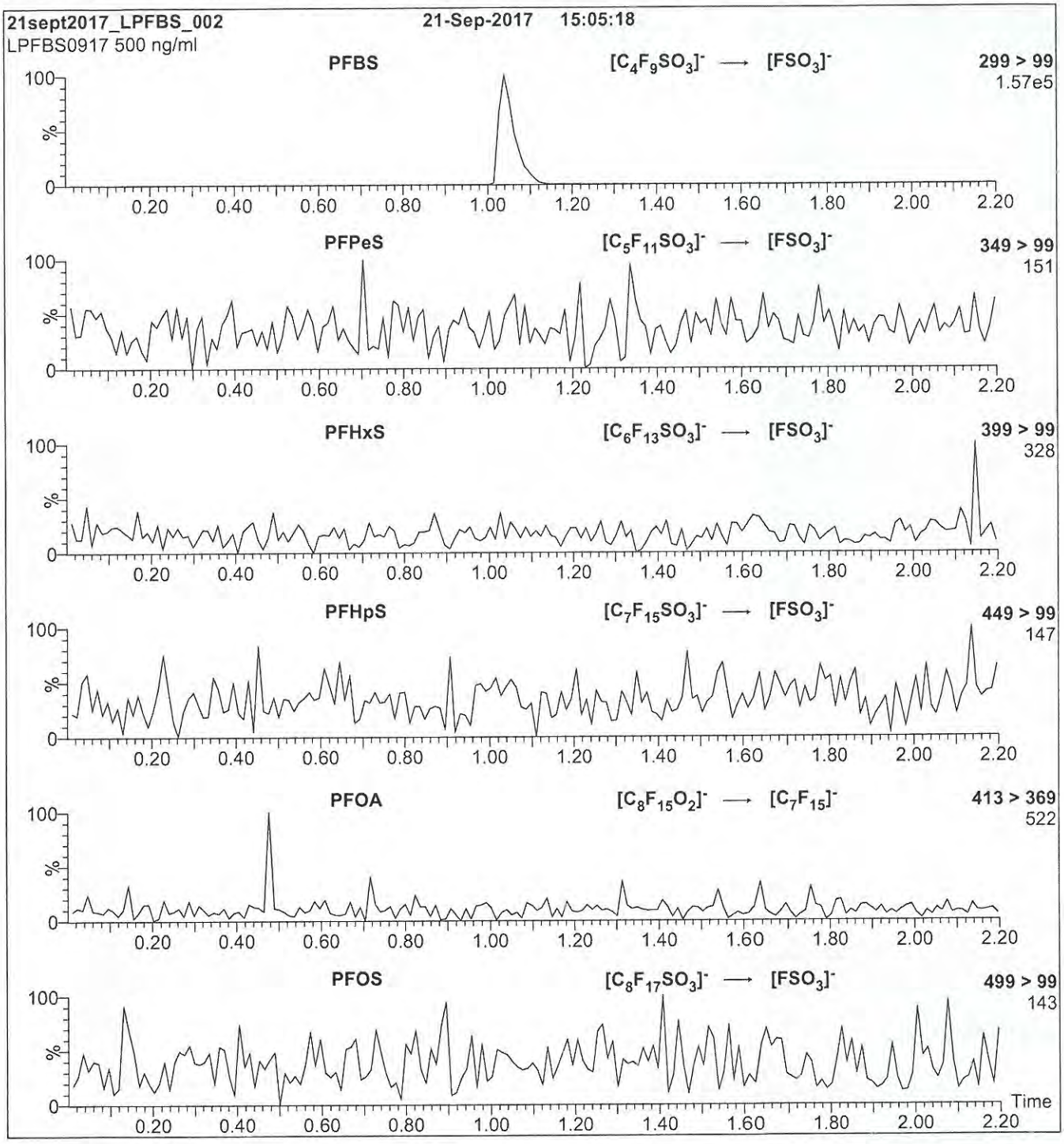
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2726

Figure 2: **L-PFBS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFBS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

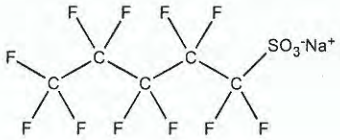
Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18C2727

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFPeS	**LOT NUMBER:**	LPFPeS0117
COMPOUND:	Sodium perfluoro-1-pentanesulfonate		
STRUCTURE:		**CAS #:**	630402-22-1



MOLECULAR FORMULA:	$C_5F_{11}SO_3Na$	**MOLECULAR WEIGHT:**	372.09
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 46.9 ± 2.3 µg/ml (PFPeS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	01/11/2017		
EXPIRY DATE: (mm/dd/yyyy)	01/11/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

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Certified By: _____ **Date:** 09/06/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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1802727

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

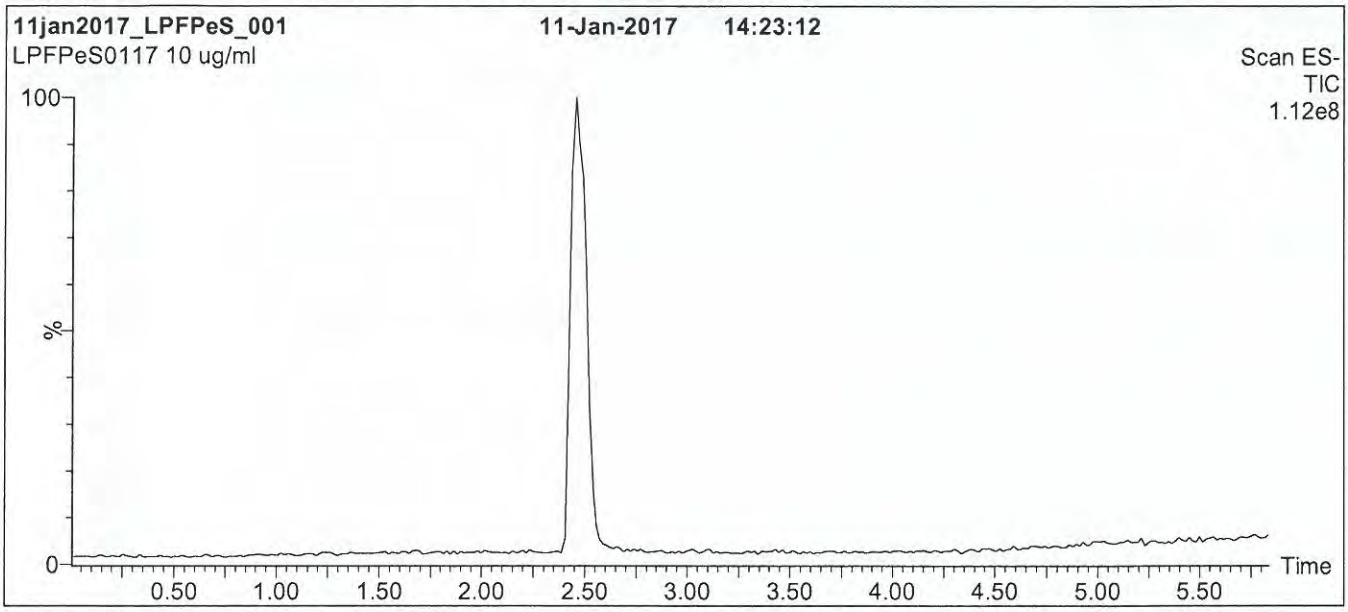
CALA Testing Accreditation No. A1226

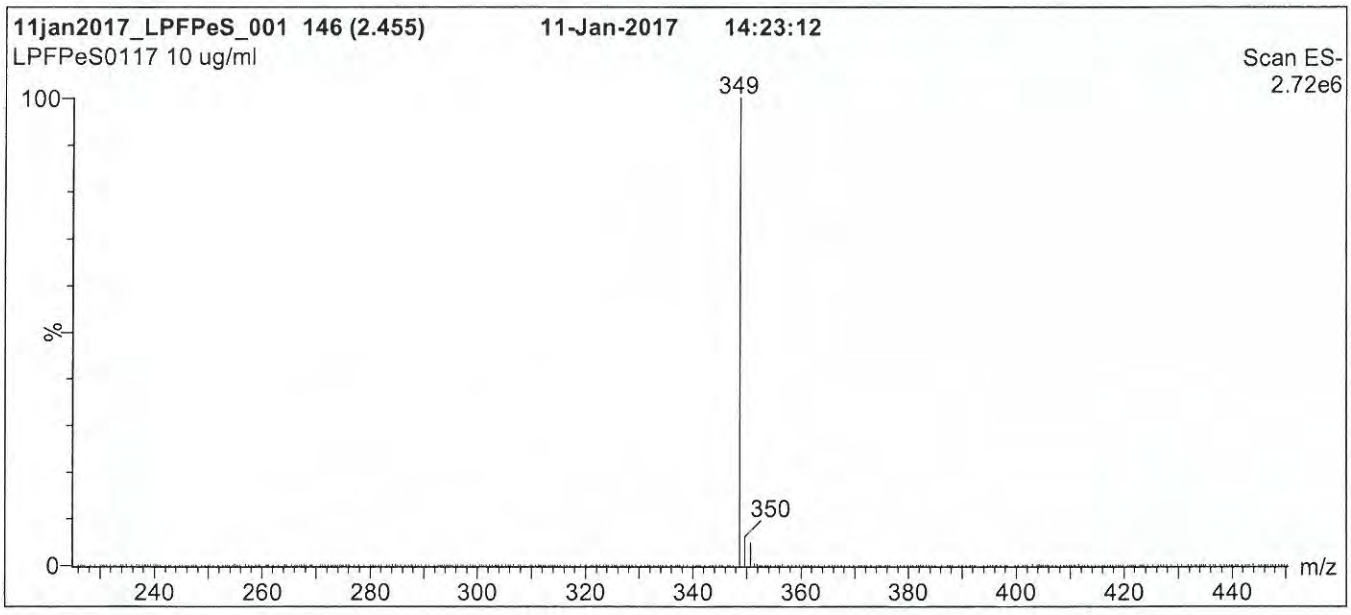
ANAB ACCREDITED Reference Material Producer

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

1802727

Figure 1: **L-PFPeS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions over 0.5 min.
Time: 10 min

Flow: 300 µl/min

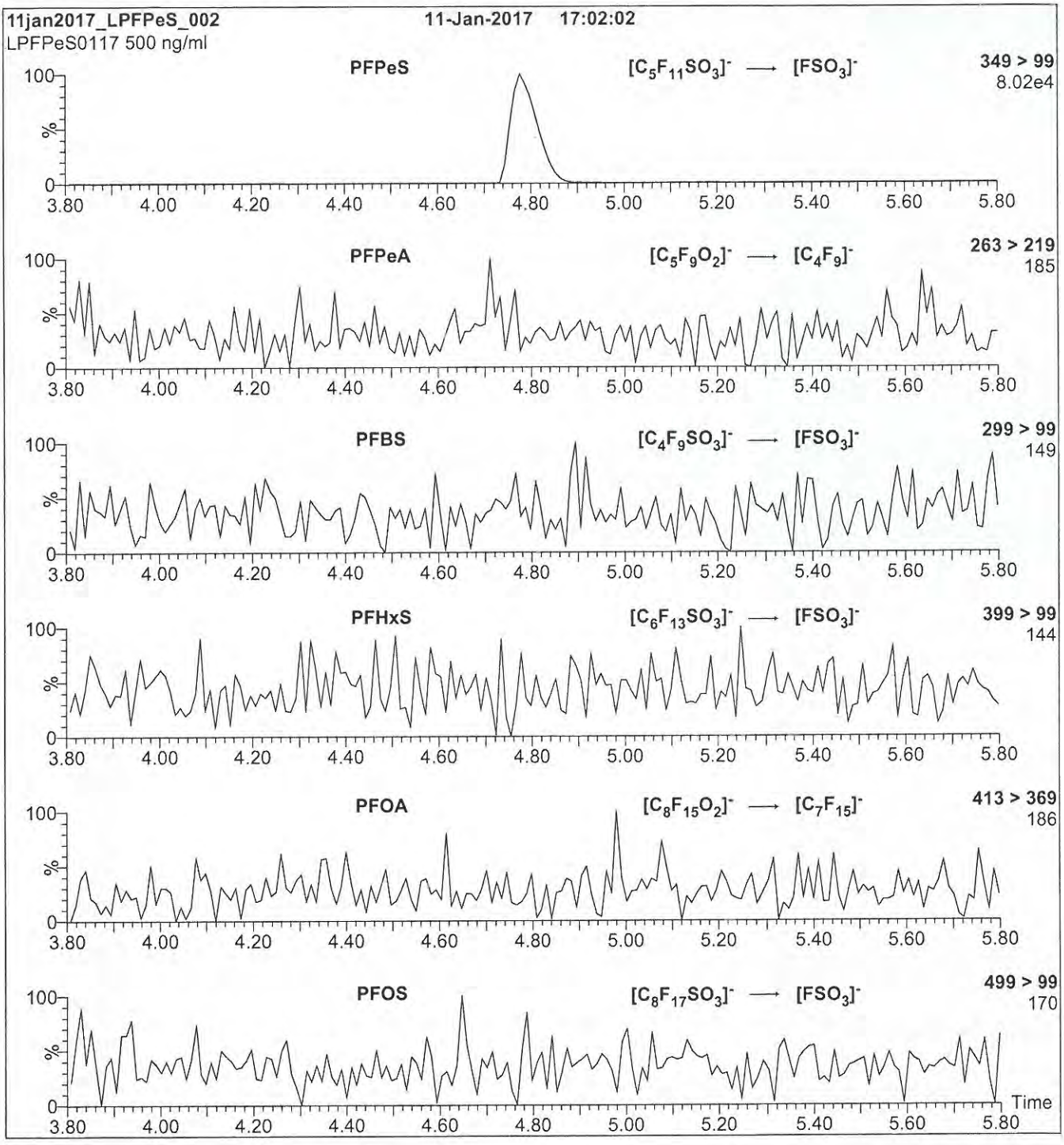
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

1802727

Figure 2: **L-PFPeS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFPeS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 30

18C2728

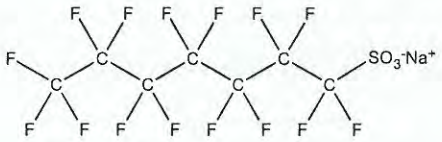
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFHpS
COMPOUND: Sodium perfluoro-1-heptanesulfonate
LOT NUMBER: LPFHpS0817

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$C_7F_{15}SO_3Na$	**MOLECULAR WEIGHT:**	472.10
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.6 ± 2.4 µg/ml (PFHpS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.2% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.1% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/07/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2728

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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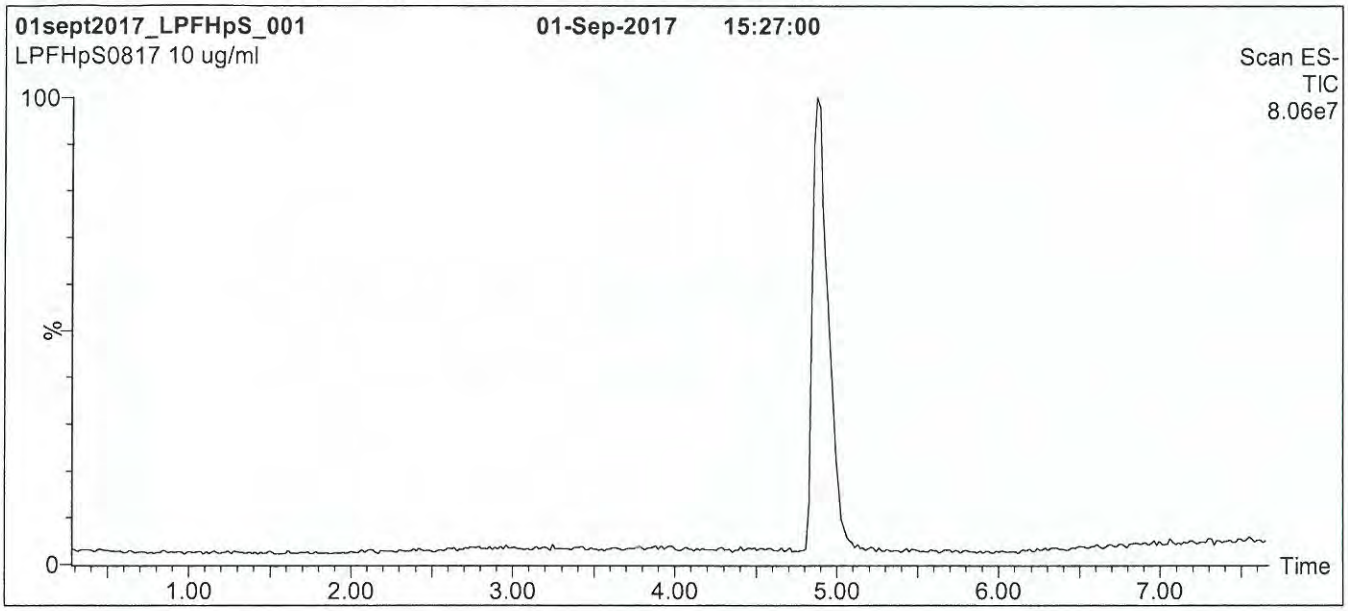
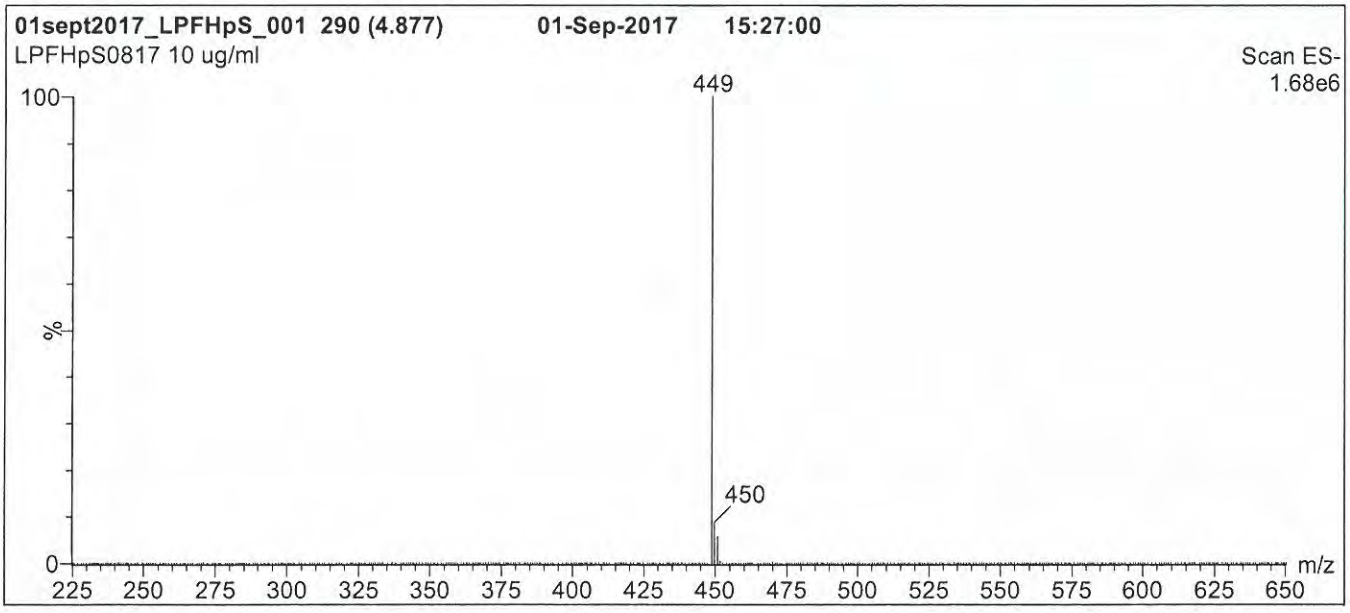
18C2728

Figure 1: **L-PFHpS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold
for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

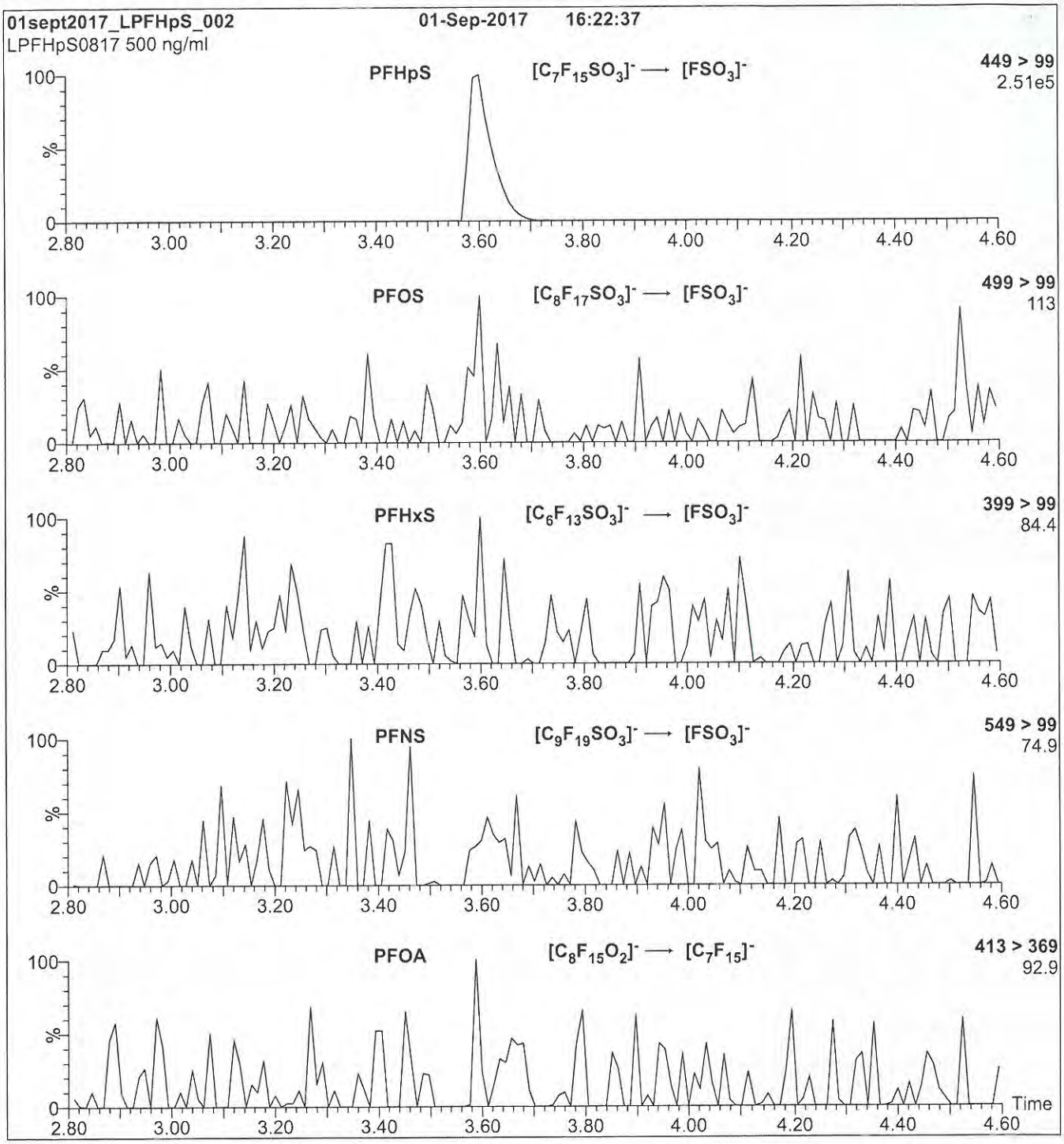
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18C2728

Figure 2: **L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

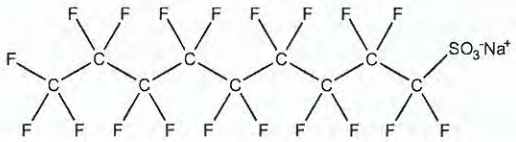
Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 35

18C2729

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	L-PFNS	**LOT NUMBER:**	LPFNS0917
COMPOUND:	Sodium perfluoro-1-nonanesulfonate		
STRUCTURE:		**CAS #:**	98789-57-2



MOLECULAR FORMULA:	$C_9F_{19}SO_3Na$	**MOLECULAR WEIGHT:**	572.12
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.0 ± 2.4 µg/ml (PFNS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/27/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/27/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/28/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2729

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CALA

ANAB ACCREDITED

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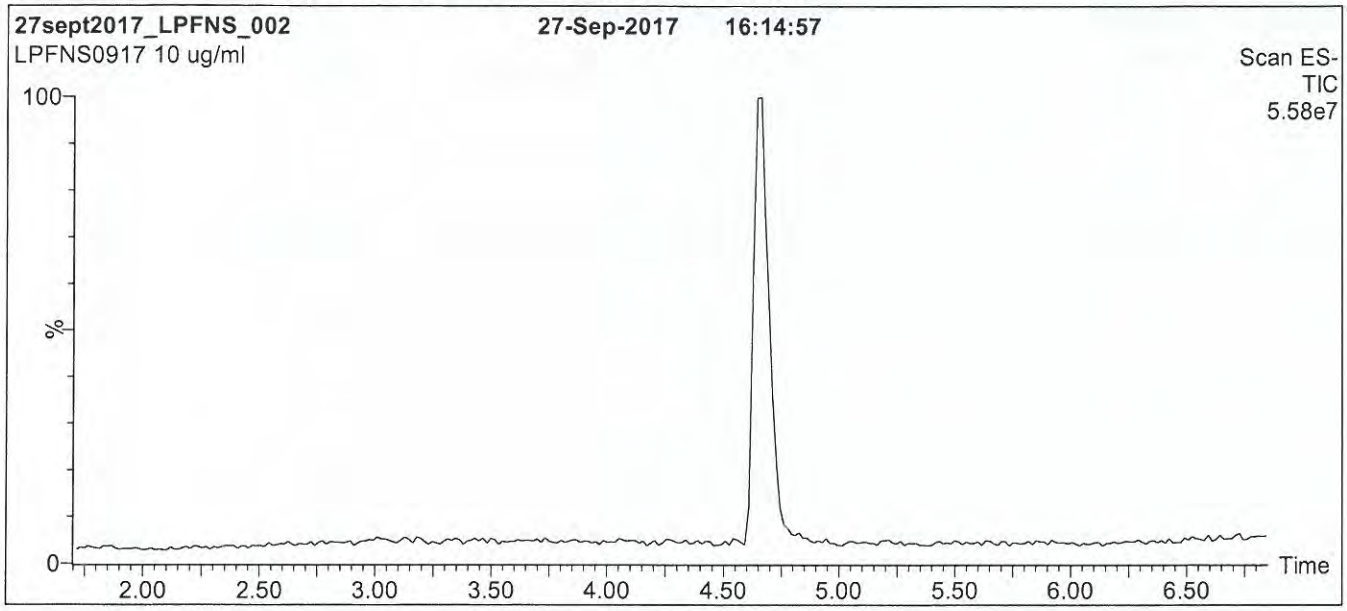
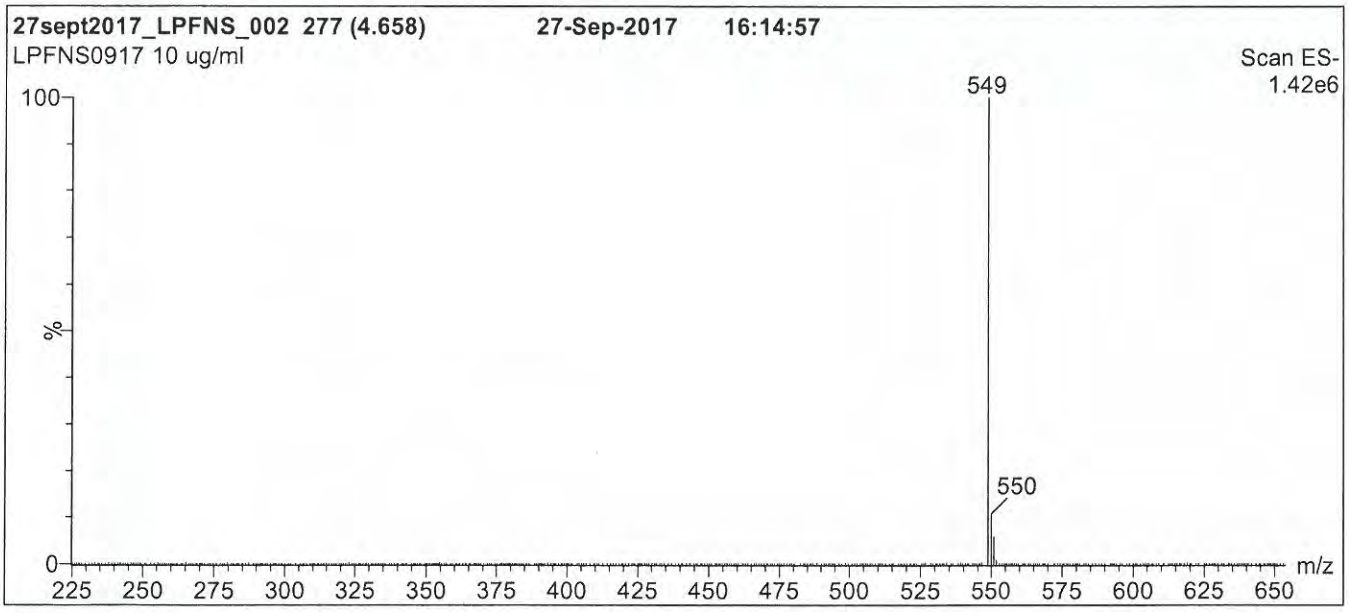
18C2729

Figure 1: **L-PFNS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

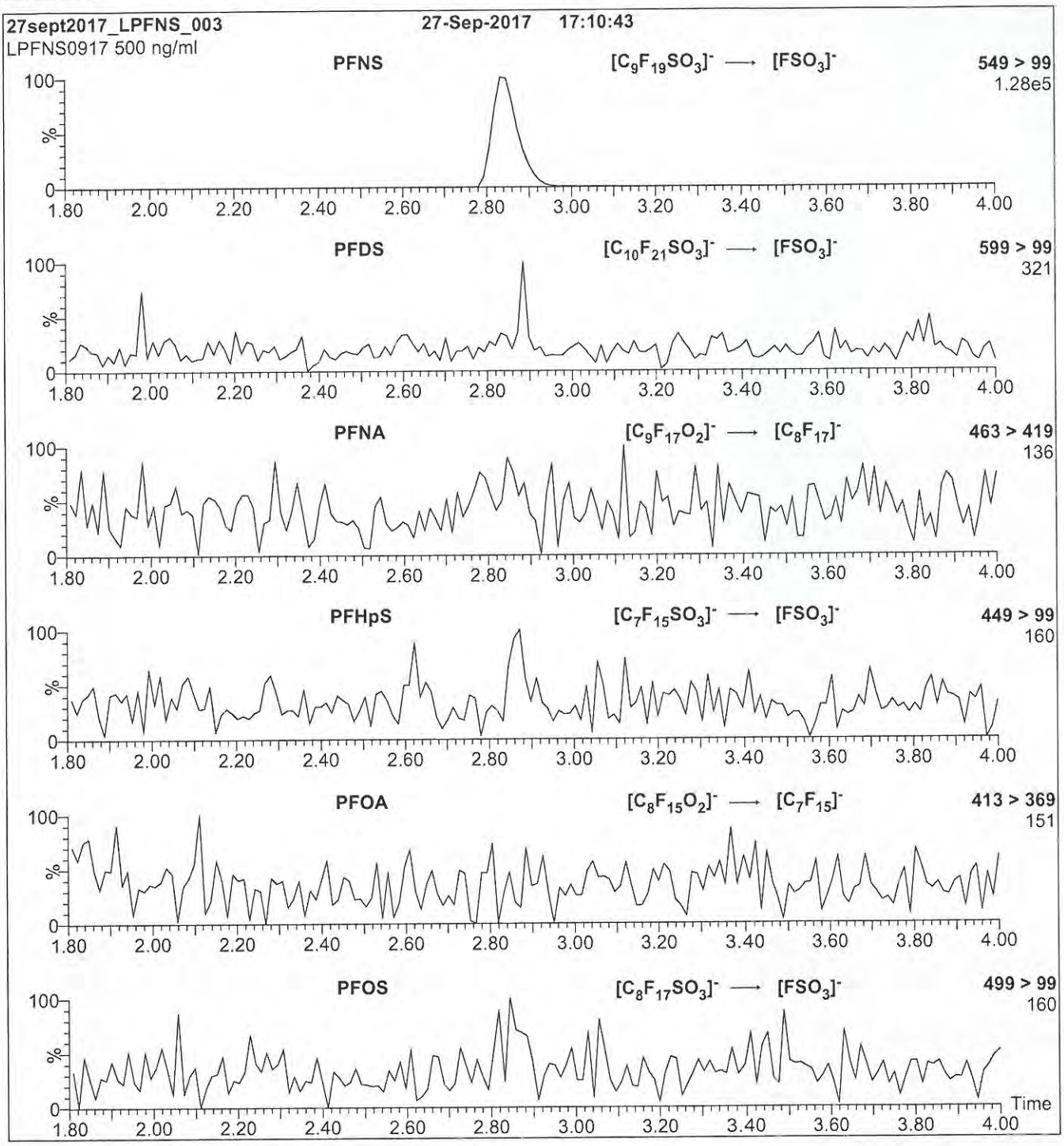
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2729

Figure 2: **L-PFNS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFNS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

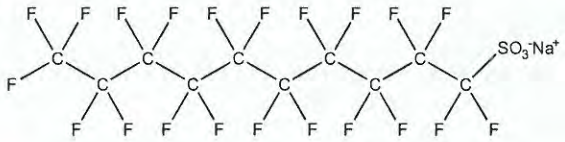
Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 45

18C2730

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: L-PFDS
LOT NUMBER: LPFDS1117
COMPOUND: Sodium perfluoro-1-decanesulfonate
STRUCTURE:
CAS #: 2806-15-7



MOLECULAR FORMULA:	$C_{10}F_{21}SO_3Na$	**MOLECULAR WEIGHT:**	622.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 48.2 ± 2.4 µg/ml (PFDS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	11/08/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/08/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

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Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

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Certified By: _____ **Date:** 11/16/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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EXPIRY DATE / PERIOD OF VALIDITY:

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QUALITY MANAGEMENT:

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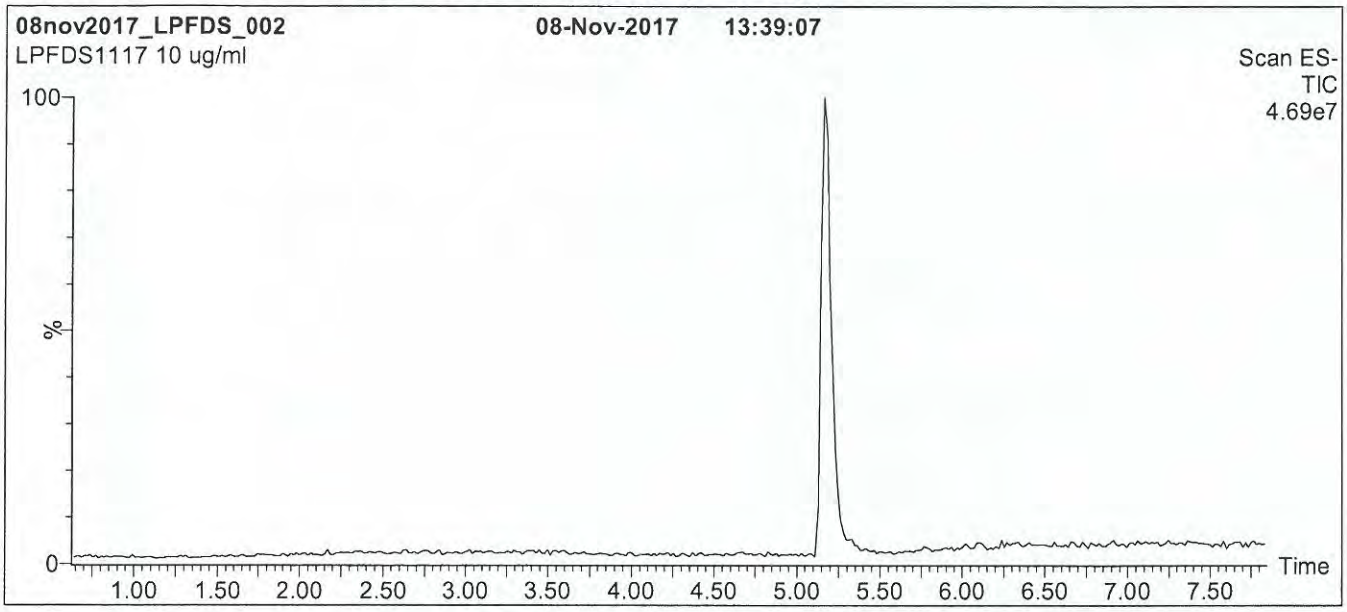
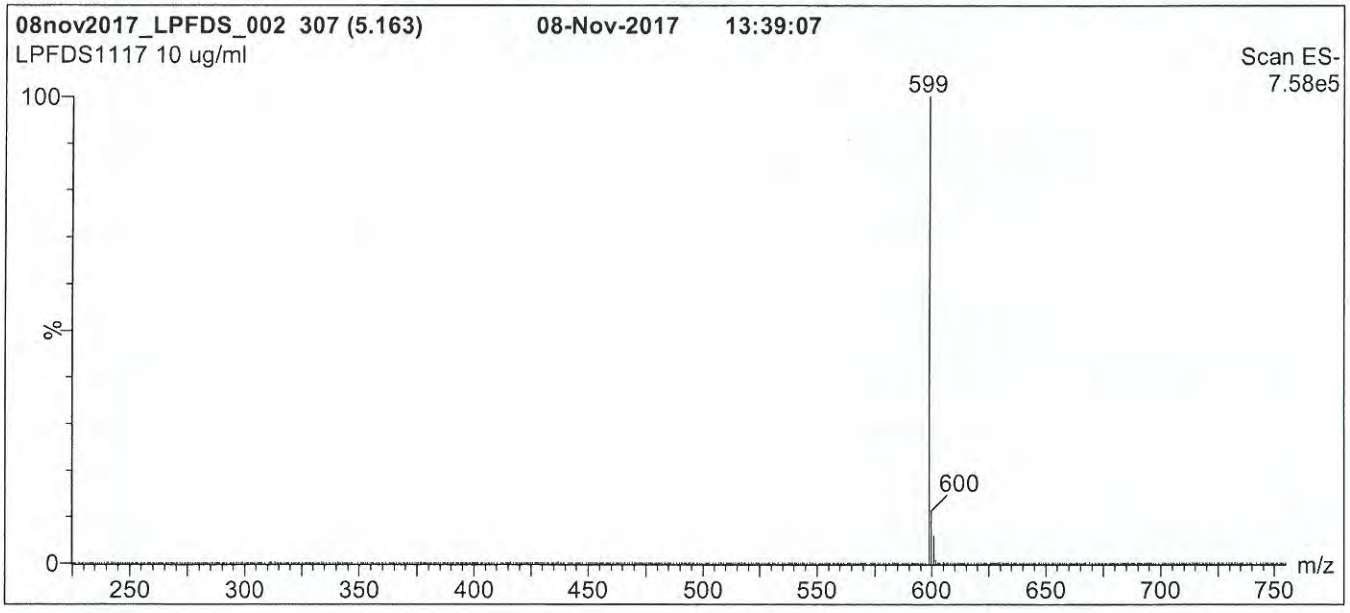
18C2730

Figure 1: **L-PFDS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

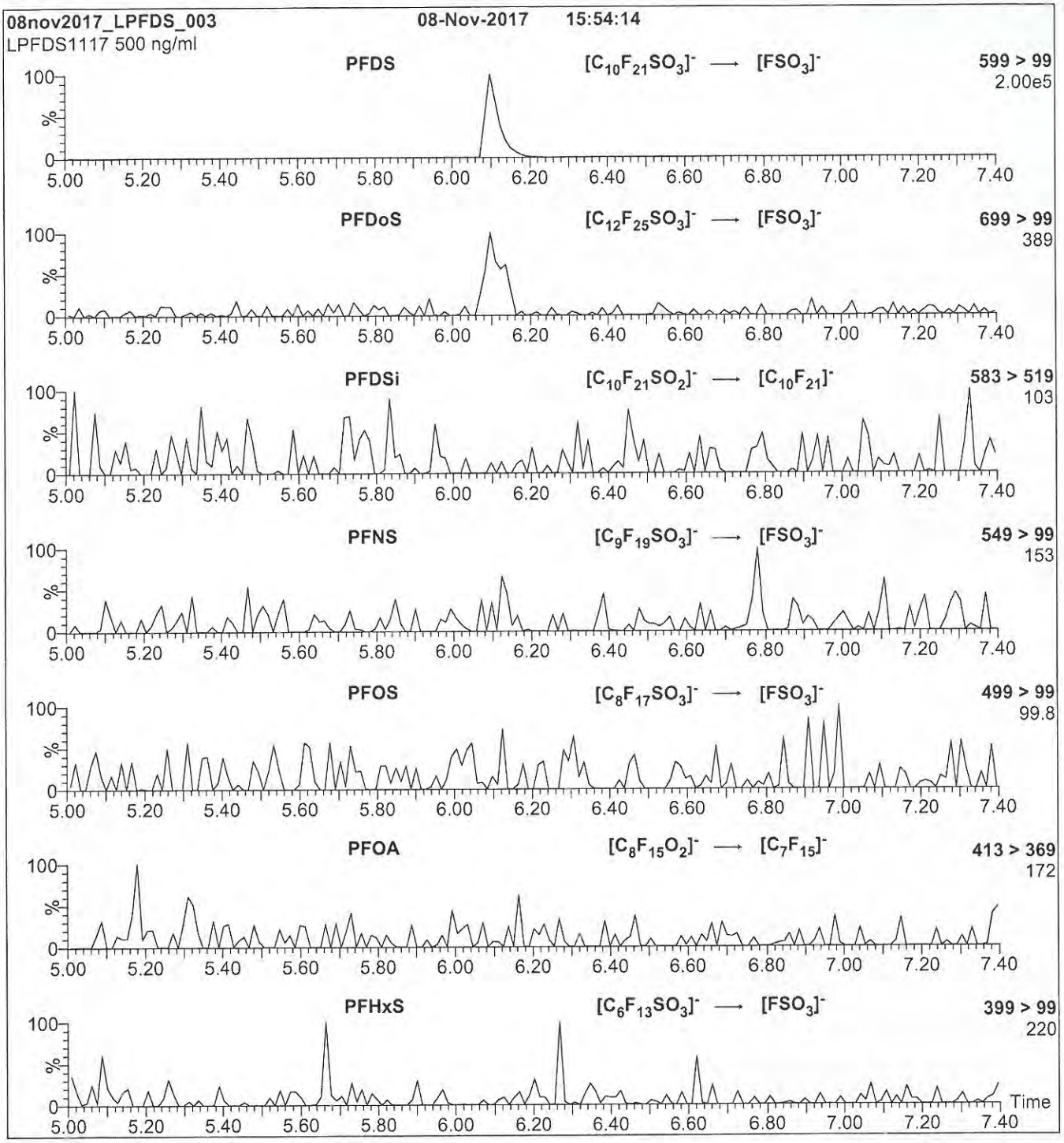
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1802730

Figure 2: **L-PFDS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 50

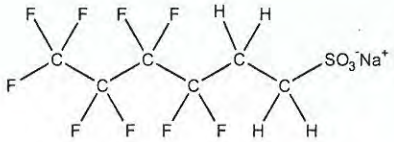
18C2731

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: 4:2FTS **LOT NUMBER:** 42FTS1216
COMPOUND: Sodium 1H,1H,2H,2H-perfluorohexane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_6H_4F_9SO_3Na$	**MOLECULAR WEIGHT:**	350.13
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt)	**SOLVENT(S):**	Methanol
	46.7 ± 2.3 µg/ml (4:2FTS anion)		
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	12/12/2016		
EXPIRY DATE: (mm/dd/yyyy)	12/12/2021		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: B.G. Chittim **Date:** 12/21/2016 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2731

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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HOMOGENEITY:

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The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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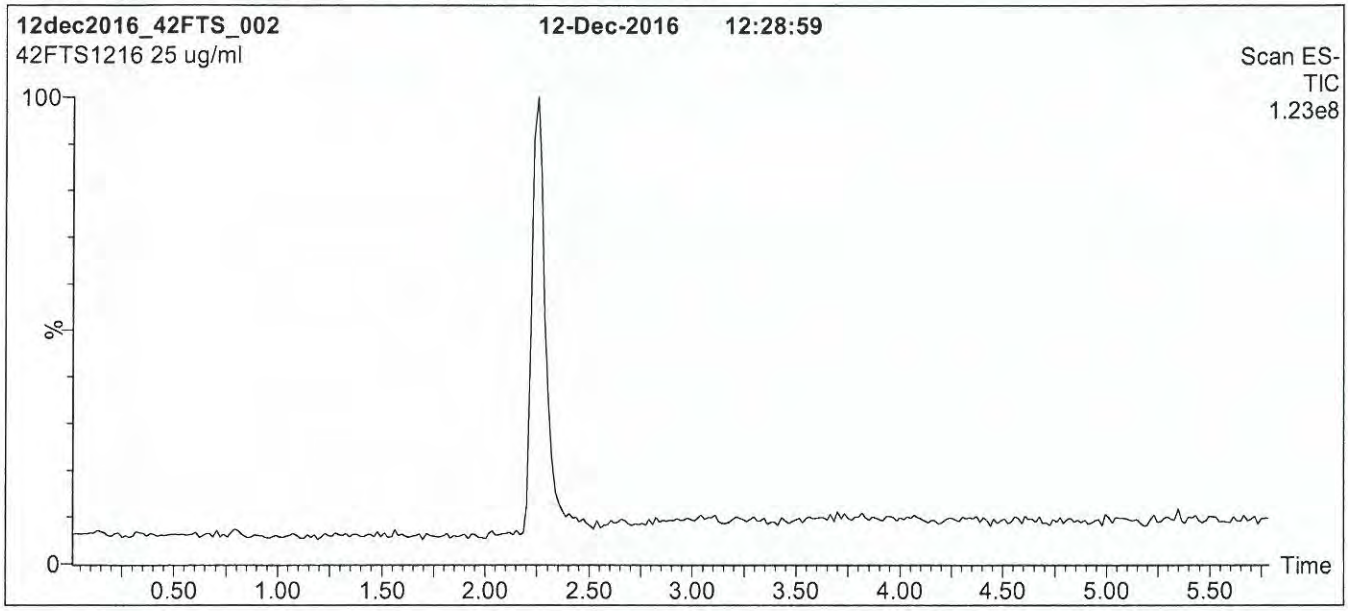
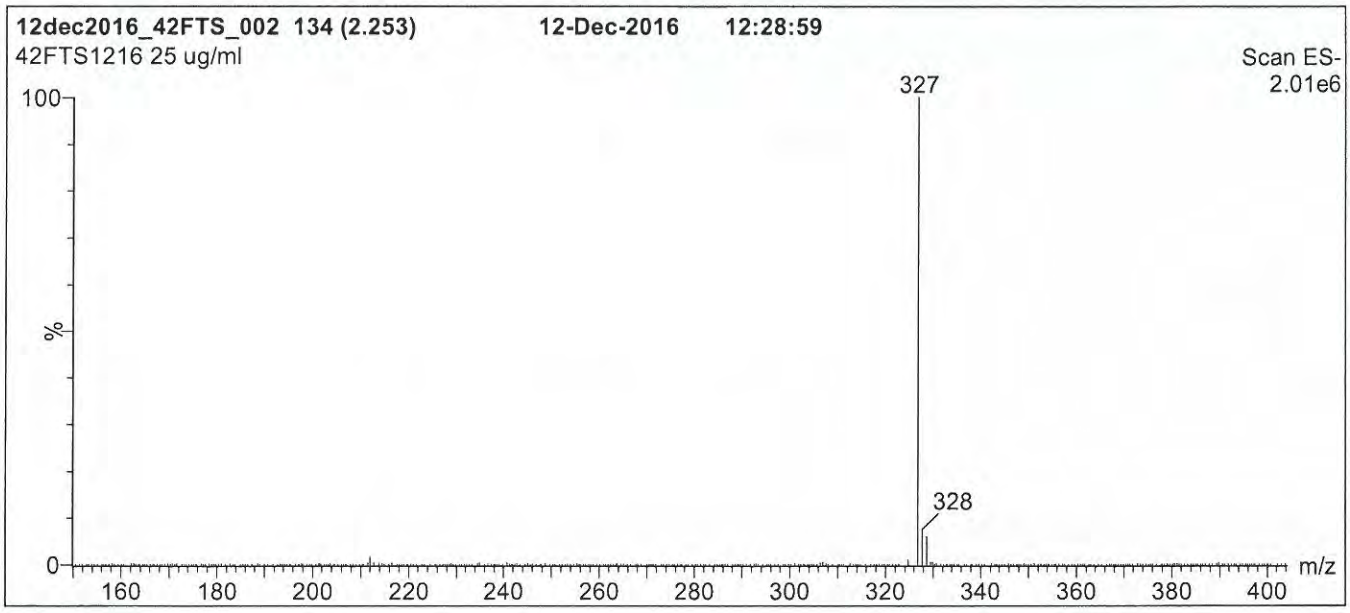
1802731

Figure 1: **4:2FTS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

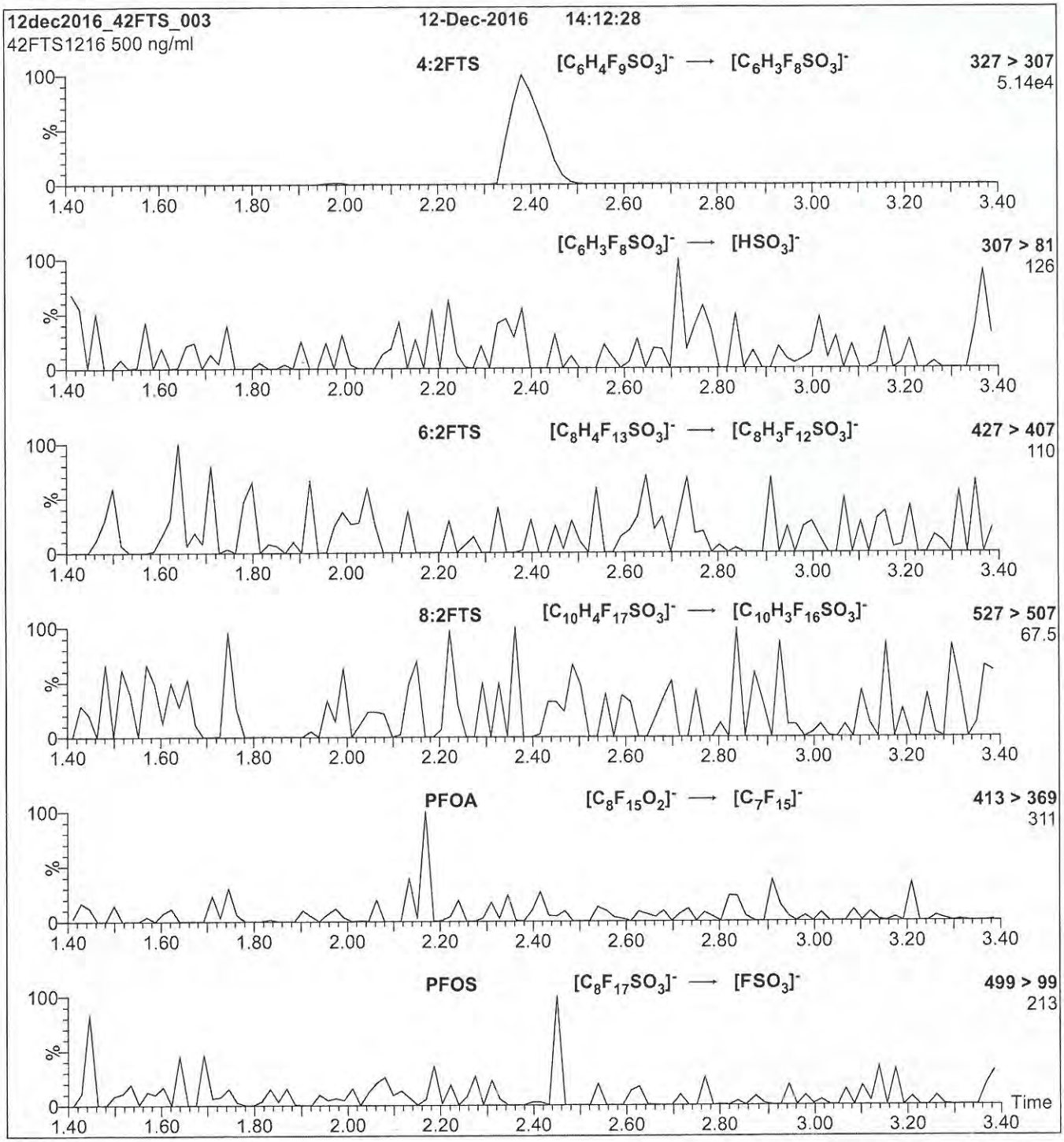
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2731

Figure 2: **4:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

18C2732

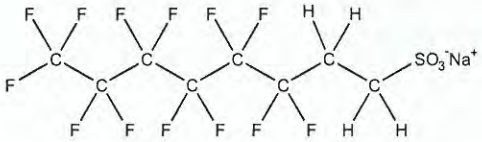
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS0417

COMPOUND: Sodium 1H,1H,2H,2H-perfluorooctane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_8H_4F_{13}SO_3Na$		**MOLECULAR WEIGHT:**	450.15
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.4 ± 2.4 µg/ml	(6:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	04/20/2017			
EXPIRY DATE: (mm/dd/yyyy)	04/20/2022			
RECOMMENDED STORAGE:	Refrigerate ampoule			

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/24/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2732

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CALA

ANAB ACCREDITED

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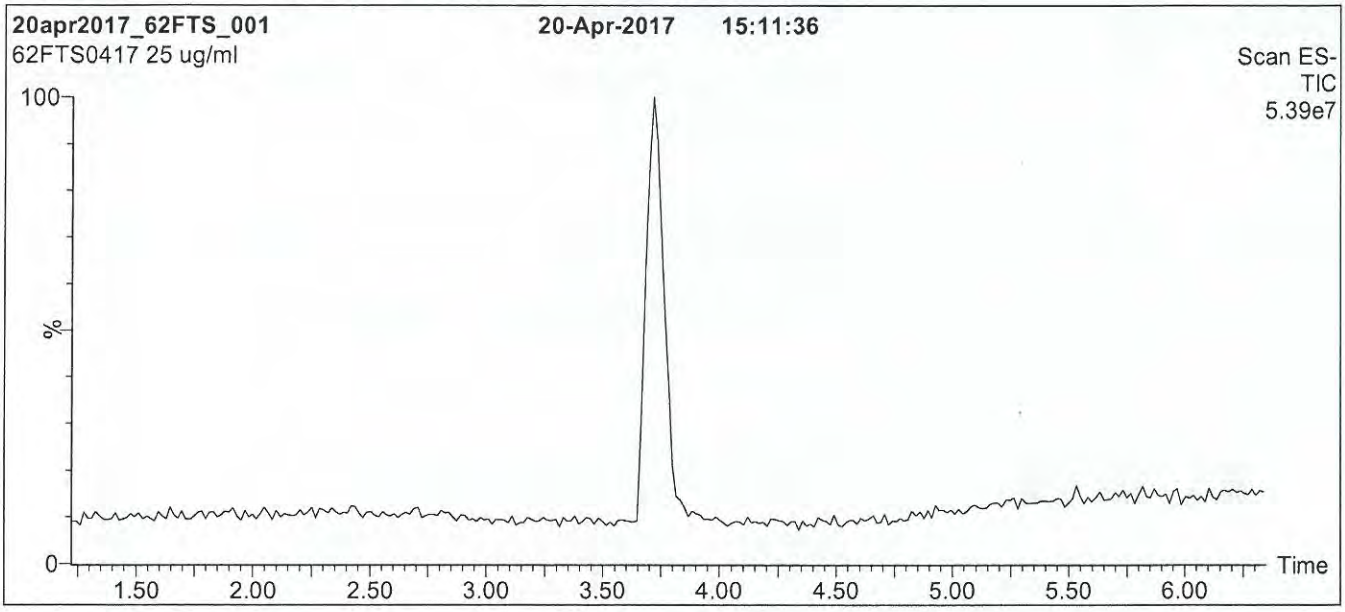
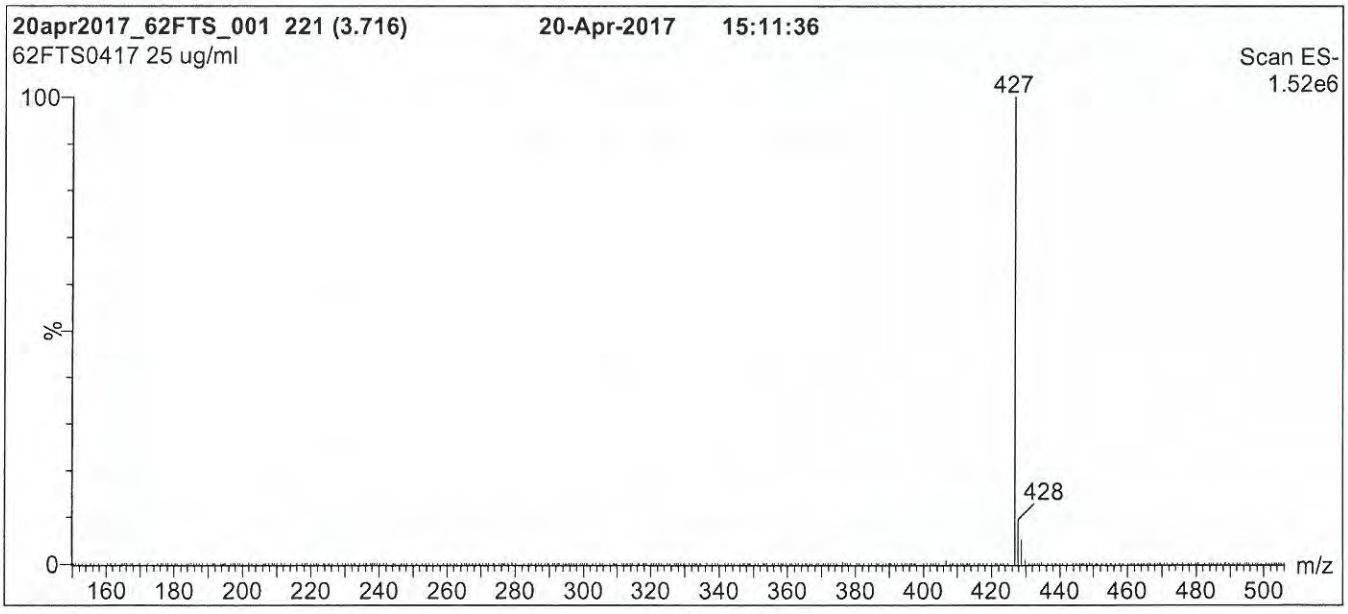
18C2732

Figure 1: **6:2FTS; LC/MS Data (TIC and Mass Spectrum)**





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LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

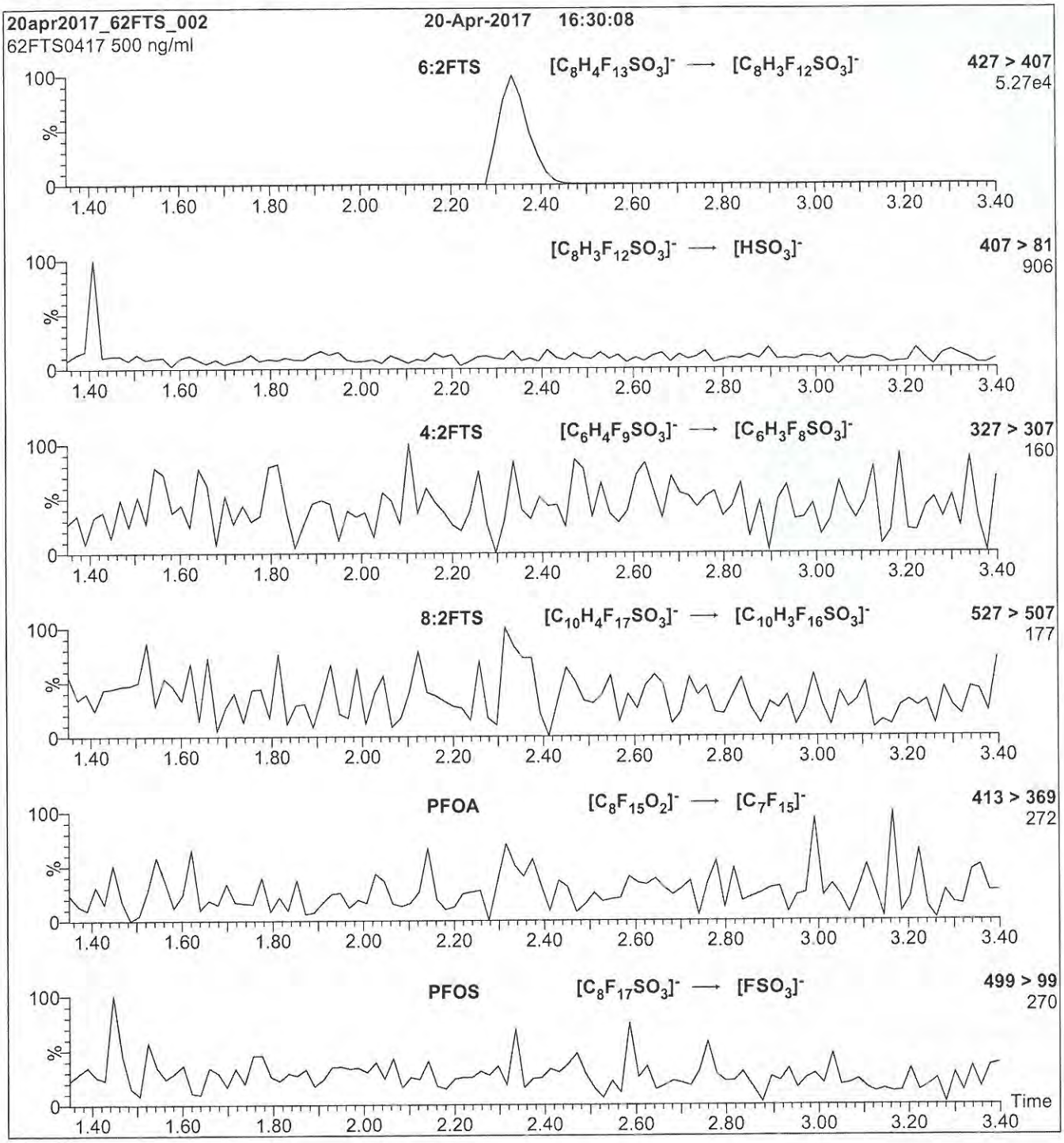
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1802732

Figure 2: **6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 6:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 25

18C2733

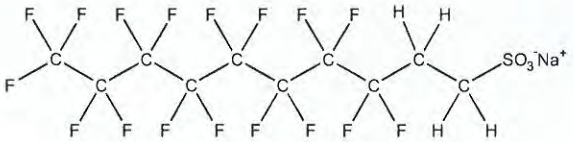
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 8:2FTS **LOT NUMBER:** 82FTS0118

COMPOUND: Sodium 1H,1H,2H,2H-perfluorodecane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$C_{10}H_4F_{17}SO_3Na$		**MOLECULAR WEIGHT:**	550.16
CONCENTRATION:	50.0 ± 2.5 µg/ml	(Na salt)	**SOLVENT(S):**	Methanol
	47.9 ± 2.4 µg/ml	(8:2FTS anion)		
CHEMICAL PURITY:	>98%			
LAST TESTED: (mm/dd/yyyy)	01/24/2018			
EXPIRY DATE: (mm/dd/yyyy)	01/24/2023			
RECOMMENDED STORAGE:	Refrigerate ampoule			

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 01/31/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18C2733

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ANAB ACCREDITED 20709 REFERENCE MATERIAL PRODUCER

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18C2733

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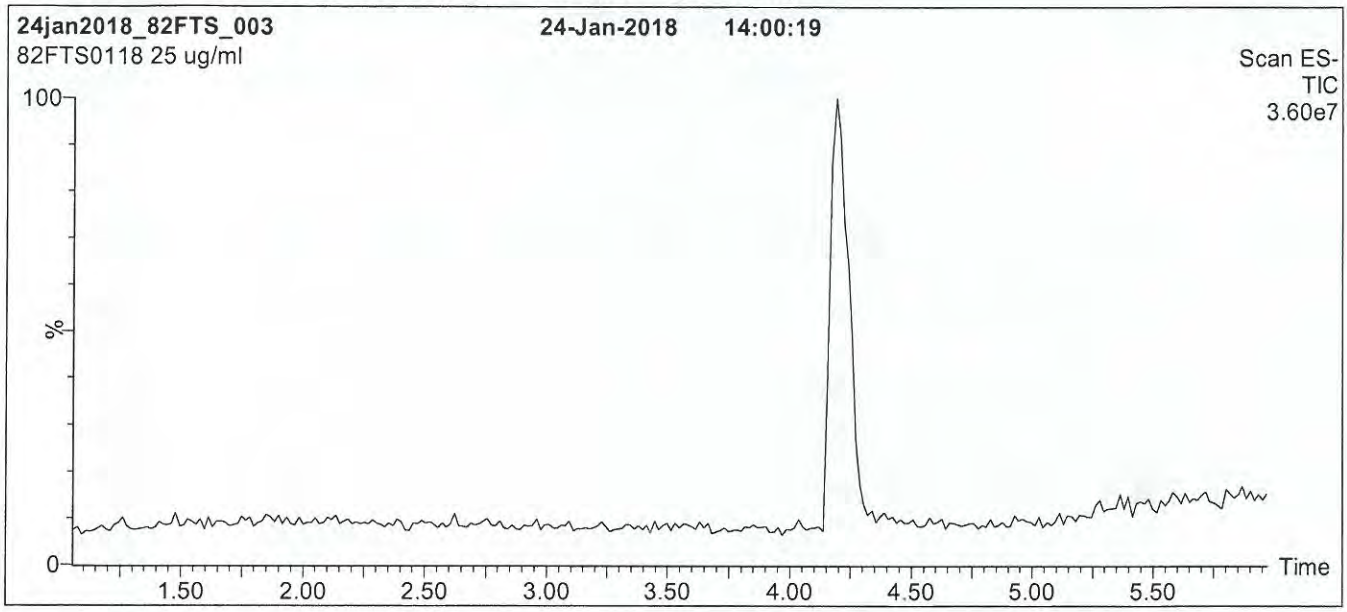

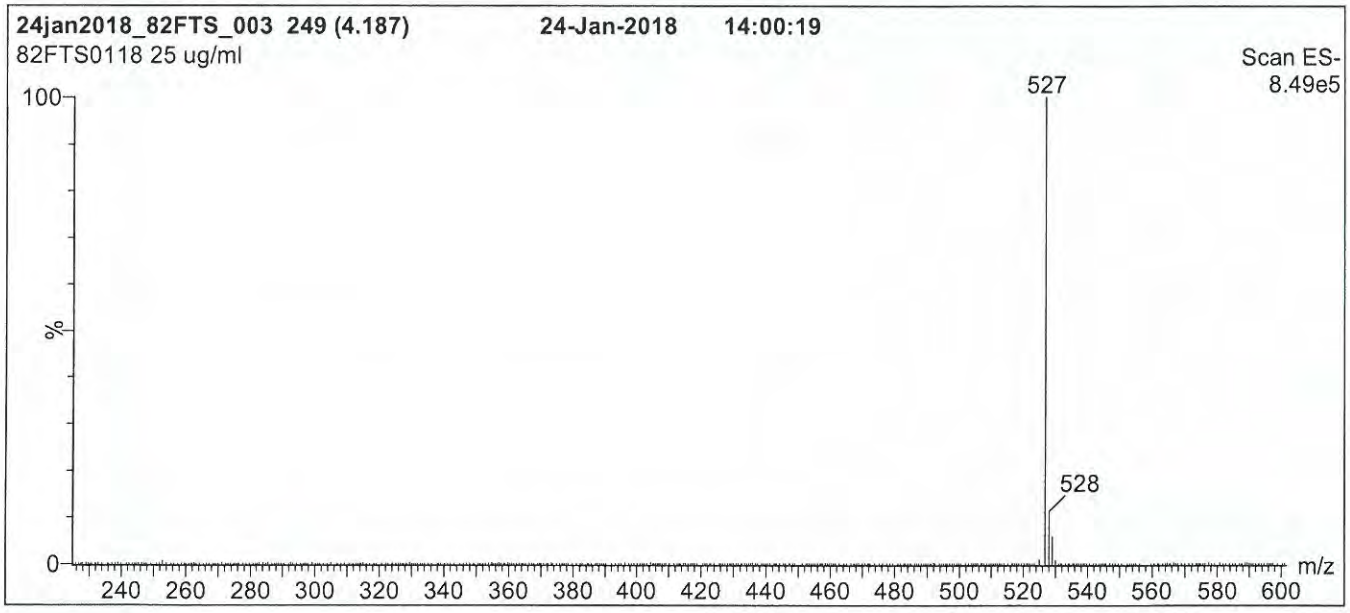

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MS: **Micromass Quattro *micro* API MS**

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1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
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Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

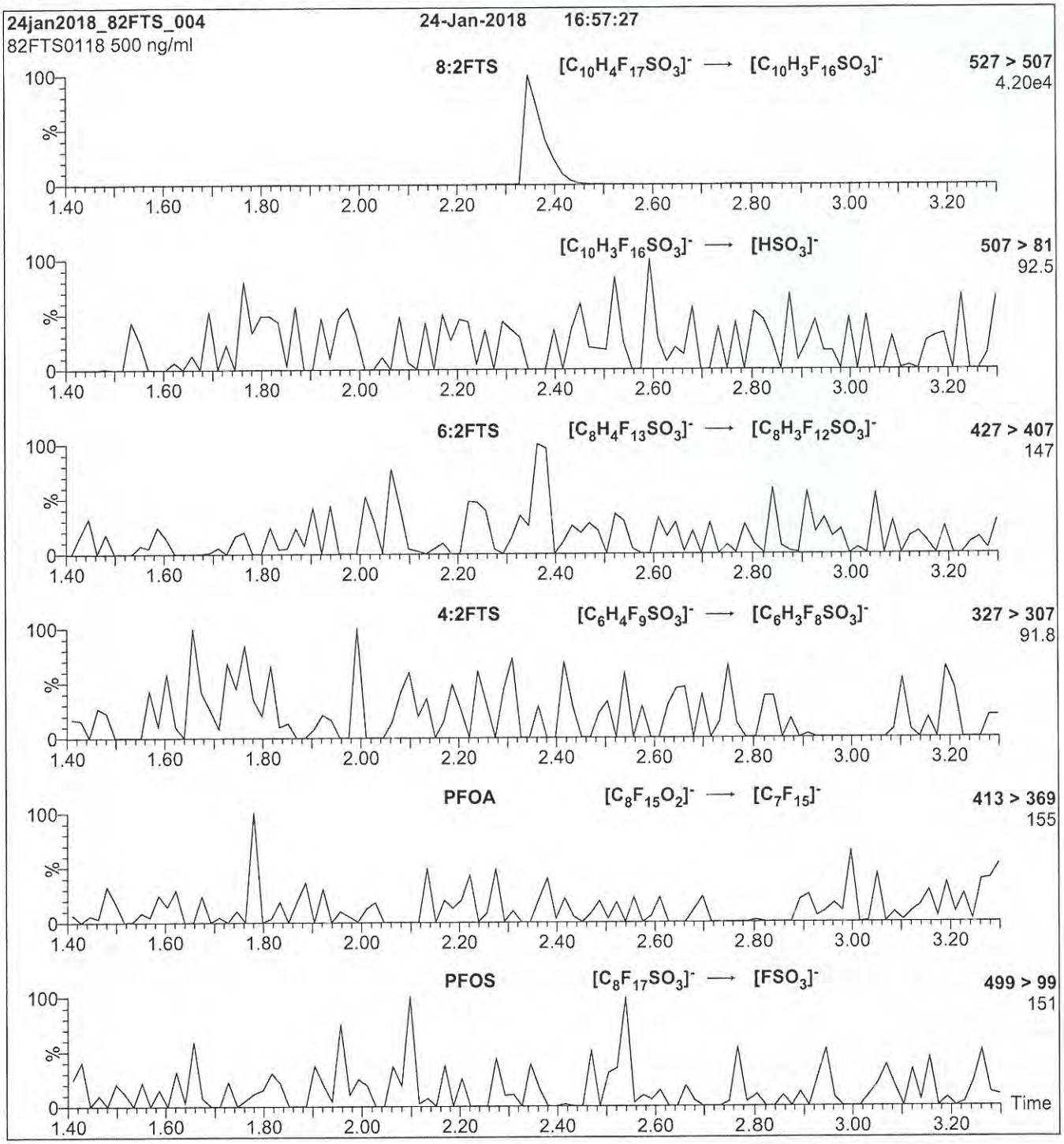
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18C2733

Figure 2: **8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml 8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 25

18C2734

WELLINGTON LABORATORIES

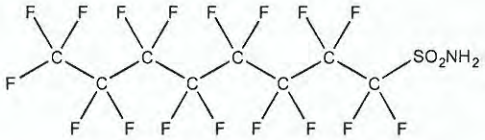
CERTIFICATE OF ANALYSIS
DOCUMENTATION

PRODUCT CODE: FOSA-I
COMPOUND: Perfluoro-1-octanesulfonamide

LOT NUMBER: FOSA0817I

STRUCTURE:

CAS #: 754-91-6



MOLECULAR FORMULA:	$C_8H_2F_{17}NO_2S$	**MOLECULAR WEIGHT:**	499.14
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Isopropanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	09/01/2017		
EXPIRY DATE: (mm/dd/yyyy)	09/01/2022		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 09/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2734

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

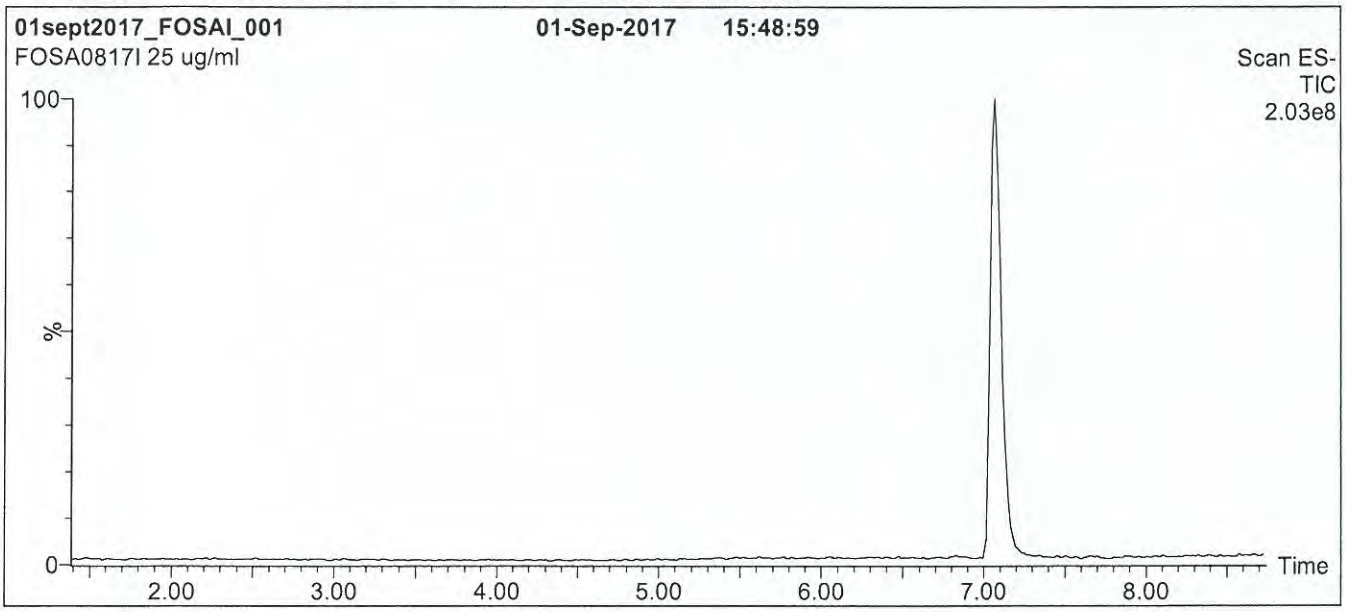
CALA Testing Accreditation No. A 1226

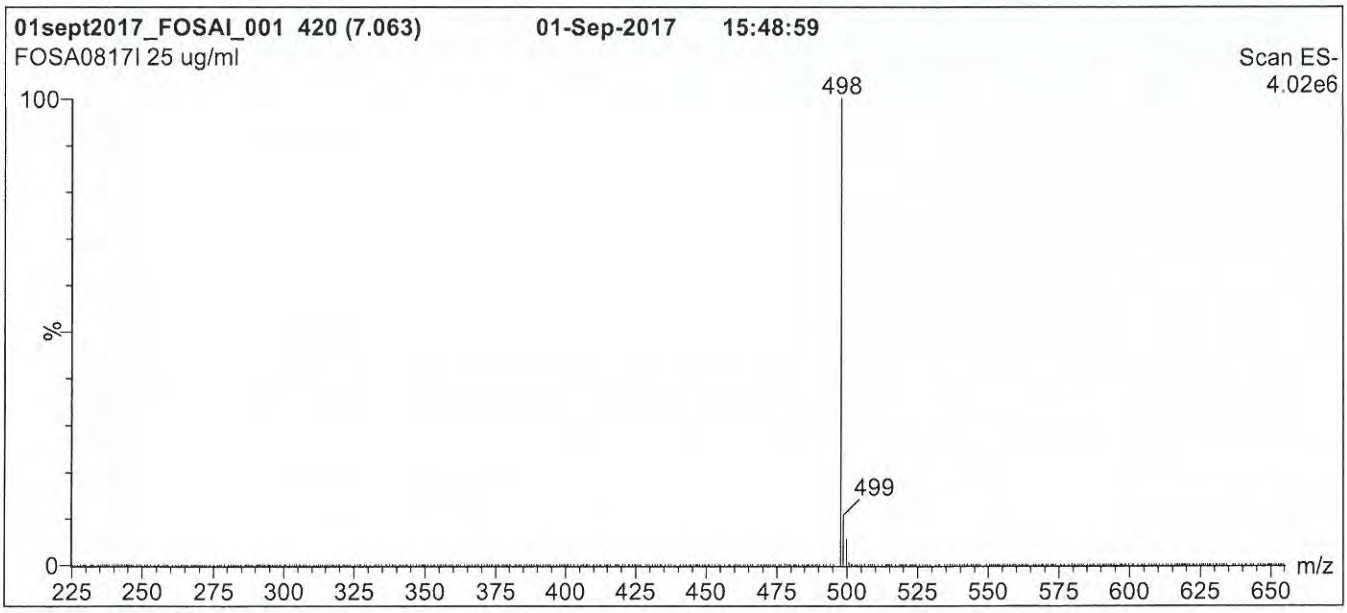
ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2734

Figure 1: **FOSA-I; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

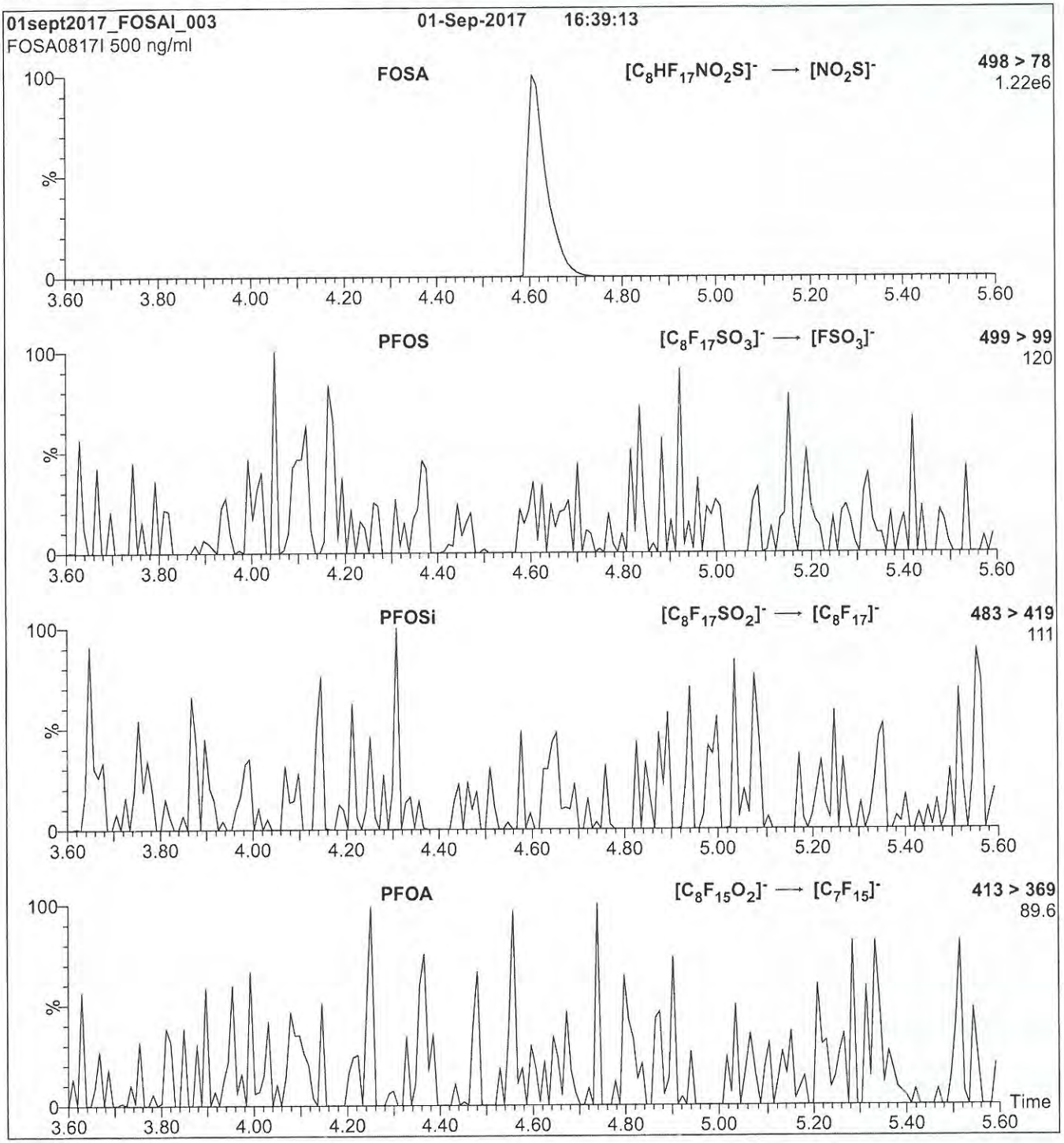
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2734

Figure 2: **FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

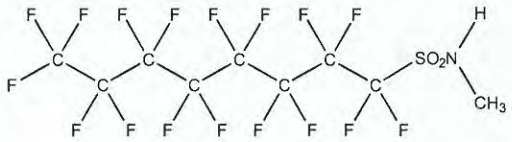
Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 30

1802737

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	N-MeFOSA-M	**LOT NUMBER:**	NMeFOSA0717M
COMPOUND:	N-methylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	31506-32-8



MOLECULAR FORMULA:	$C_9H_4F_{17}NO_2S$	**MOLECULAR WEIGHT:**	513.17
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/10/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1802737

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HAZARDS:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

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CALA Testing Accreditation No. A 1226

ANAB ACCREDITED Reference Material Producer

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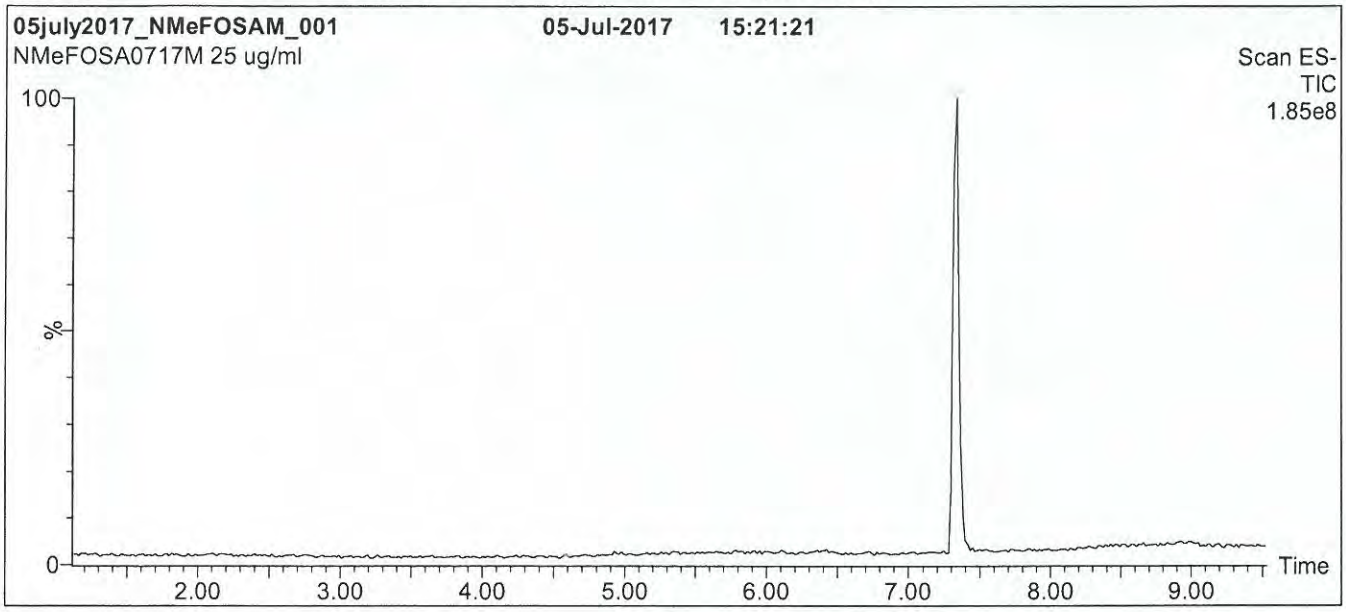
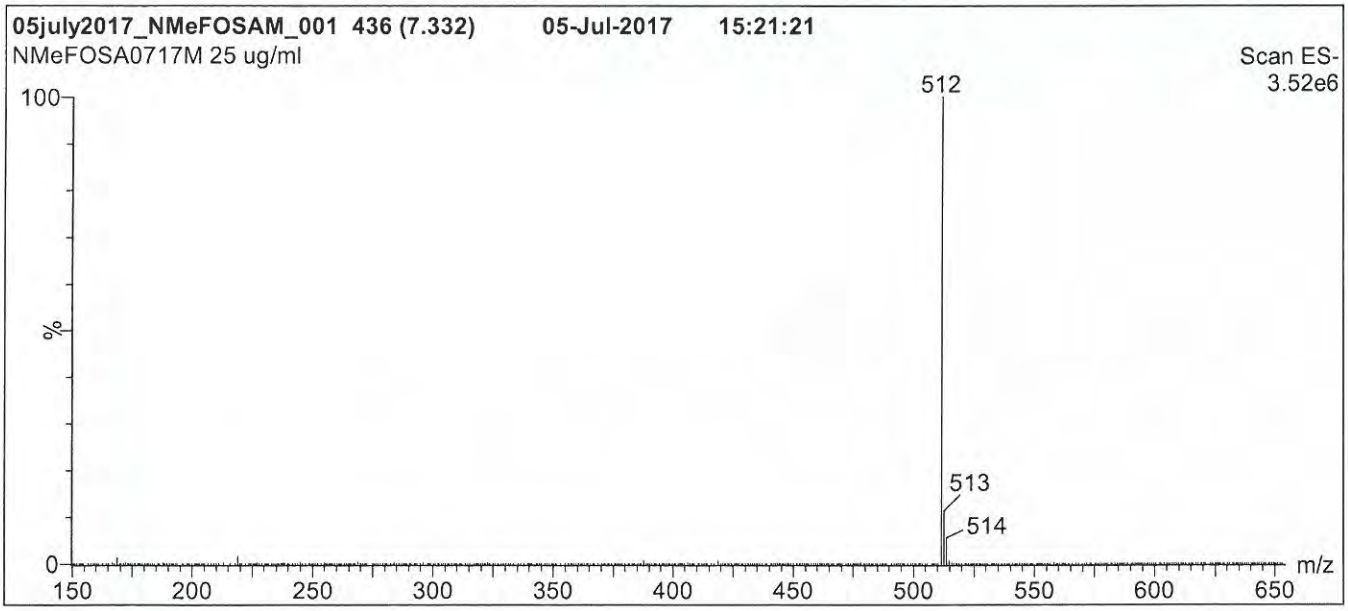
18C2737

Figure 1: **N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

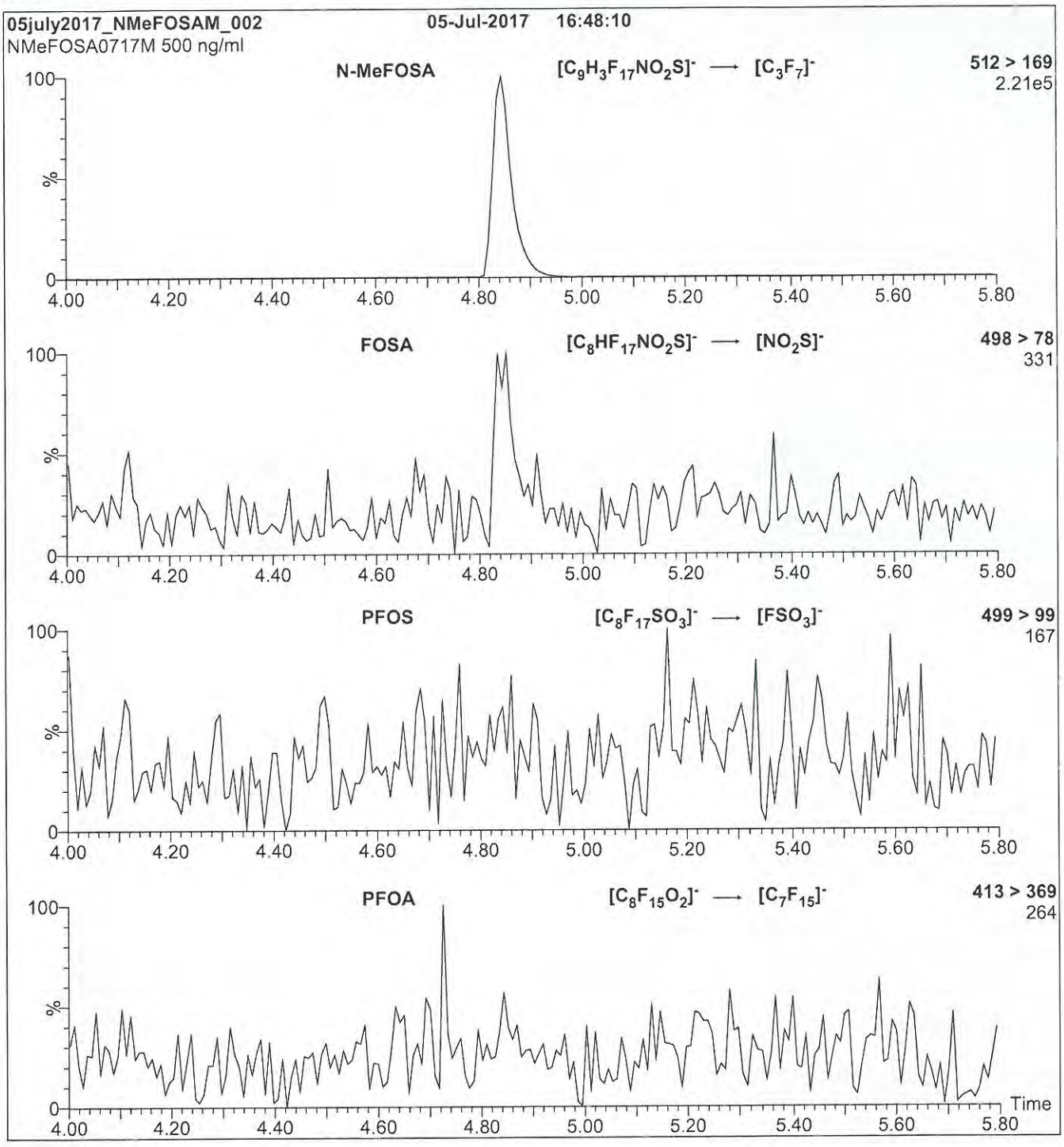
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2737

Figure 2: **N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

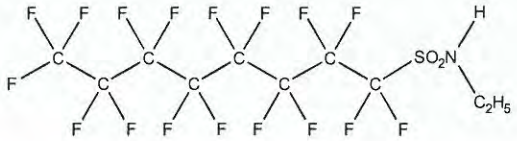
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 30

18C2738

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	N-EtFOSA-M	**LOT NUMBER:**	NEtFOSA0717M
COMPOUND:	N-ethylperfluoro-1-octanesulfonamide		
STRUCTURE:		**CAS #:**	4151-50-2



MOLECULAR FORMULA:	$C_{10}H_6F_{17}NO_2S$	**MOLECULAR WEIGHT:**	527.20
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2738

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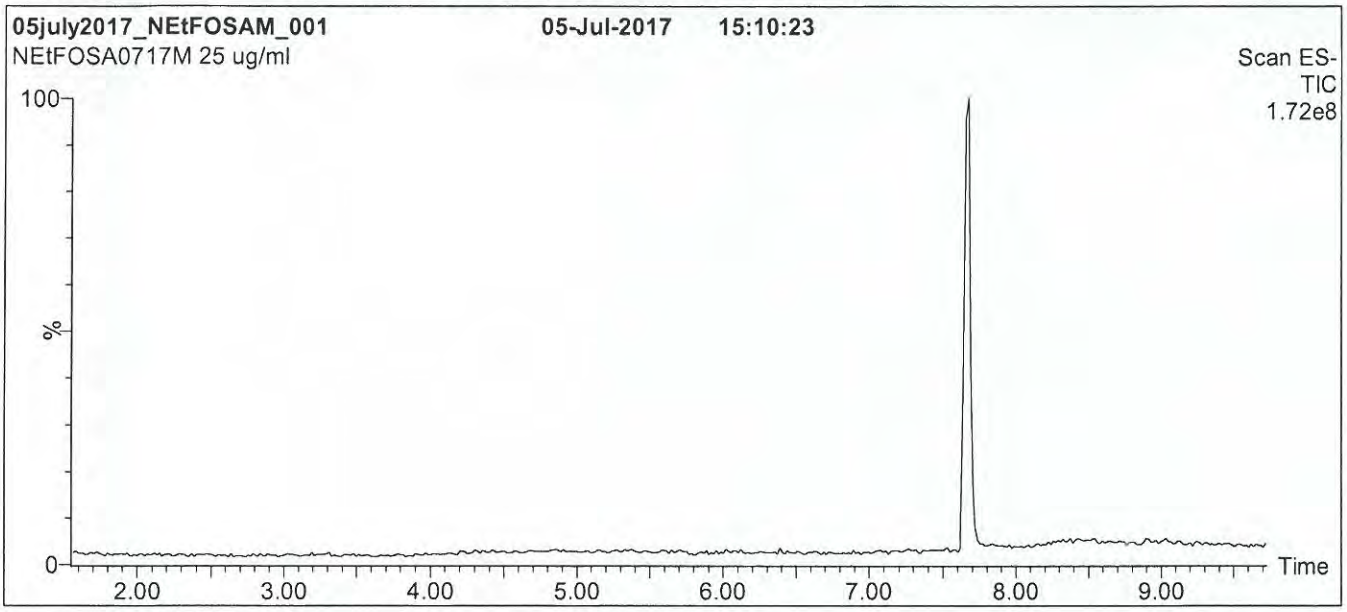
CALA Testing Accreditation No. A 0226

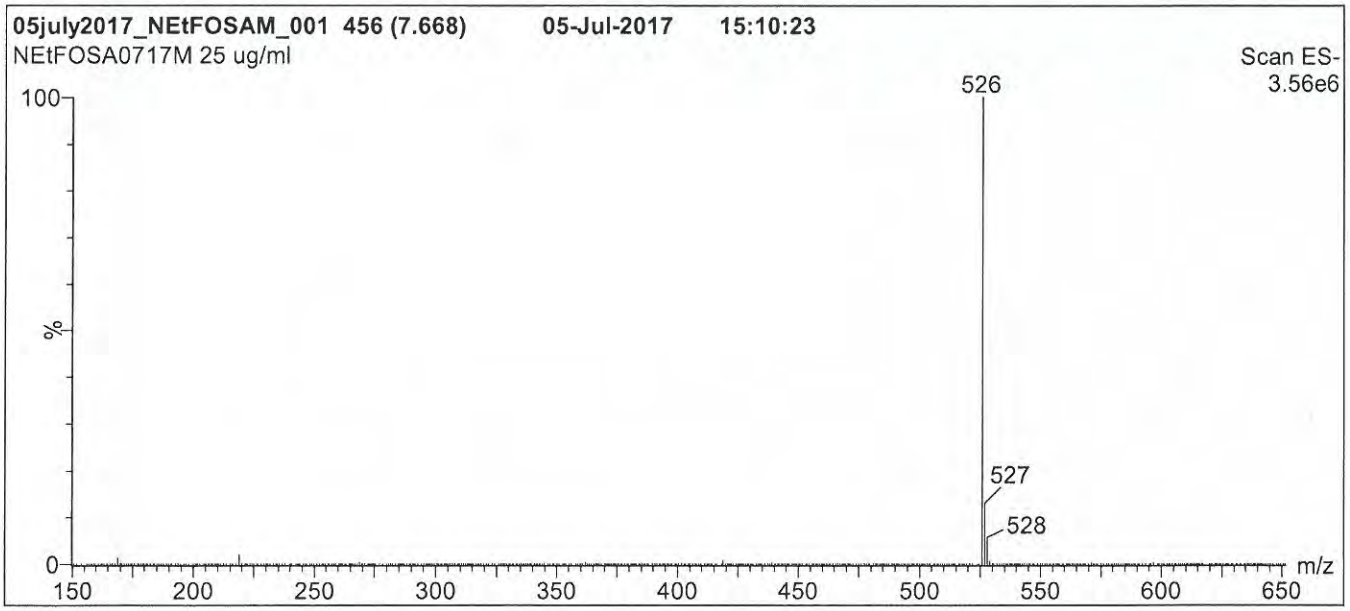
ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18C2738

Figure 1: **N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 45% H_2O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

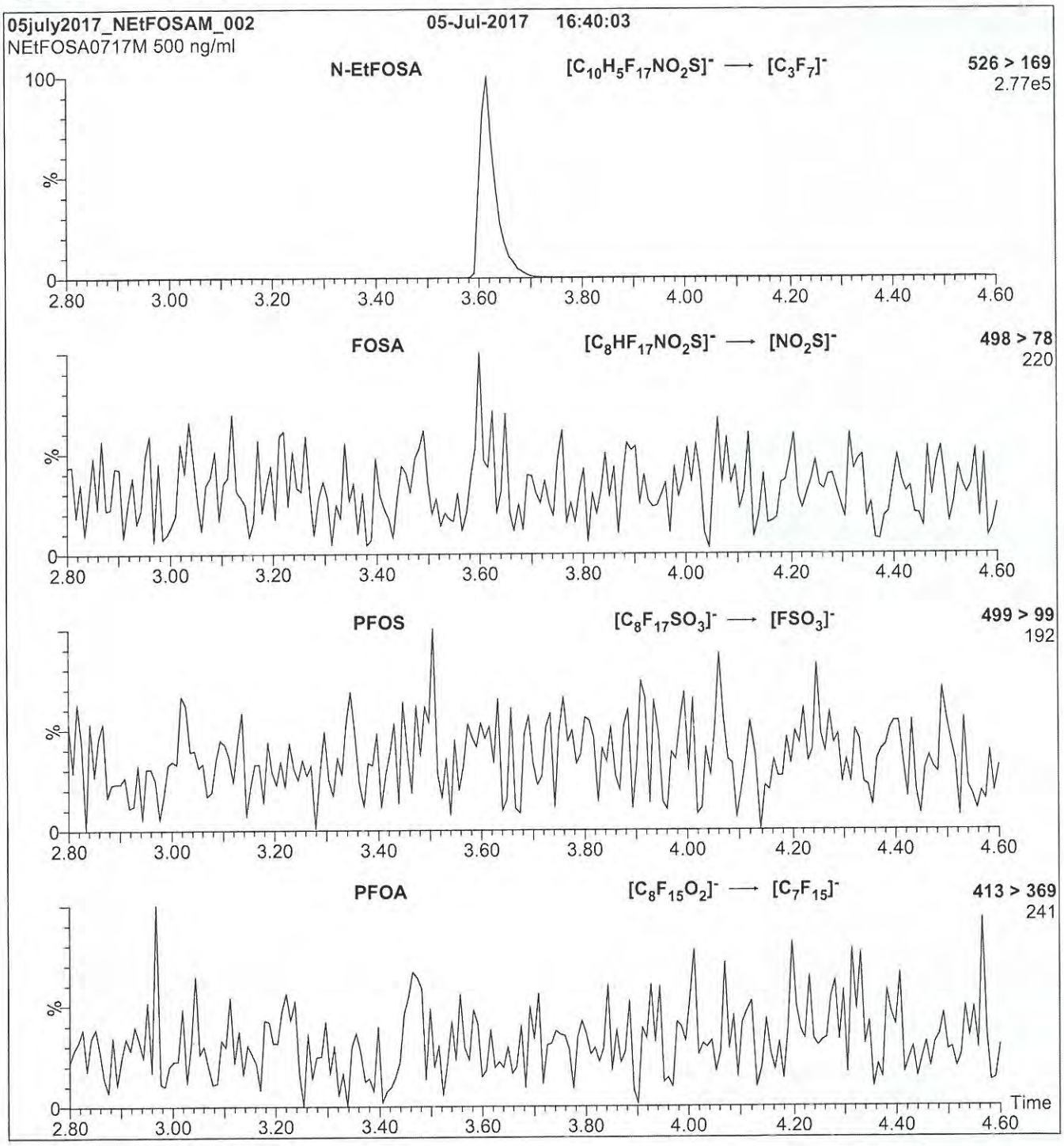
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18C2738

Figure 2: **N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18C2739

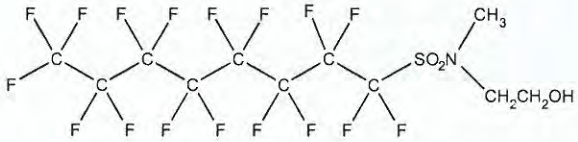
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSE-M **LOT NUMBER:** NMeFOSE0417M

COMPOUND: 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol

STRUCTURE: **CAS #:** 24448-09-7



MOLECULAR FORMULA: $C_{11}H_8F_{17}NO_3S$ **MOLECULAR WEIGHT:** 557.22

CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol

CHEMICAL PURITY: >98%

LAST TESTED: (mm/dd/yyyy) 04/24/2017 (HRGC/LRMS)
04/21/2017 (LC/MS)

EXPIRY DATE: (mm/dd/yyyy) 04/24/2022

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: HRGC/LRMS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (TIC and Mass Spectrum)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- In order to see the molecular ion (adduct free), the LC mobile phase should be free of ammonium acetate buffer.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/05/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1802739

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA Testing Accreditation No. A1226

ANAB ACCREDITED REFERENCE MATERIAL PRODUCER

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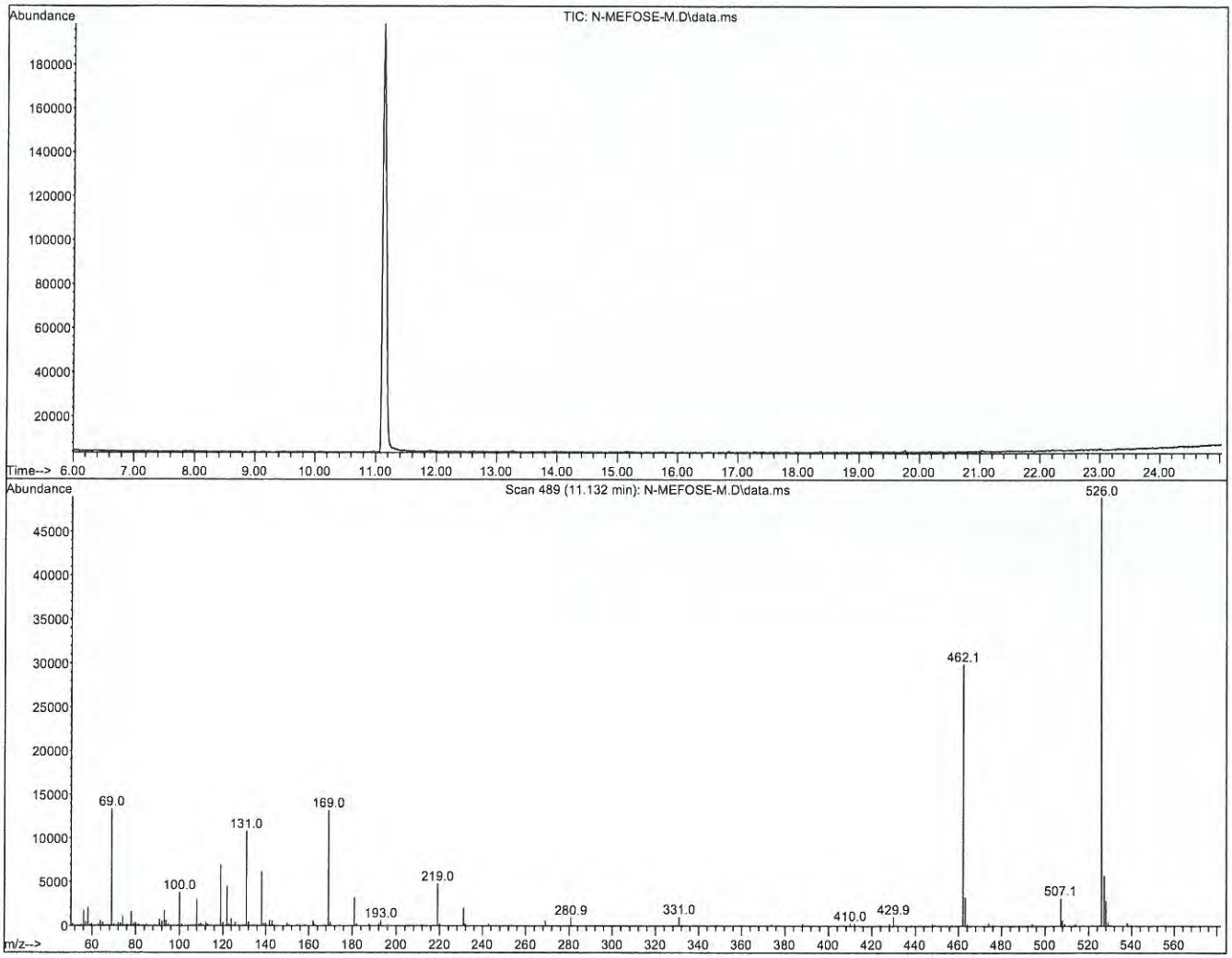
18C2739

Figure 1: **N-MeFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

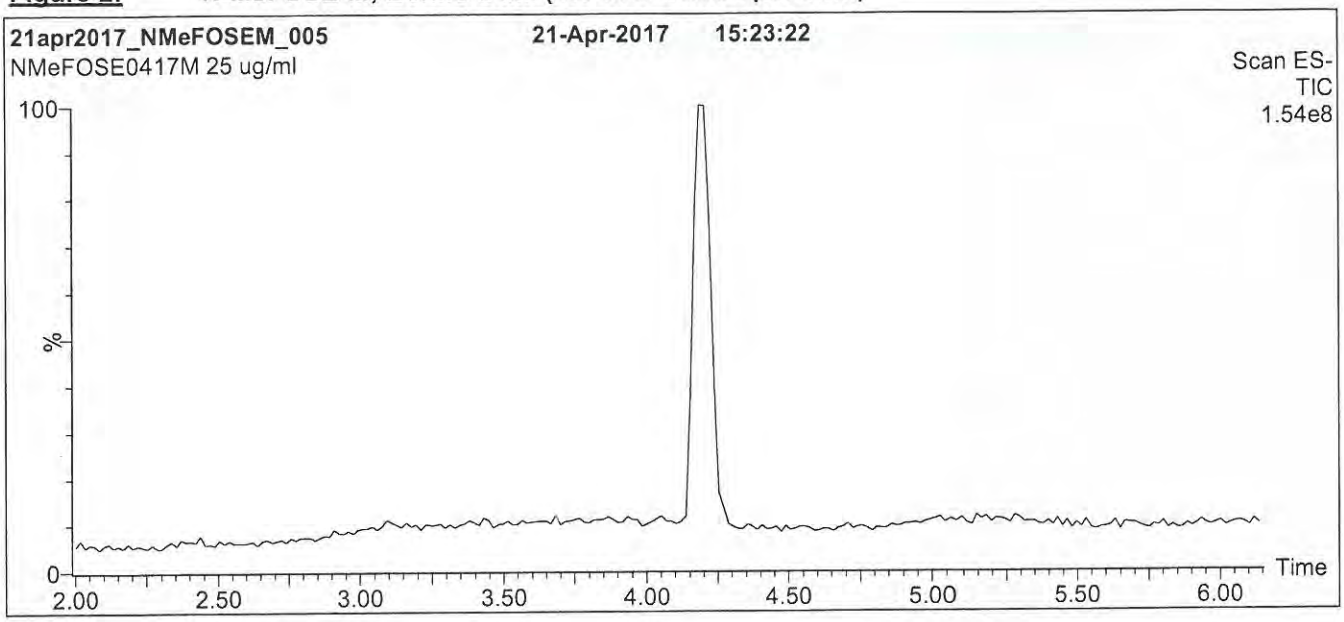
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

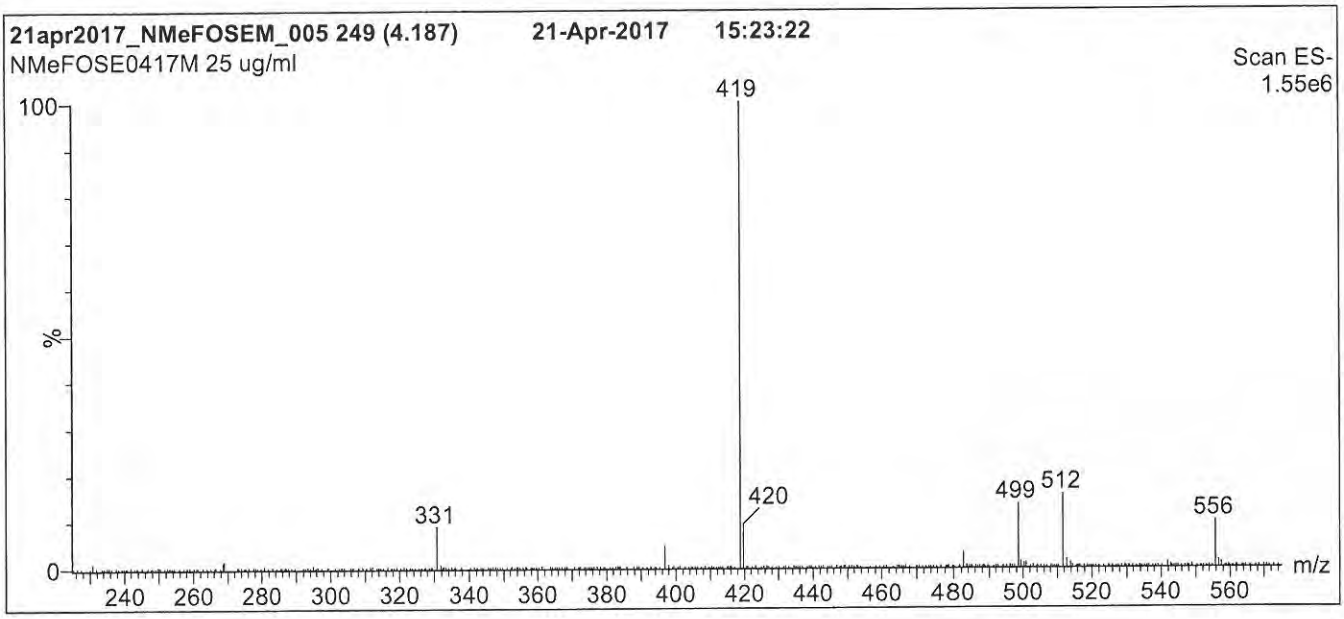
Chromatographic Conditions:

Column:	30 m DB-5 (0.25 mm id, 0.25 µm film thickness) Agilent J&W
Injector:	250 °C (Splitless Injection)
Oven:	100 °C (5 min)
	10 °C/min to 325 °C
	325 °C (20 min)
Ionization:	EI+
Detector:	250 °C
	Full Scan (50-1000 amu)

18C2739

Figure 2: **N-MeFOSE-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% MeOH / 40% H_2O
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

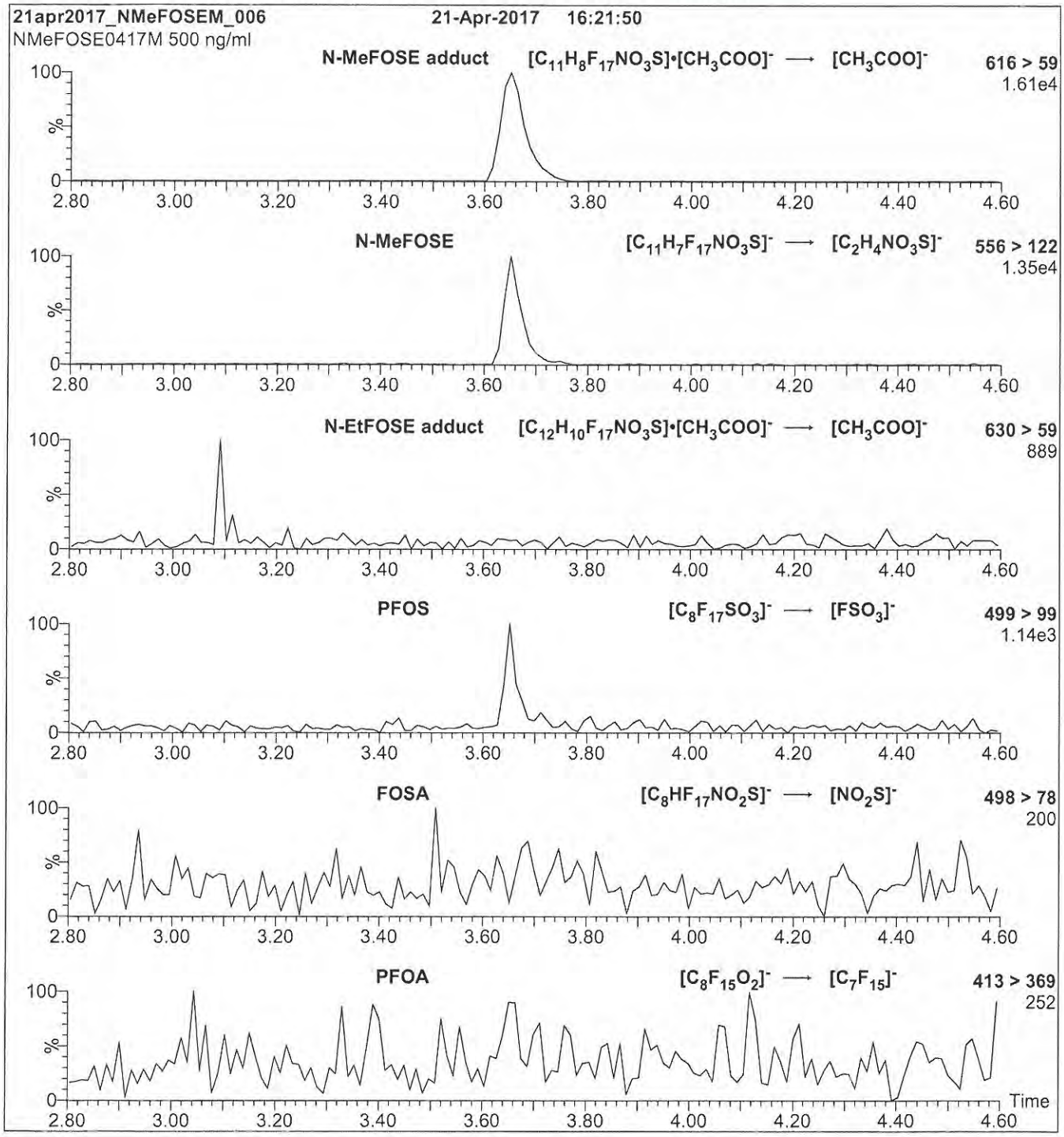
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18C2739

Figure 3: **N-MeFOSE-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml N-MeFOSE-M)

Mobile phase: Isocratic 80% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 35

1802740

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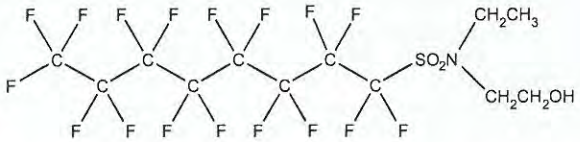
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-EtFOSE-M **LOT NUMBER:** NEtFOSE0417M

COMPOUND: 2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol

STRUCTURE: **CAS #:** 1691-99-2



MOLECULAR FORMULA:	$C_{12}H_{10}F_{17}NO_3S$	**MOLECULAR WEIGHT:**	571.25
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%		
LAST TESTED: (mm/dd/yyyy)	04/24/2017 (HRGC/LRMS) 04/21/2017 (LC/MS)		
EXPIRY DATE: (mm/dd/yyyy)	04/24/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: HRGC/LRMS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (TIC and Mass Spectrum)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- In order to see the molecular ion (adduct free), the LC mobile phase should be free of ammonium acetate buffer.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/26/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18C2740

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where x is expressed as a relative standard uncertainty of the individual parameter.

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ANAB ACCREDITED

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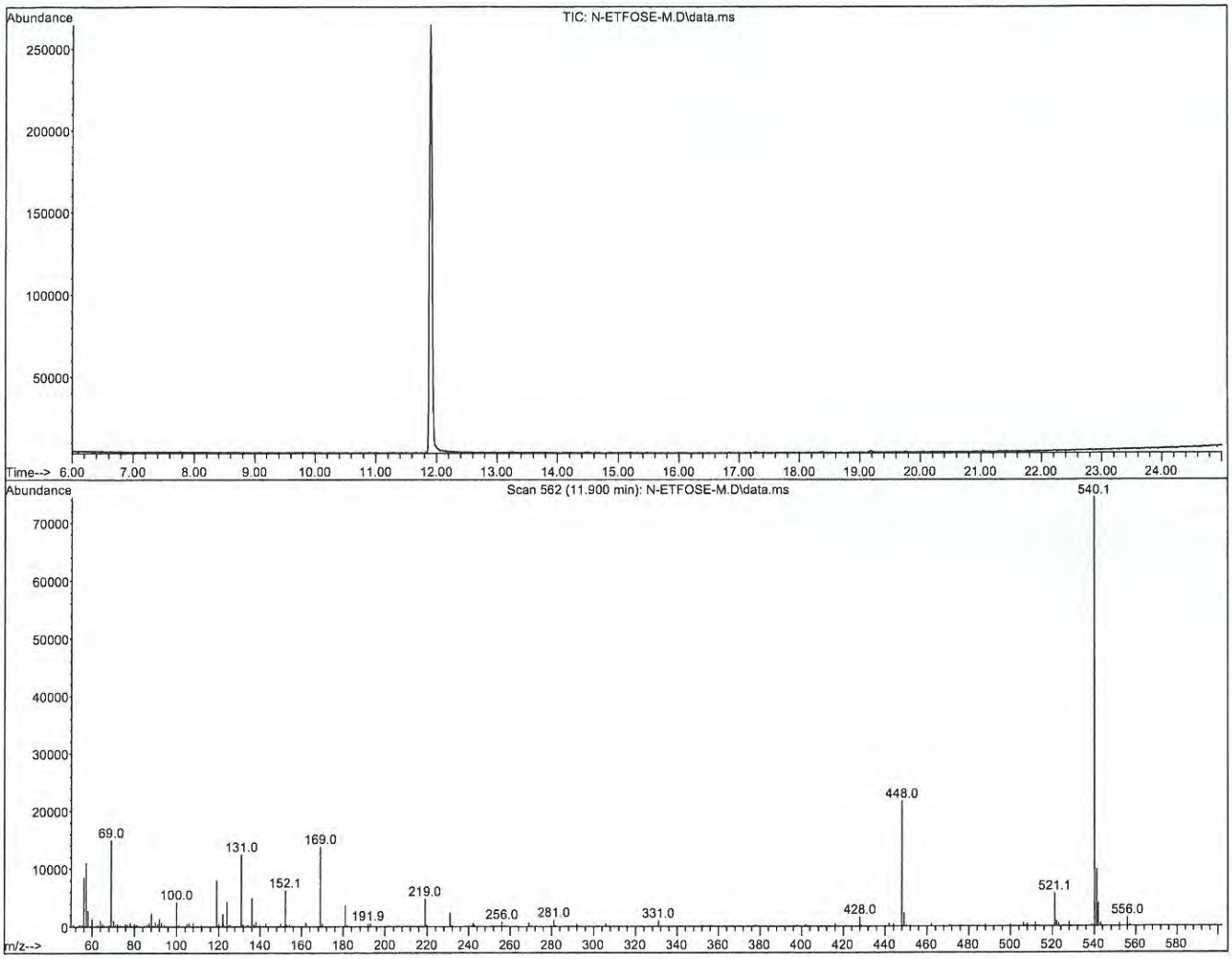
18C2740

Figure 1: **N-EtFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)**



HRGC/LRMS:

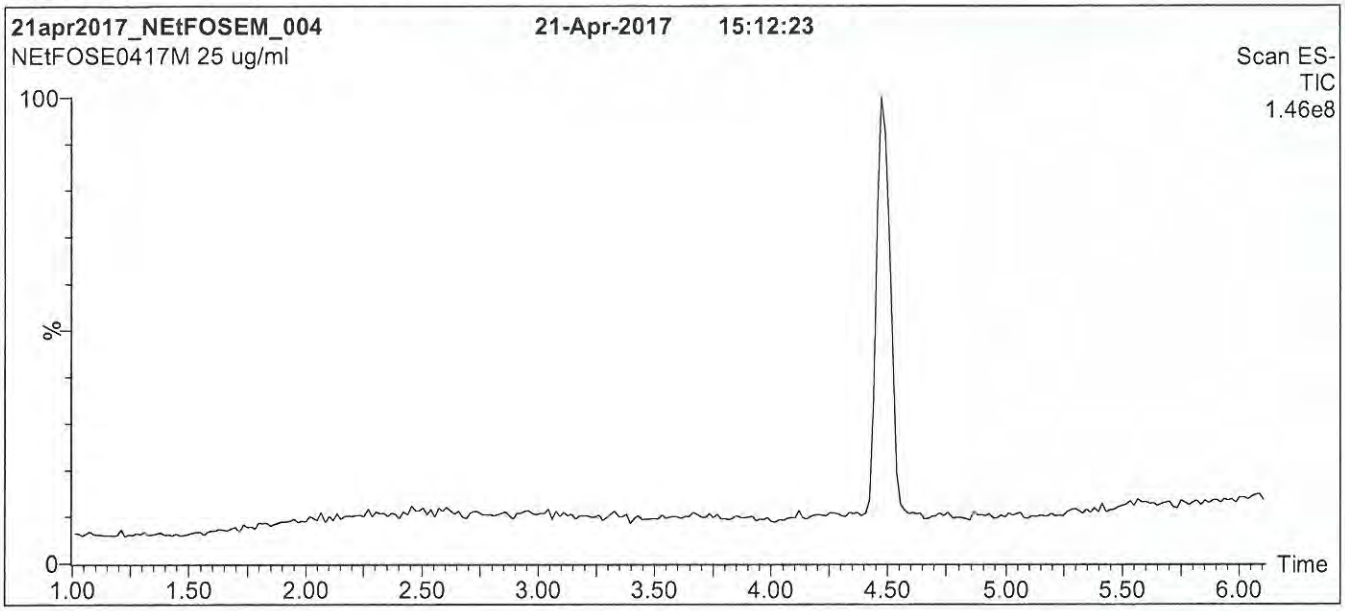
Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

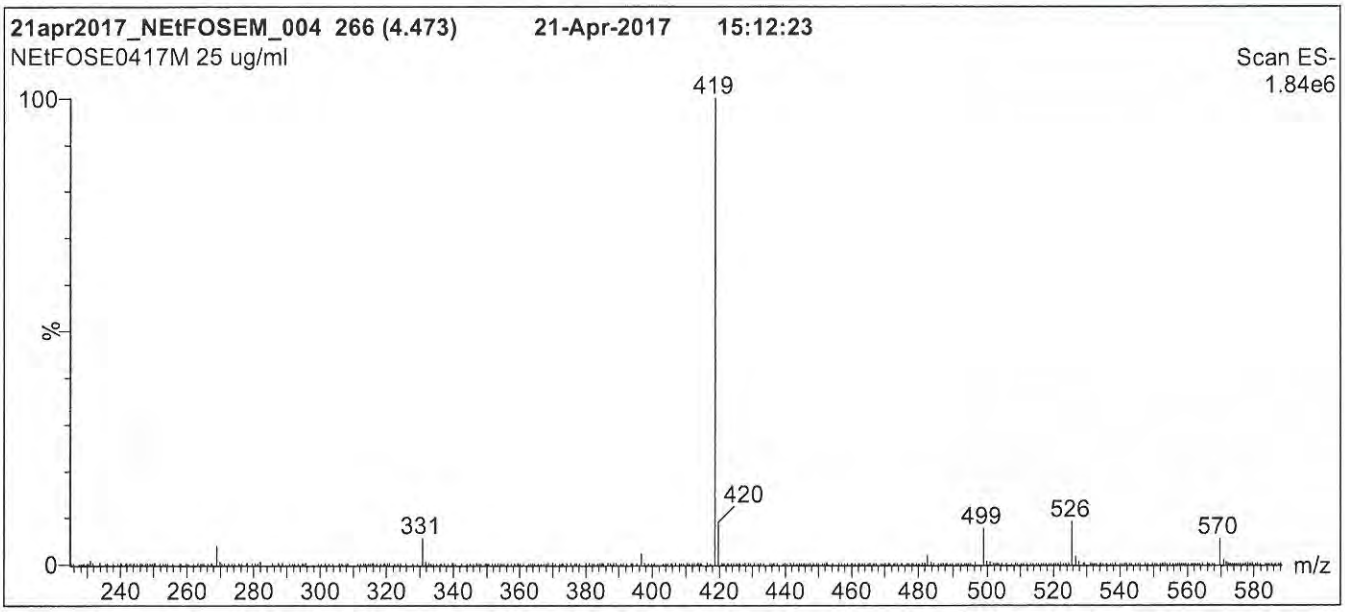
Chromatographic Conditions:

Column:	30 m DB-5 (0.25 mm id, 0.25 µm film thickness) Agilent J&W
Injector:	250 °C (Splitless Injection)
Oven:	100 °C (5 min) 10 °C/min to 325 °C 325 °C (20 min)
Ionization:	EI+
Detector:	250 °C Full Scan (50-1000 amu)

18C2746

Figure 2: **N-EtFOSE-M; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% MeOH / 40% H_2O
Ramp to 90% organic over 7 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

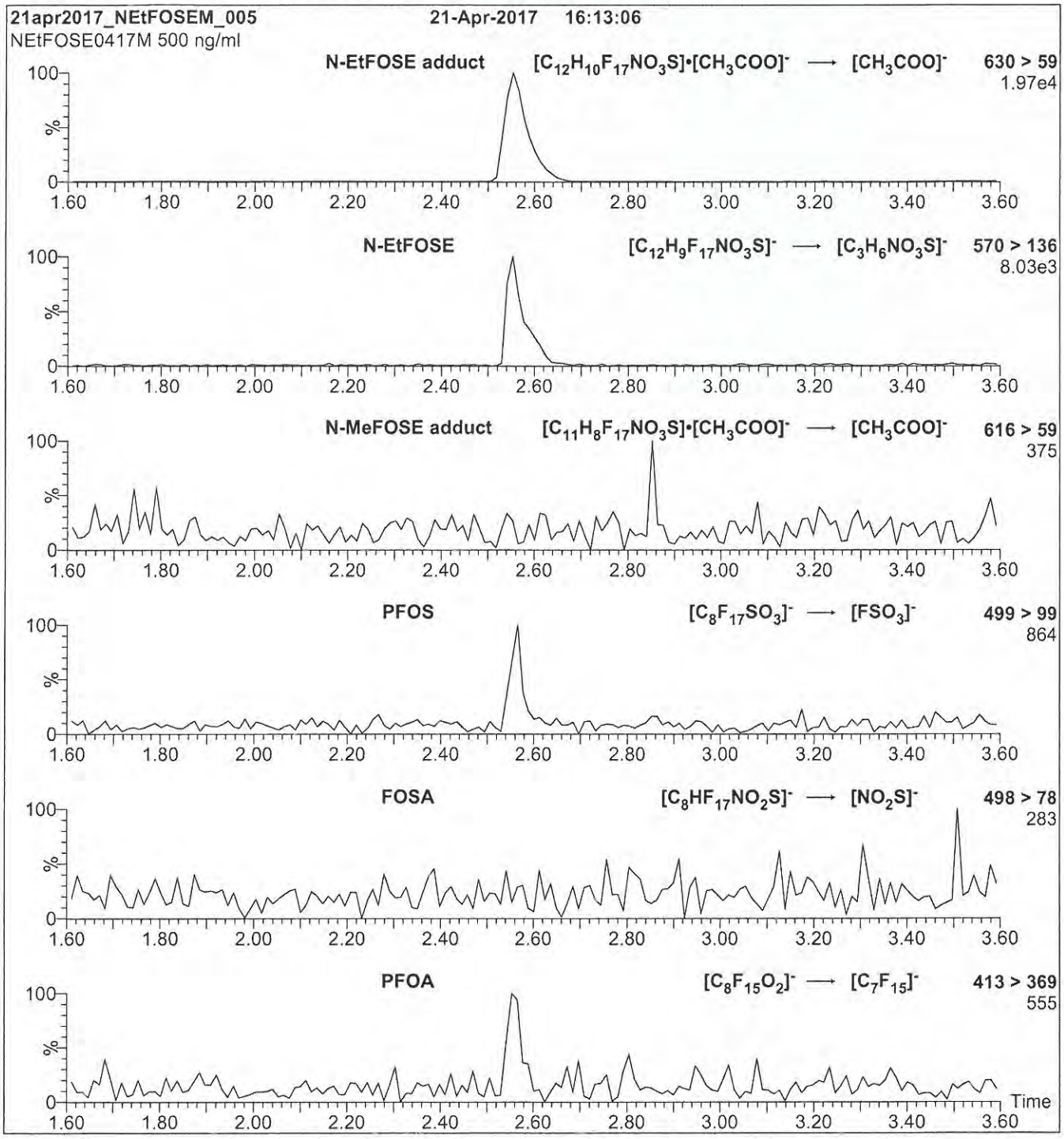
Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

Figure 3: **N-EtFOSE-M; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 3:

Injection: Direct loop injection
10 µl (500 ng/ml N-EtFOSE-M)

Mobile phase: Isocratic 80% MeOH / 20% H_2O

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 33

18D1306

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

br-NMeFOSAA

N-Methylperfluorooctanesulfonamidoacetic Acid Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-NMeFOSAA
LOT NUMBER:	brNMeFOSAA0118
CONCENTRATION:	50.0 ± 2.5 µg/ml
SOLVENT(S):	Methanol/Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	01/10/2018
LAST TESTED: (mm/dd/yyyy)	01/17/2018
EXPIRY DATE: (mm/dd/yyyy)	01/17/2023
RECOMMENDED STORAGE:	Refrigerate ampoule

DESCRIPTION:

The chemical purity has been determined to be ≥98% N-methylperfluorooctanesulfonamidoacetic acid (linear and branched isomers). The full name, structure and percent composition for each of the identified isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the acetic acid moiety to its respective methyl ester.

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519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801306

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HANDLING:

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CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

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1801306

Table A: **br-NMeFOSAA; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-methylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(CH_3)CH_2CO_2H$	76.0
2	N-methylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(CH_3)CH_2CO_2H$	0.7
3	N-methylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(CH_3)CH_2CO_2H$	2.0
4	N-methylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	6.0
5	N-methylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(CH_3)CH_2CO_2H$	14.0
6	N-methylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(CH_3)CH_2CO_2H$	0.2
7	Other Unidentified Isomers		1.1

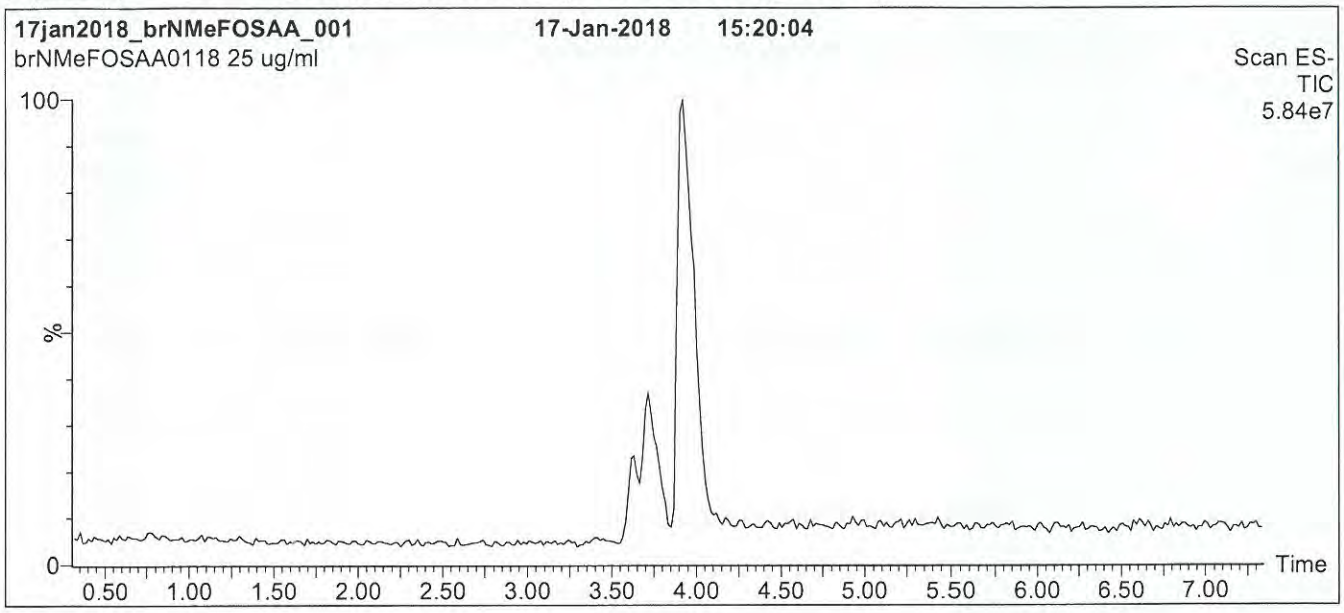
* Percent of total N-methylperfluorooctanesulfonamidoacetic acid isomers only.

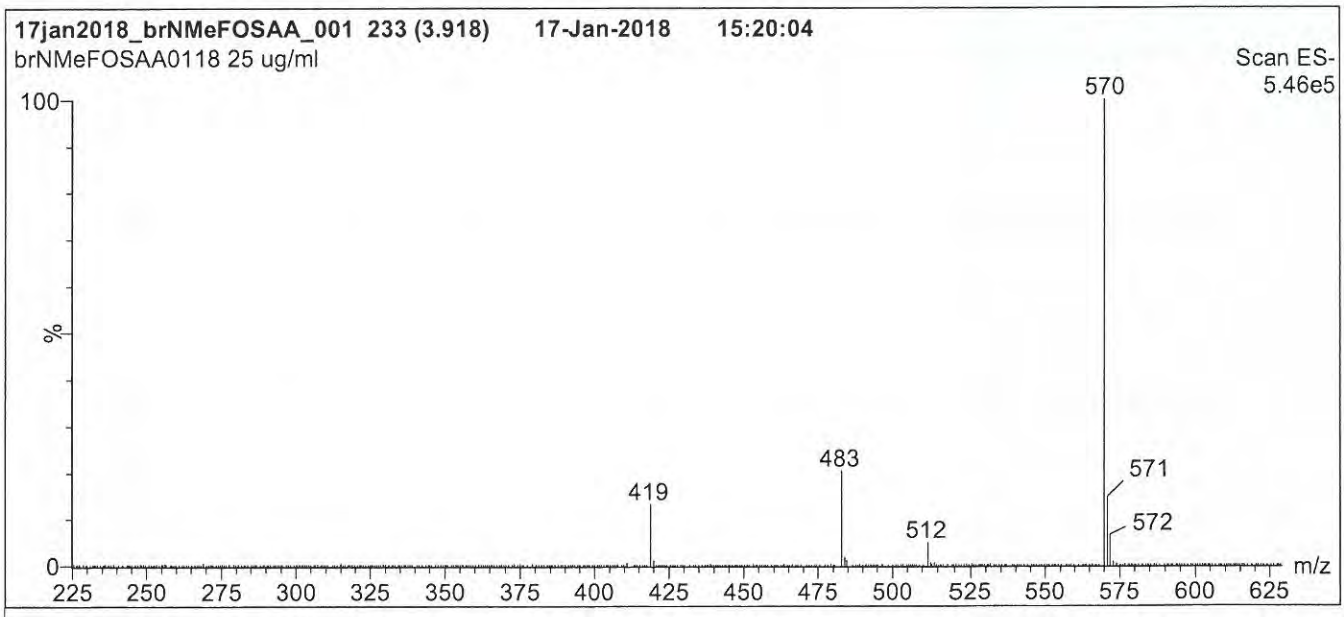
Certified By: _____ **Date:** 03/22/2018 (mm/dd/yyyy)

B.G. Chittim, General Manager

1801306

Figure 1: **br-NMeFOSAA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

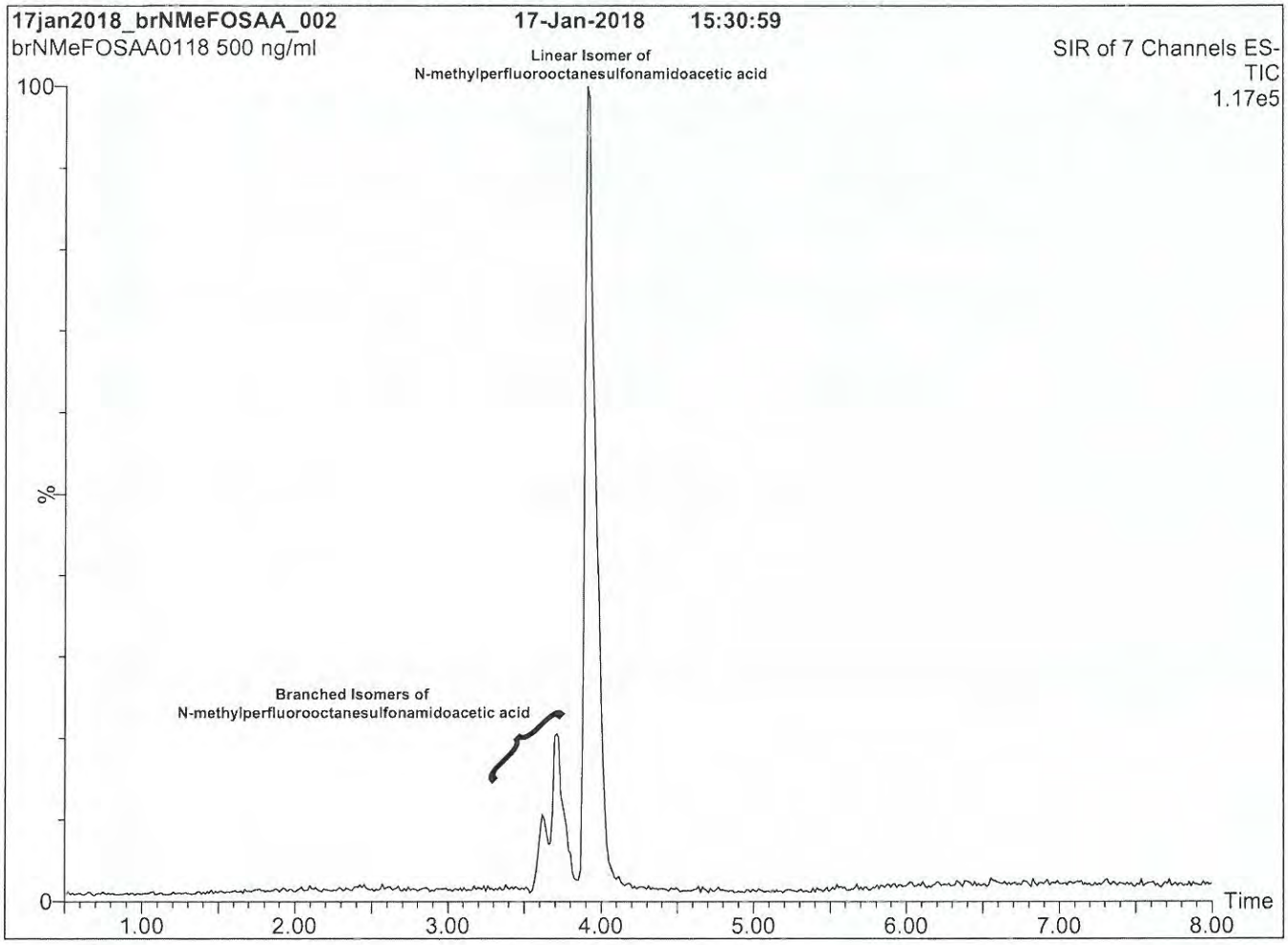
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1801306

Figure 2: **br-NMeFOSAA; LC/MS Data (SIR)**



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Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

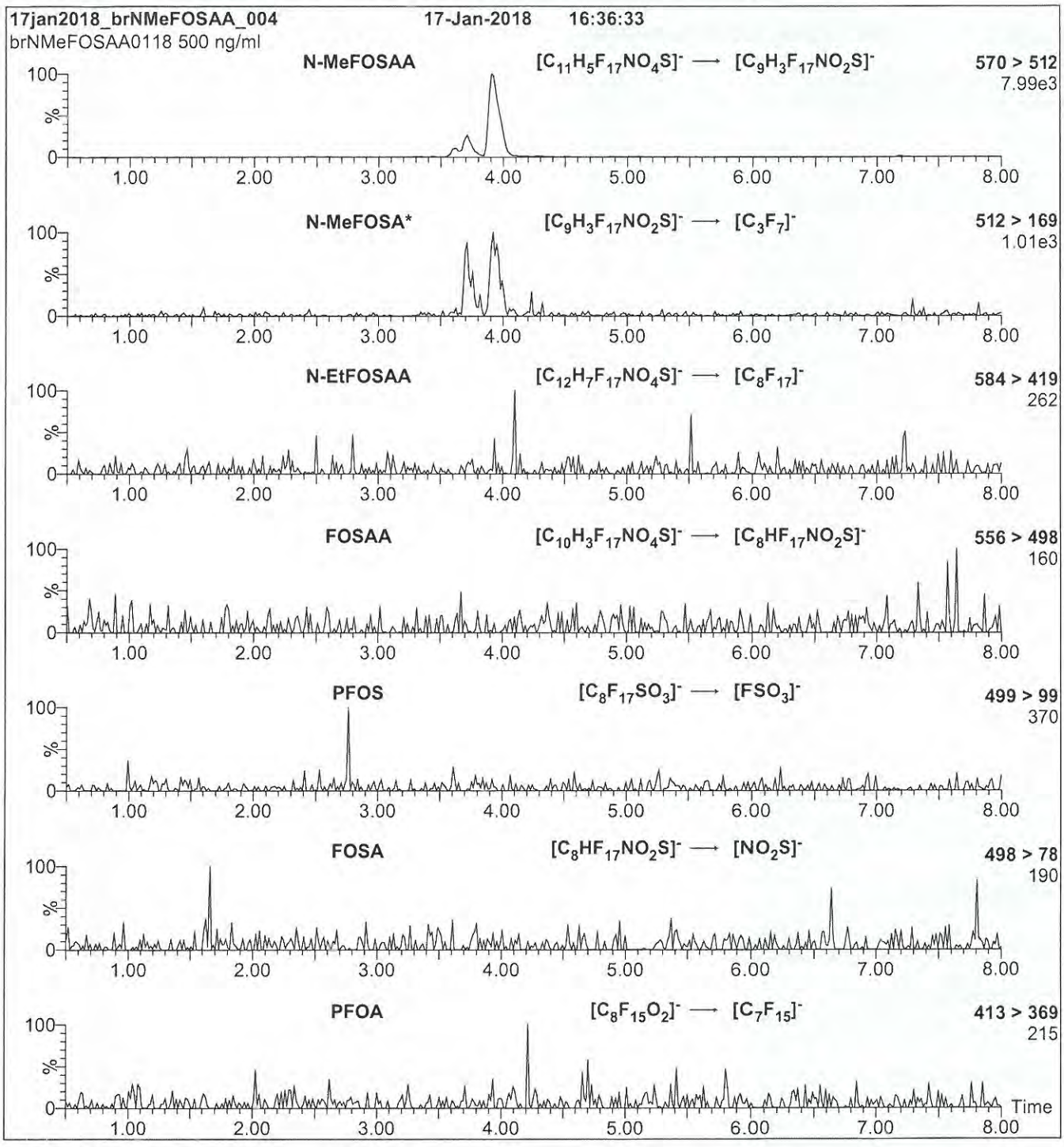
MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18D1306

Figure 3: **br-NMeFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



***Note**: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

18D1307

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS
DOCUMENTATION

br-NEtFOSAA

N-Ethylperfluorooctanesulfonamidoacetic Acid Solution/Mixture of Linear and Branched Isomers

PRODUCT CODE:	br-NEtFOSAA
LOT NUMBER:	brNEtFOSAA0118
CONCENTRATION:	50.0 ± 2.5 µg/ml
SOLVENT(S):	Methanol/Water (<1%)
DATE PREPARED: (mm/dd/yyyy)	01/10/2018
LAST TESTED: (mm/dd/yyyy)	01/17/2018
EXPIRY DATE: (mm/dd/yyyy)	01/17/2023
RECOMMENDED STORAGE:	Refrigerate ampoule

DESCRIPTION:

The chemical purity has been determined to be ≥98% N-ethylperfluorooctanesulfonamidoacetic acid (linear and branched isomers). The full name, structure and percent composition for each of the identified isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ^{19}F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the acetic acid moiety to its respective methyl ester.

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Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1801307

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compounds it contains.

HANDLING:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Our products are synthesized using single-product unambiguous routes whenever possible. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS, and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products, as well as mixtures and calibration solutions, are compared to older lots in a similar manner. This further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly calibrated by an external ISO/IEC 17025 accredited laboratory. In addition, their calibration is verified prior to each weighing using calibrated external weights traceable to an ISO/IEC 17025 accredited laboratory. All volumetric glassware used is calibrated, of Class A tolerance, and traceable to an ISO/IEC 17025 accredited laboratory. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO 17034 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

ANAB ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18D1307

Table A: **br-NEtFOSAA; Isomeric Components and Percent Composition (by ^{19}F-NMR)***

Isomer	Name	Structure	Percent Composition by ^{19}F-NMR
1	N-ethylperfluoro-1-octanesulfonamidoacetic acid	$CF_3(CF_2)_7SO_2N(C_2H_5)CH_2CO_2H$	77.5
2	N-ethylperfluoro-3-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_3CF(CF_3)(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	2.3
3	N-ethylperfluoro-4-methylheptanesulfonamidoacetic acid	$CF_3(CF_2)_2CF(CF_3)(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	2.2
4	N-ethylperfluoro-5-methylheptanesulfonamidoacetic acid	$CF_3CF_2CF(CF_3)(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	5.4
5	N-ethylperfluoro-6-methylheptanesulfonamidoacetic acid	$CF_3CF(CF_3)(CF_2)_5SO_2N(C_2H_5)CH_2CO_2H$	10.4
6	N-ethylperfluoro-5,5-dimethylhexanesulfonamidoacetic acid	$CF_3C(CF_3)_2(CF_2)_4SO_2N(C_2H_5)CH_2CO_2H$	0.3
7	N-ethylperfluoro-4,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF(CF_2)_3SO_2N(C_2H_5)CH_2CO_2H$	0.3
8	N-ethylperfluoro-3,5-dimethylhexanesulfonamidoacetic acid	$CF_3CF(CF_3)CF_2CF(CF_2)_2SO_2N(C_2H_5)CH_2CO_2H$	0.3
9	Other Unidentified Isomers		1.3

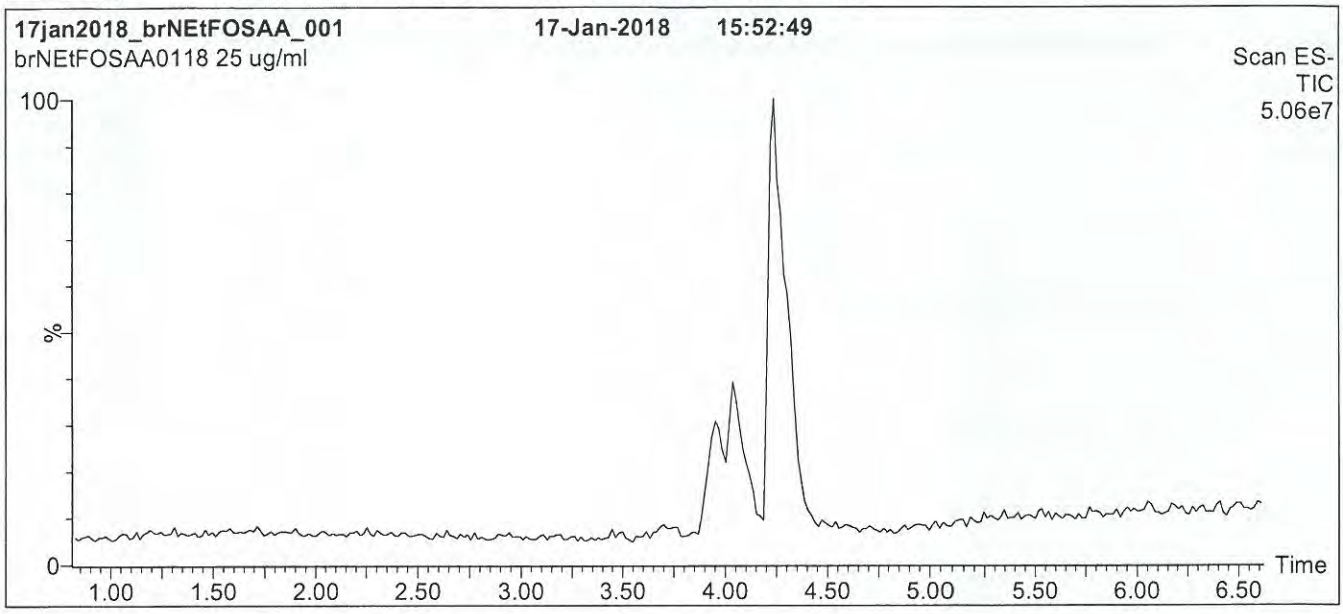
* Percent of total N-ethylperfluorooctanesulfonamidoacetic acid isomers only.

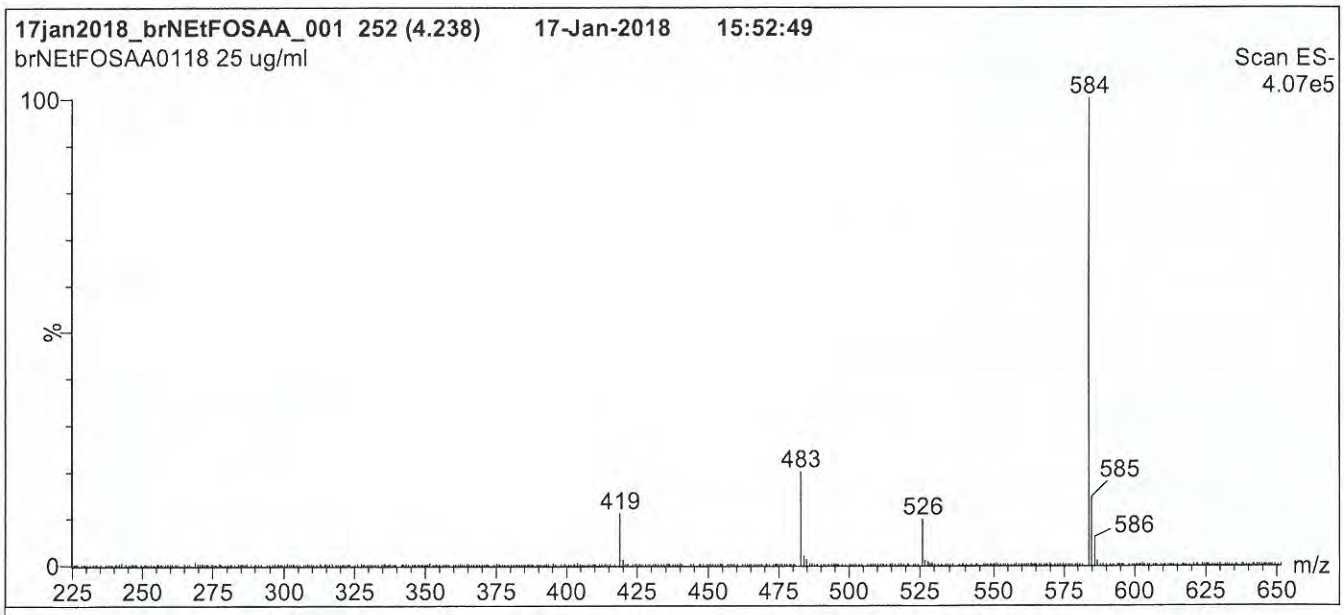
Certified By: _____ **Date:** 03/22/2018
(mm/dd/yyyy)

B.G. Chittim, General Manager

1801307

Figure 1: **br-NEtFOSAA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

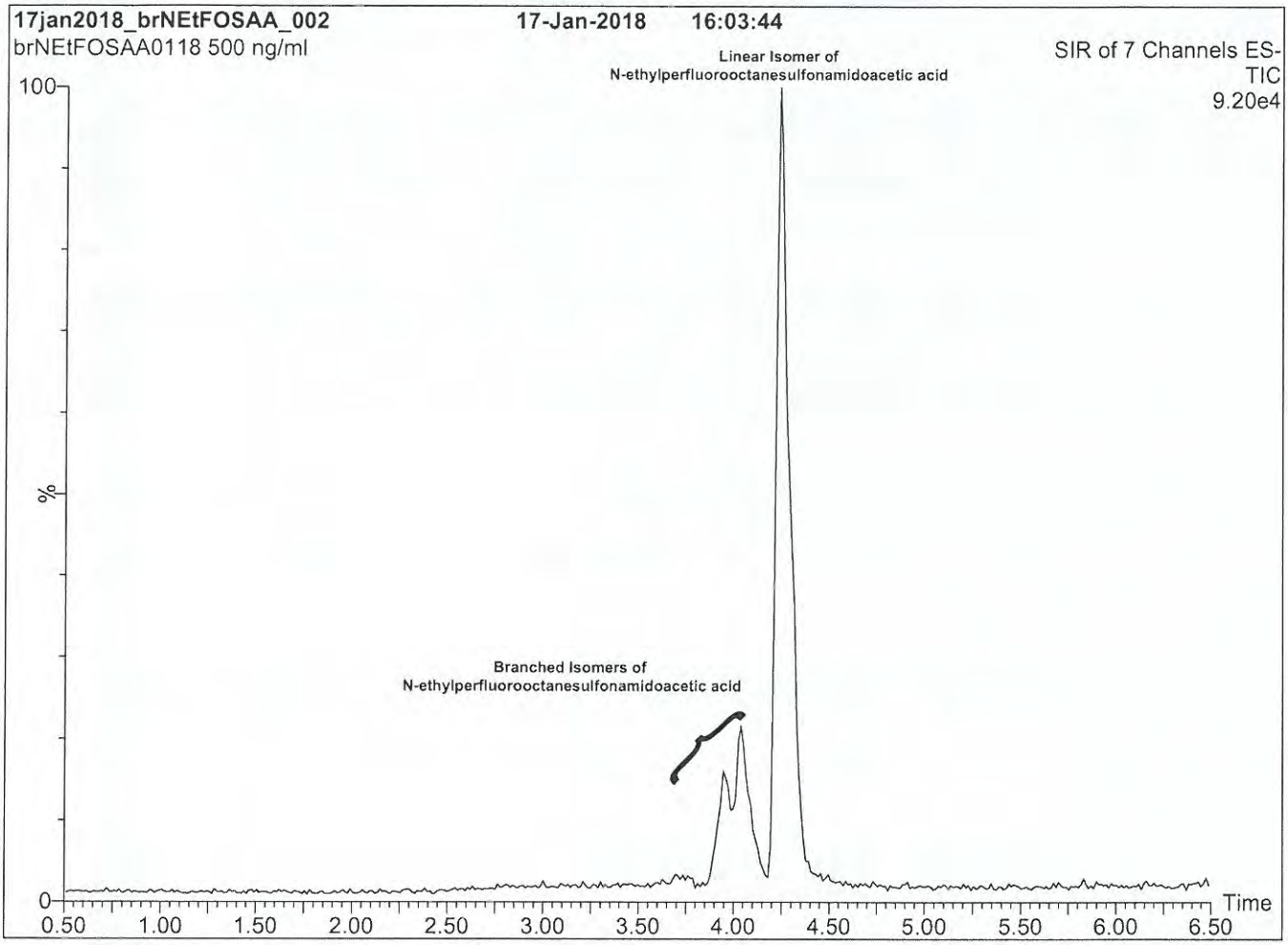
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 35.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1801307

Figure 2: **br-NEtFOSAA; LC/MS Data (SIR)**



Conditions for Figure 2:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 µl/min

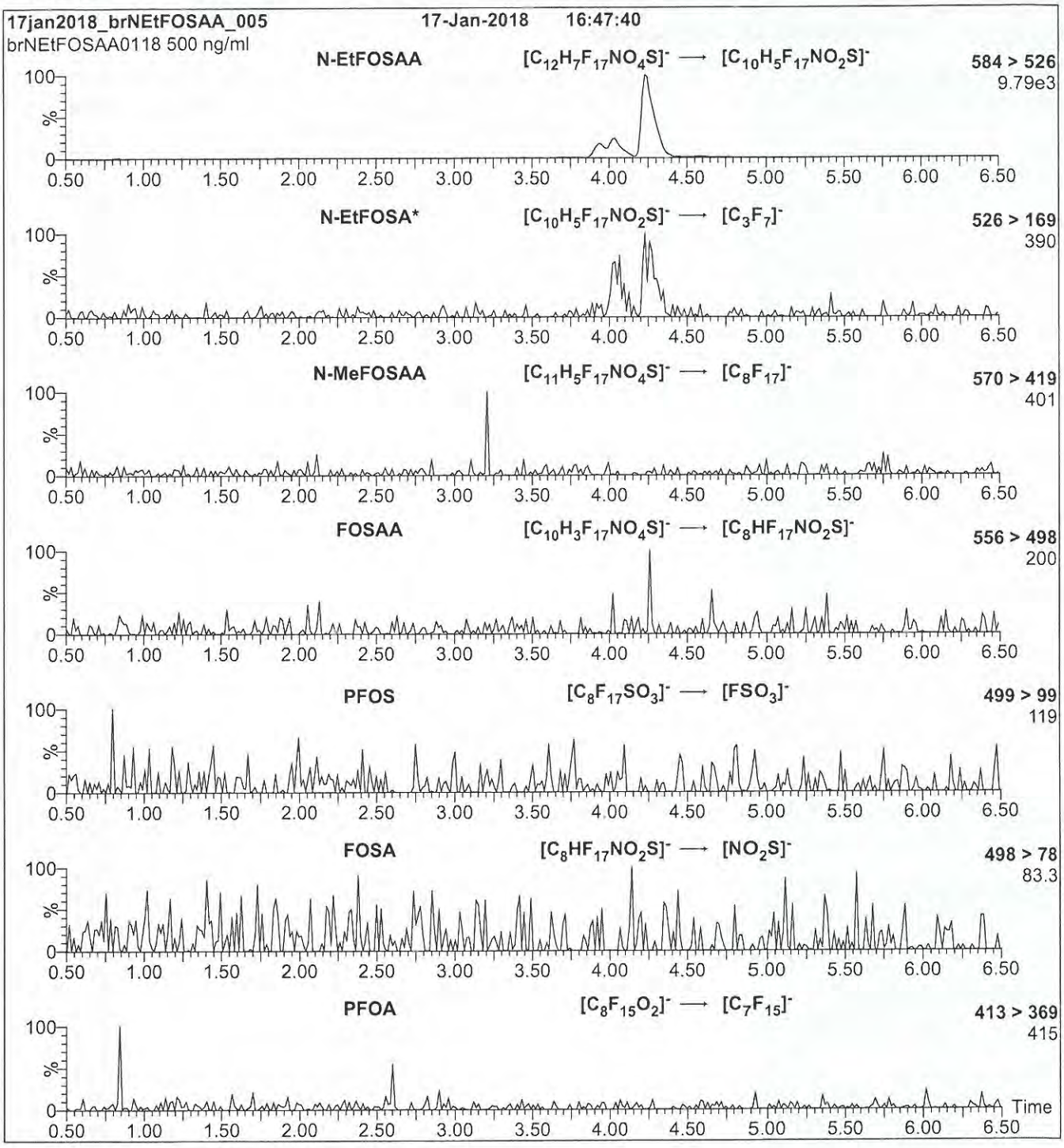
MS Parameters

Experiment: SIR (7 channels)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15-60
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

1801307

Figure 3: **br-NEtFOSAA; LC/MS/MS Data (Selected MRM Transitions)**



***Note**: N-EtFOSA is formed by in-source fragmentation.

Conditions for Figure 3:

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 11-40 (variable)

Analytical Standard Record

Vista Analytical Laboratory

18D2005

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18B1530	13C2-FOUEA	15-Feb-18	** Vendor **	14-Nov-19	1
18B1531	13C3-PFHxS	15-Feb-18	** Vendor **	05-Jul-22	1.06
18B1532	13C4-PFOS	15-Feb-18	** Vendor **	17-Oct-22	1.05
18B1533	13C7-PFUdA	15-Feb-18	** Vendor **	13-Jul-22	1
18B1534	13C5-PFHxA	15-Feb-18	** Vendor **	17-Oct-22	1
18B1535	13C6-PFDA	15-Feb-18	** Vendor **	17-Oct-22	1
18B1536	13C8-PFOA	15-Feb-18	** Vendor **	05-Jul-22	1.02
18B1537	13C4-PFBA	15-Feb-18	** Vendor **	12-Apr-22	1
18B1538	13C9-PFNA	15-Feb-18	** Vendor **	23-May-22	1

Description:	PFC-RS	Expires:	20-Apr-20
Standard Type:	Reagent	Prepared:	20-Apr-18
Solvent:	MeOH	Prepared By:	Giana R. Bilotta
Final Volume (mls):	40	Department:	LCMS
Vials:	1	Last Edit:	20-Apr-18 10:41 by GRB

Analyte	CAS Number	Concentration	Units
13C9-PFNA		1.25	ug/mL
13C8-PFOA		1.25	ug/mL
13C7-PFUnA		1.25	ug/mL
13C6-PFDA		1.25	ug/mL
13C5-PFHxA		1.25	ug/mL
13C4-PFOS		1.25	ug/mL
13C4-PFBA		1.25	ug/mL
13C3-PFHxS		1.25	ug/mL
13C2-FOUEA		1.25	ug/mL

1881530

WELLINGTON LABORATORIES

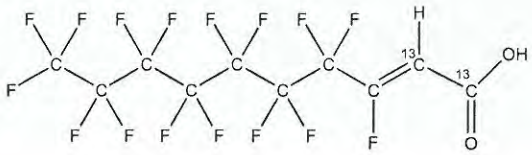
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MFOUEA
COMPOUND: 2H-Perfluoro-[1,2-$^{13}C_2$]-2-decenoic acid

LOT NUMBER: MFOUEA1117

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_2{}^{12}C_8H_2F_{16}O_2$	**MOLECULAR WEIGHT:**	460.08
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Anhydrous Isopropanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2\text{-}^{13}C_2$)
LAST TESTED: (mm/dd/yyyy)	11/14/2017		
EXPIRY DATE: (mm/dd/yyyy)	11/14/2019		
RECOMMENDED STORAGE:	Refrigerate ampoule		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Dilution of this standard in methanol may lead to the formation of 2H-3-methoxy-perfluoro-[1,2-$^{13}C_2$]-2-decenoic acid. This reaction can be catalyzed by the presence of acid or base. All dilutions should be routinely checked for degradation.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 11/15/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18B1530

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2,...x_n$ on which it depends is:

$$u_c(y(x_1, x_2, ...x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

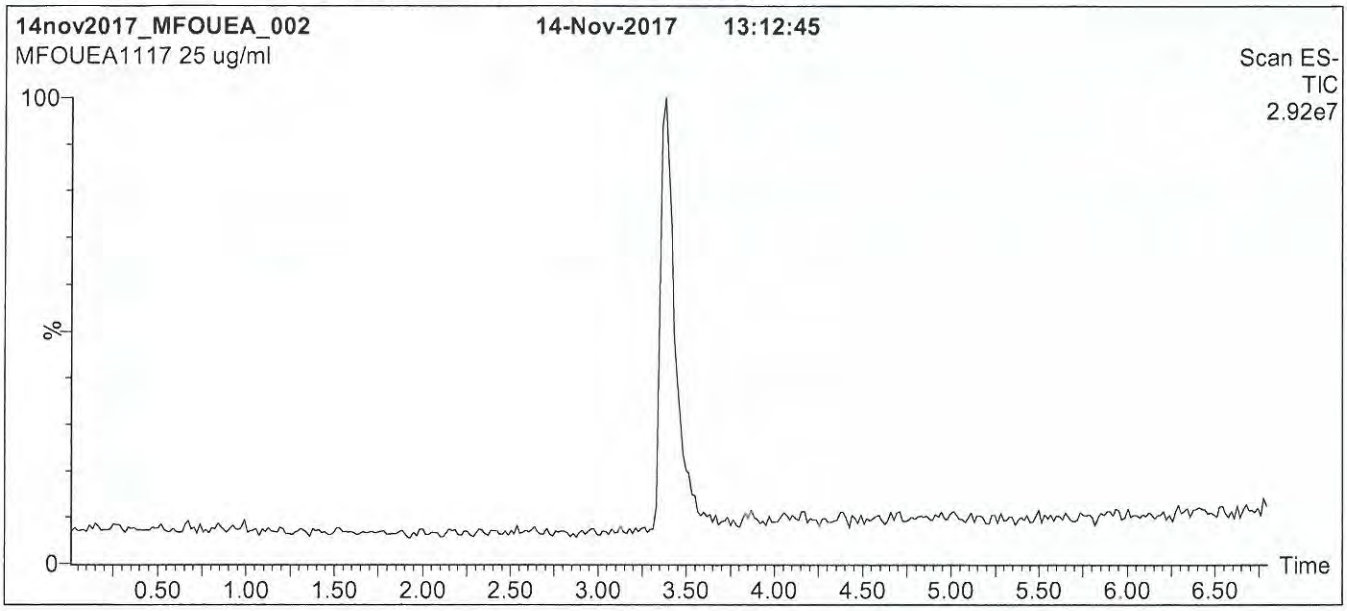
CALA

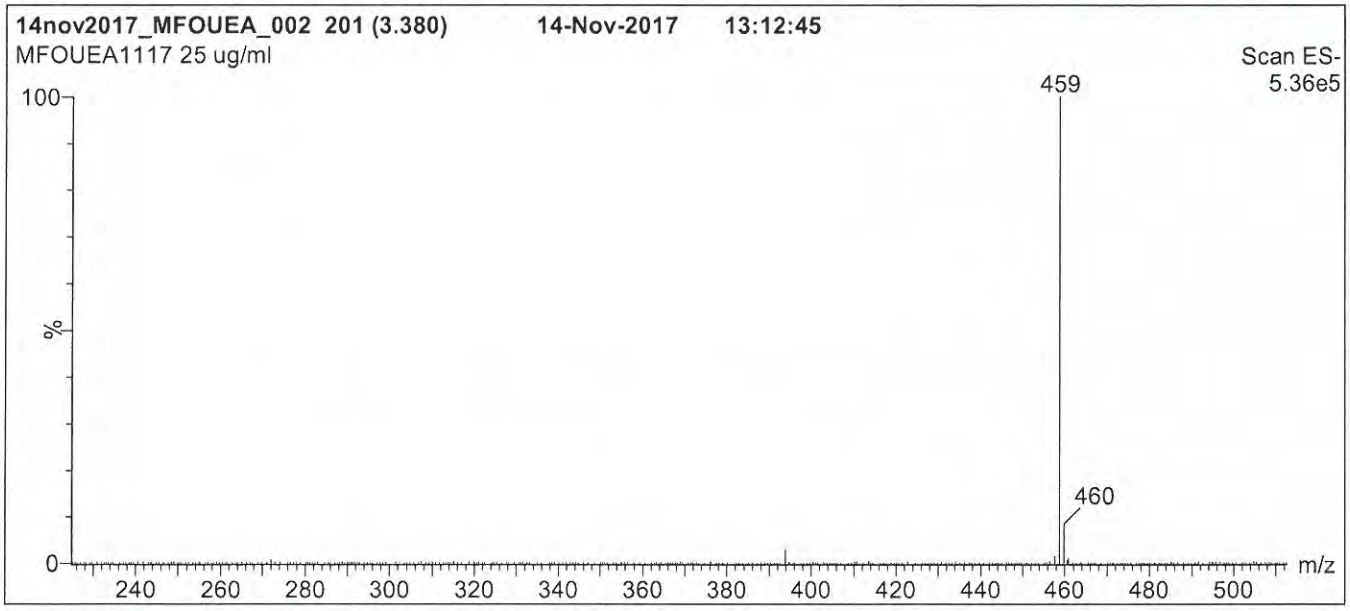
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1530

Figure 1: **MFOUEA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold
for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

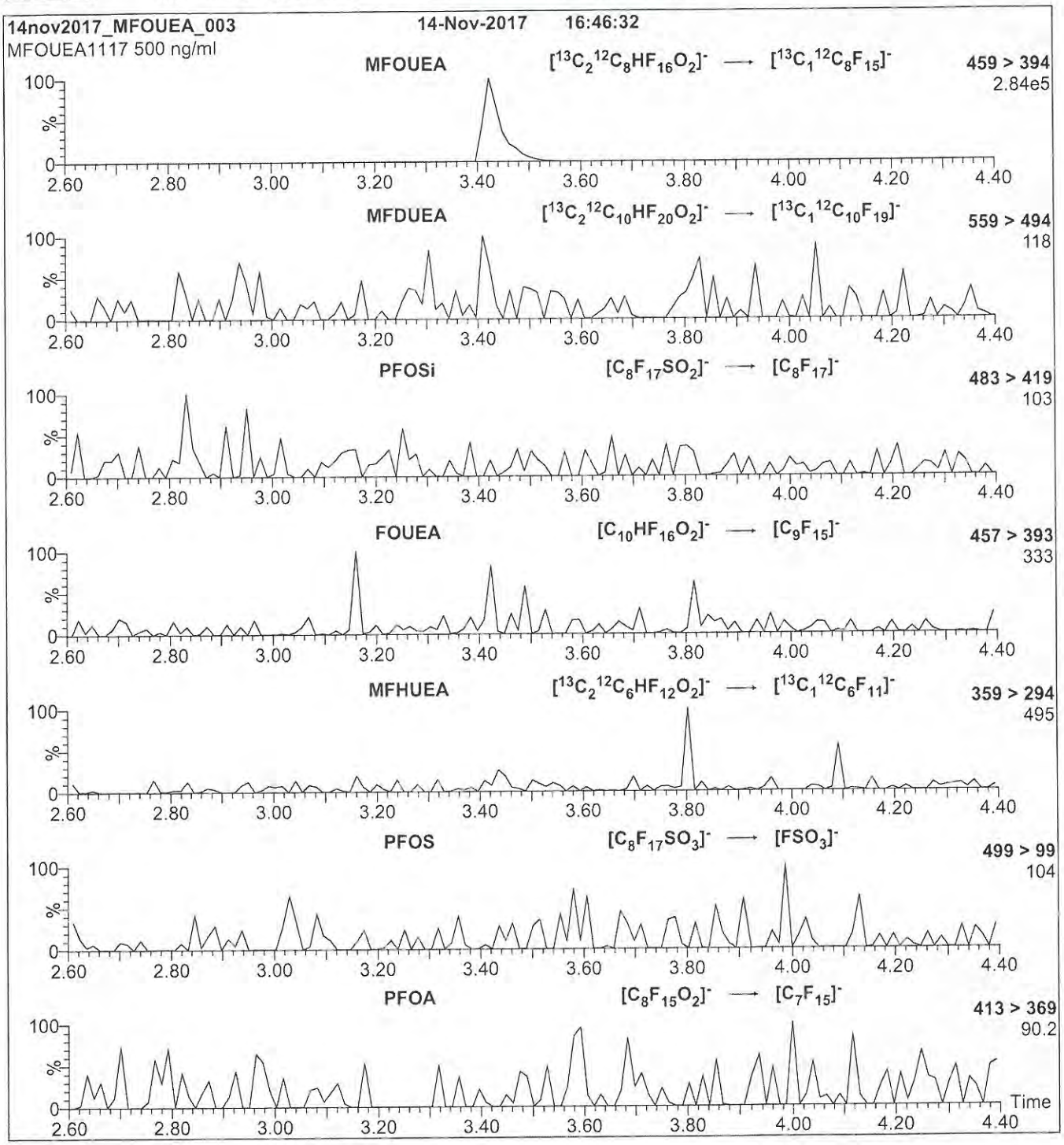
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 14.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1530

Figure 2: **MFOUEA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MFOUEA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 21

18B1531

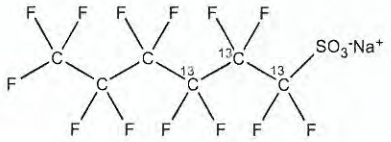
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFHxS **LOT NUMBER:** M3PFHxS0717

COMPOUND: Sodium perfluoro-1-[1,2,3-$^{13}C_3$]hexanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_3{}^{12}C_3F_{13}SO_3Na$	**MOLECULAR WEIGHT:**	425.07
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.3 ± 2.4 µg/ml (M3PFHxS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3\text{-}^{13}C_3$)
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

1881531

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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UNCERTAINTY:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

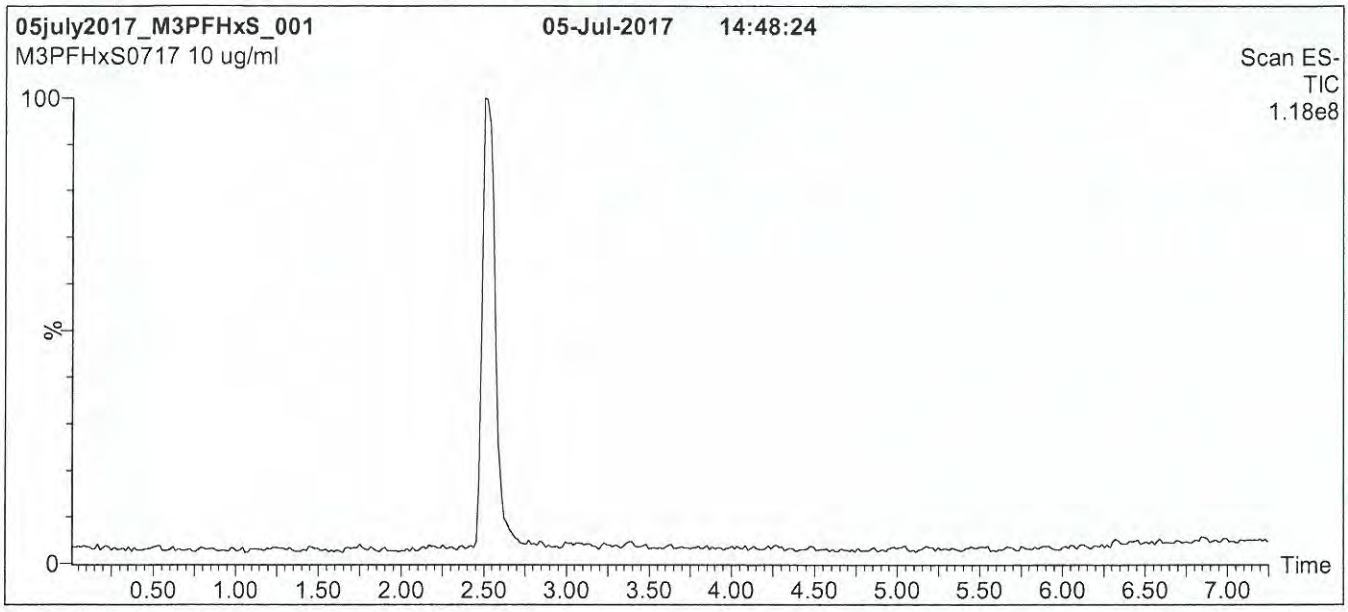
CALA

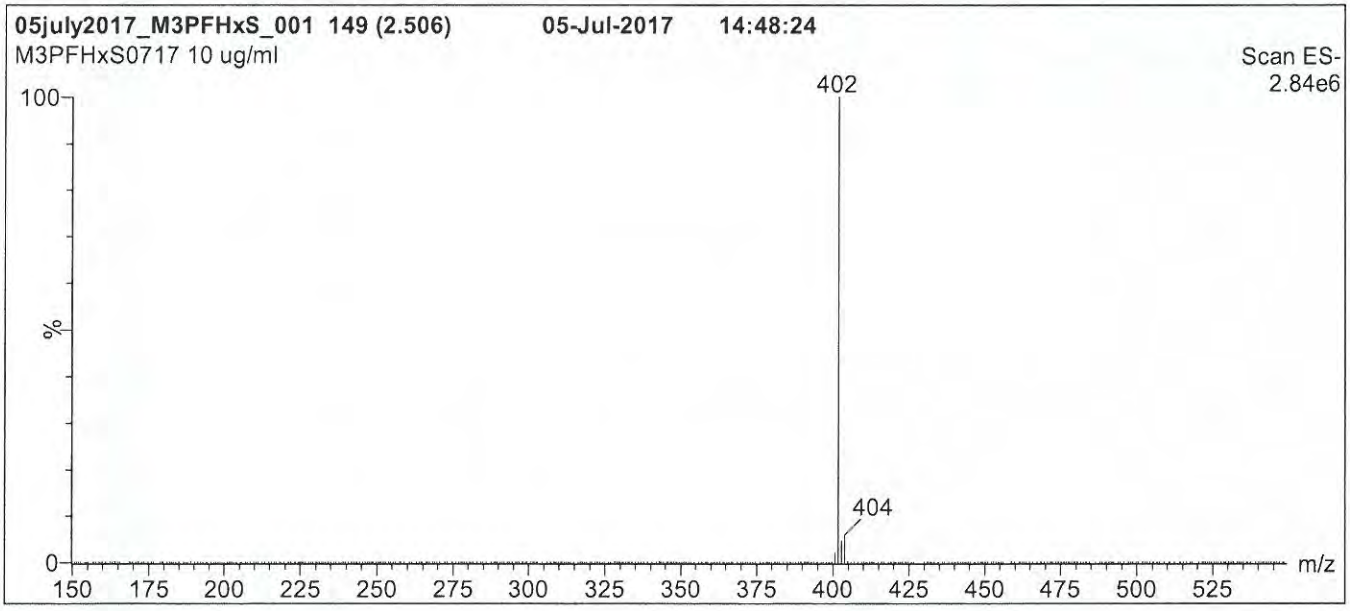
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1531

Figure 1: **M3PFHxS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

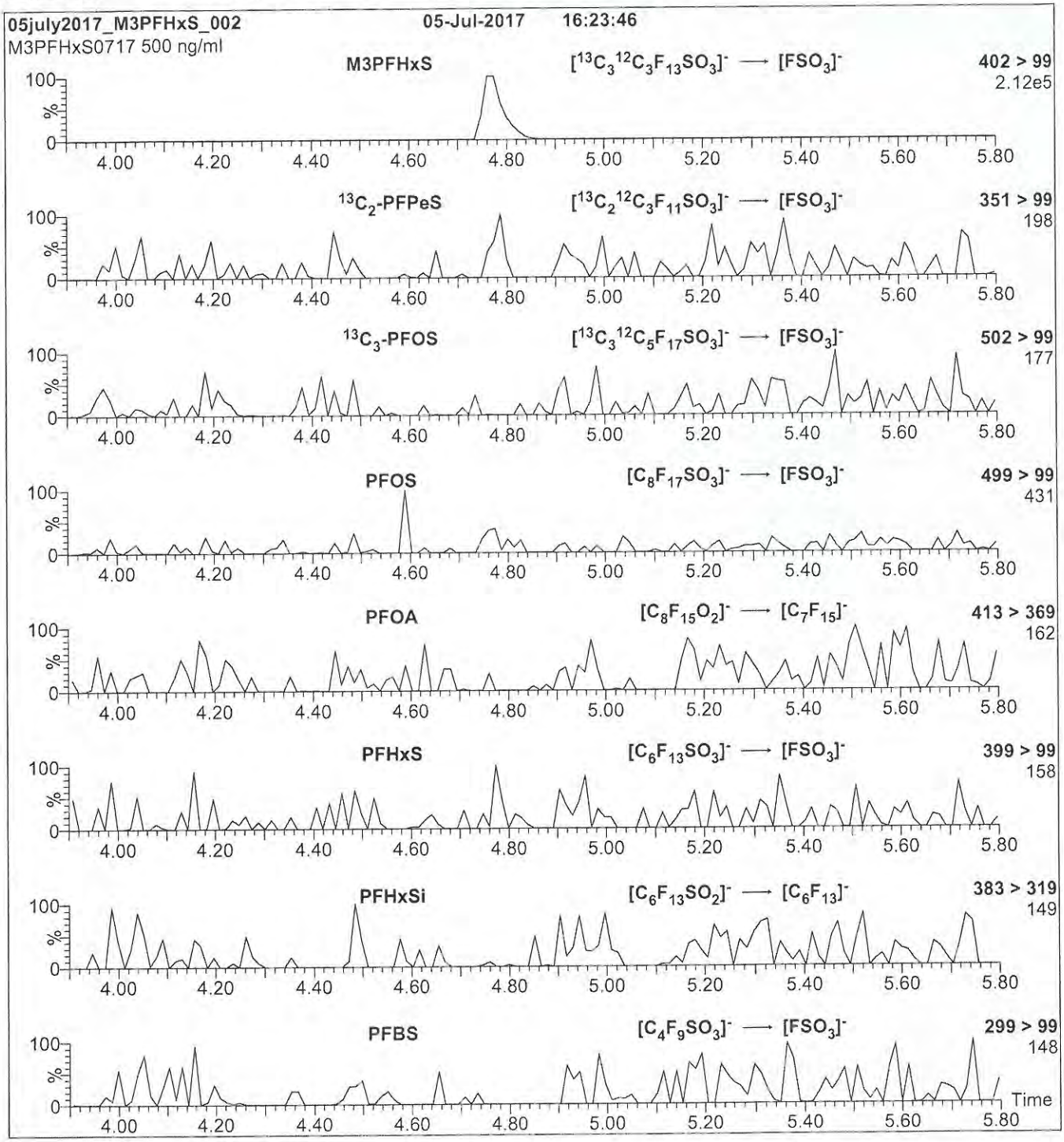
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1531

Figure 2: **M3PFHxS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M3PFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

18B1532

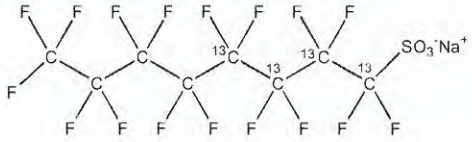
WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1017

COMPOUND: Sodium perfluoro-1-[1,2,3,4-$^{13}C_4$]octanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA:	$^{13}C_4{}^{12}C_4F_{17}SO_3Na$	**MOLECULAR WEIGHT:**	526.08
CONCENTRATION:	50.0 ± 2.5 µg/ml (Na salt) 47.8 ± 2.4 µg/ml (MPFOS anion)	**SOLVENT(S):**	Methanol
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($1,2,3,4\text{-}^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	10/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.4% Sodium perfluoro-1-[1,2,3-$^{13}C_3$]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1532

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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CALA

ANAB ACCREDITED

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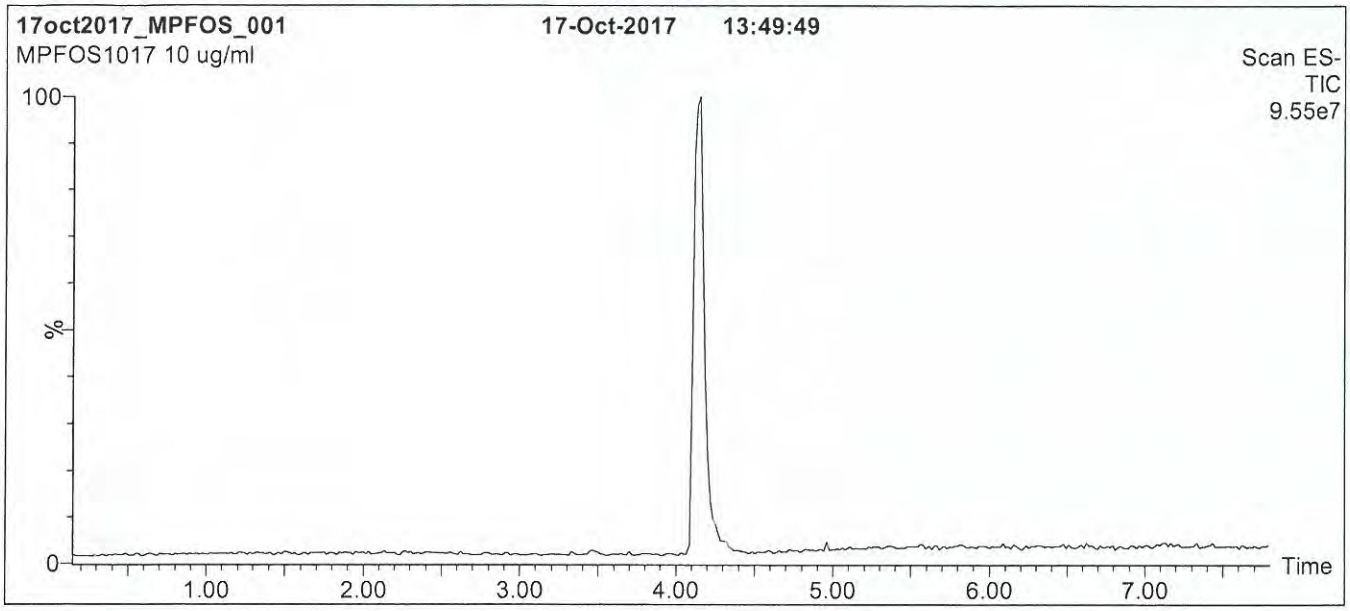
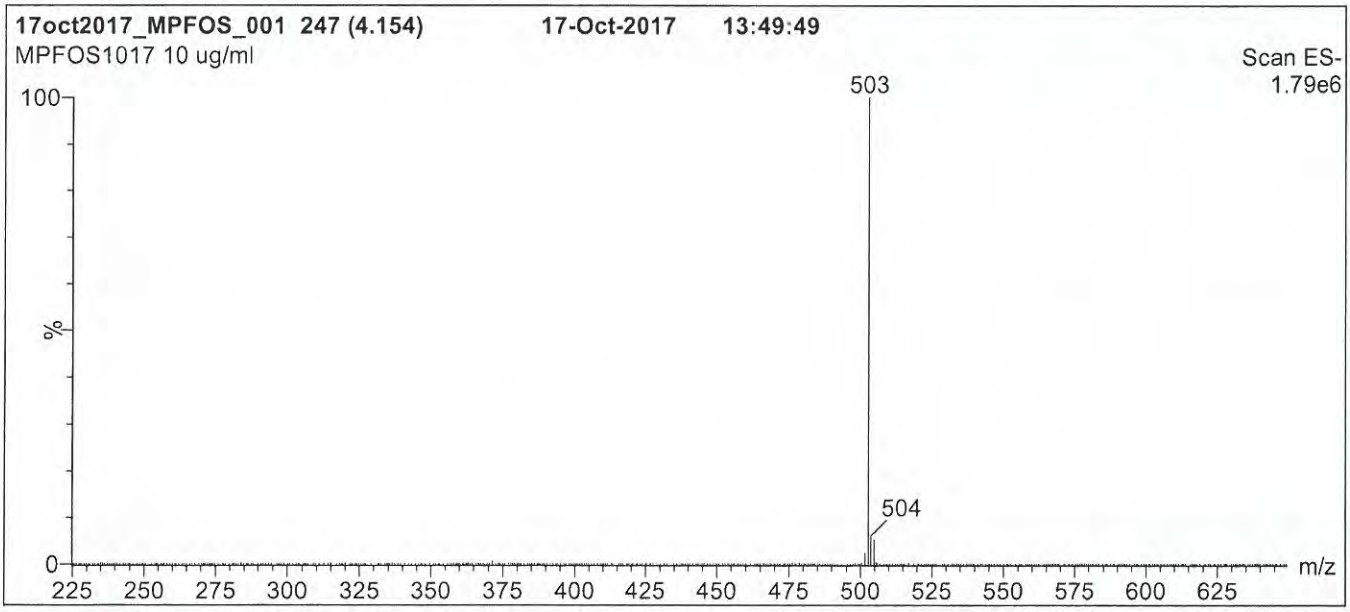
18B1532

Figure 1: **MPFOS; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

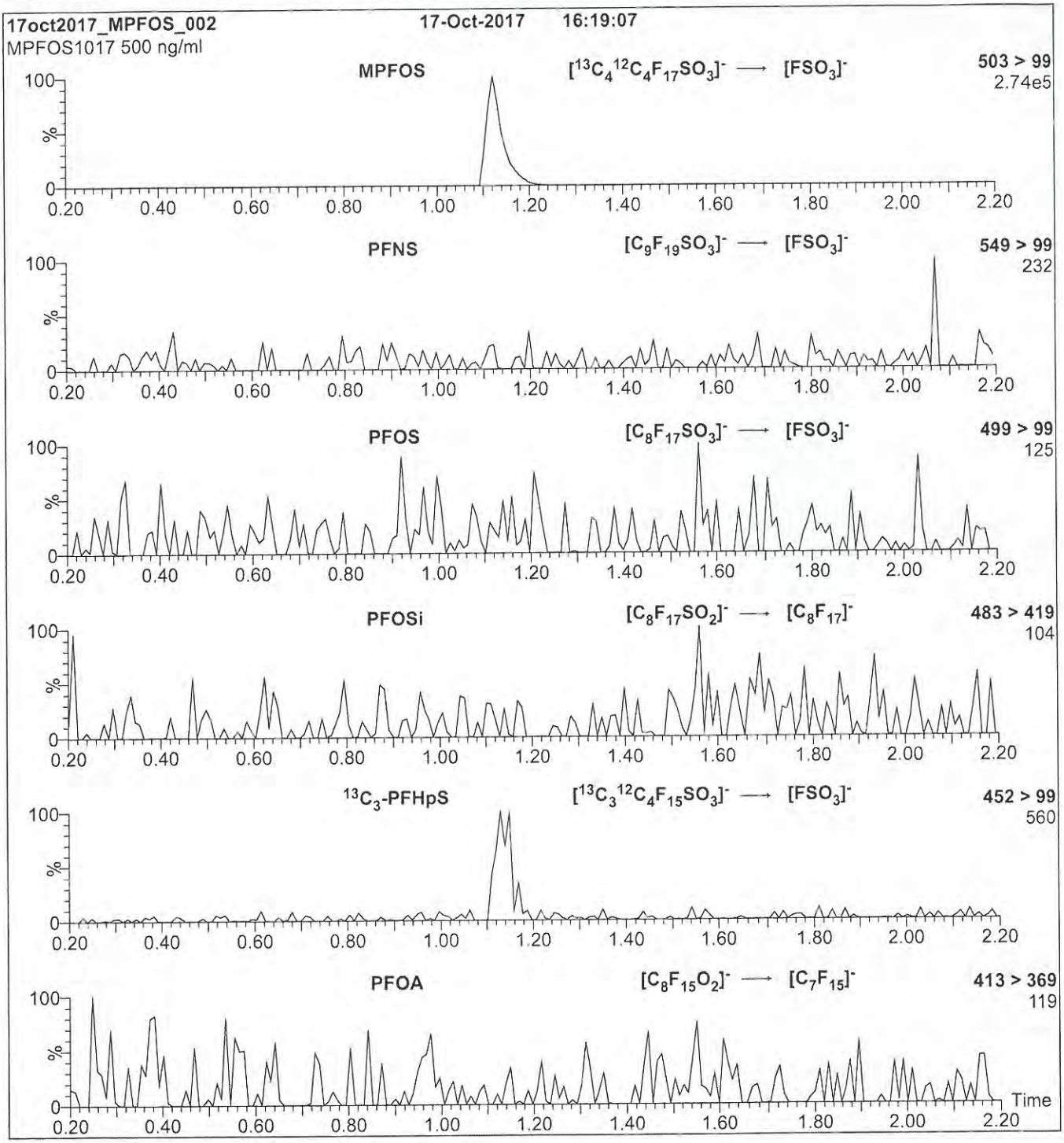
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1532

Figure 2: **MPFOS; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

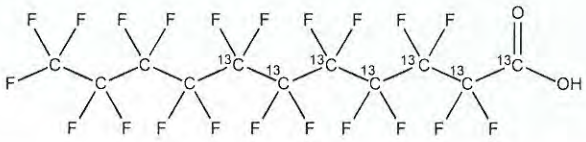
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 40

18B1533

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M7PFUdA	**LOT NUMBER:**	M7PFUdA0717
COMPOUND:	Perfluoro-n-[1,2,3,4,5,6,7-$^{13}C_7$]undecanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_7{}^{12}C_4HF_{21}O_2$	**MOLECULAR WEIGHT:**	571.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C
LAST TESTED: (mm/dd/yyyy)	07/13/2017		(1,2,3,4,5,6,7-$^{13}C_7$)
EXPIRY DATE: (mm/dd/yyyy)	07/13/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1533

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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CALA

ANAB ACCREDITED

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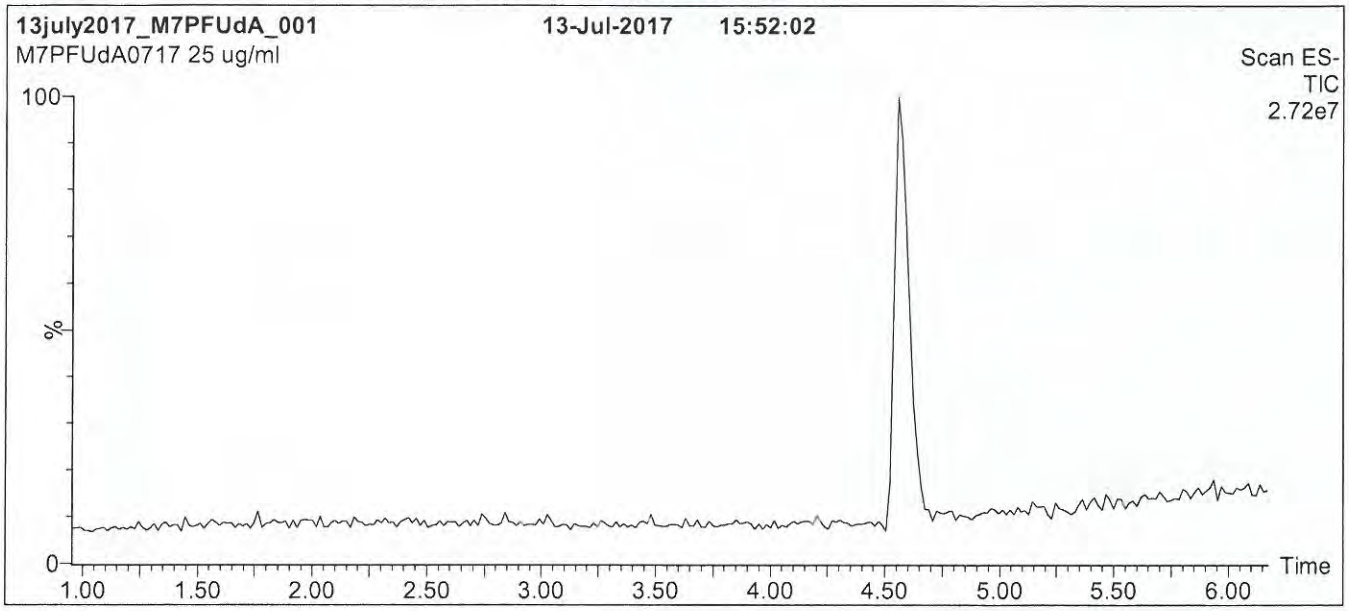
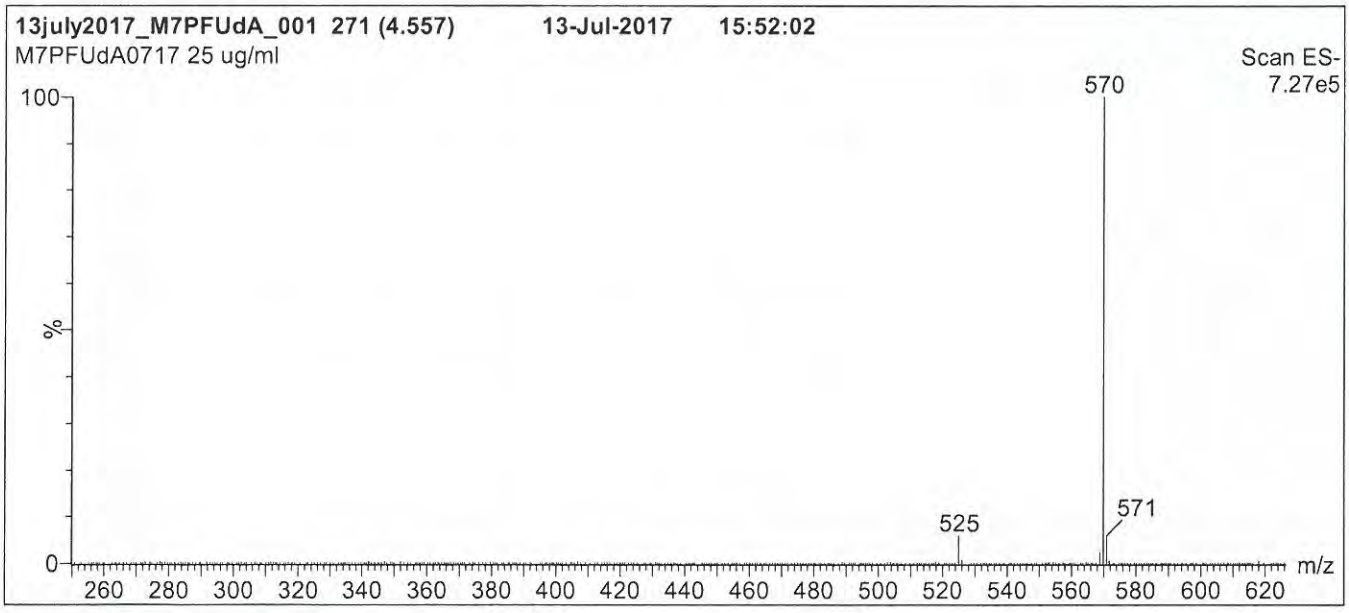
18B1533

Figure 1: **M7PFUdA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

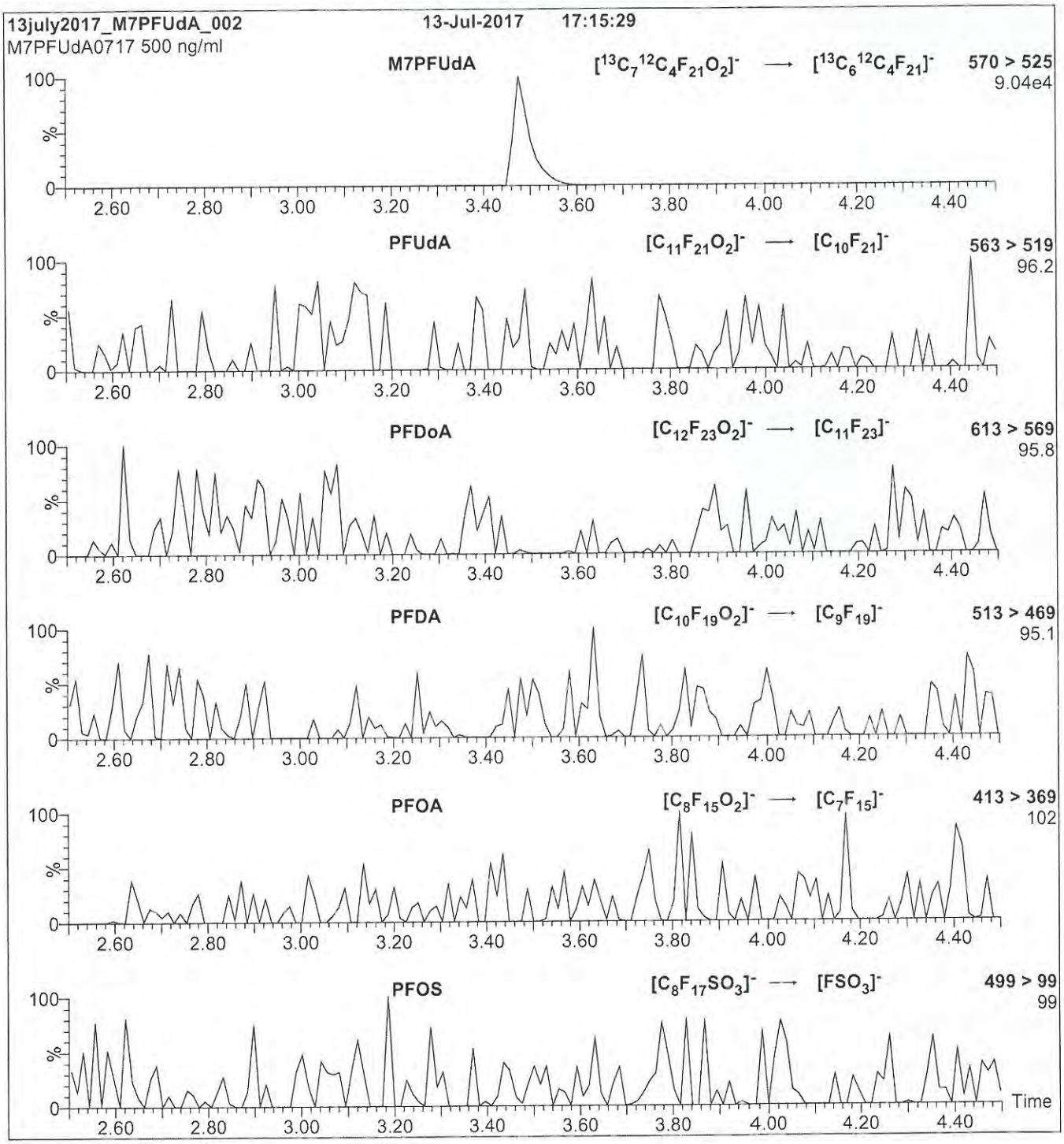
MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

18B1533

Figure 2: **M7PFUdA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M7PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

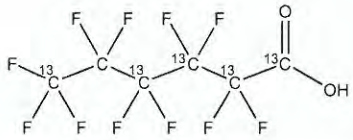
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

18B1534

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M5PFHxA	**LOT NUMBER:**	M5PFHxA1017
COMPOUND:	Perfluoro-n-[1,2,3,4,6-$^{13}C_5$]hexanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_5{}^{12}C_1HF_{11}O_2$	**MOLECULAR WEIGHT:**	319.02
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,6-$^{13}C_5$)
LAST TESTED: (mm/dd/yyyy)	10/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/18/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1534

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CALA Testing

ANAB ACCREDITED

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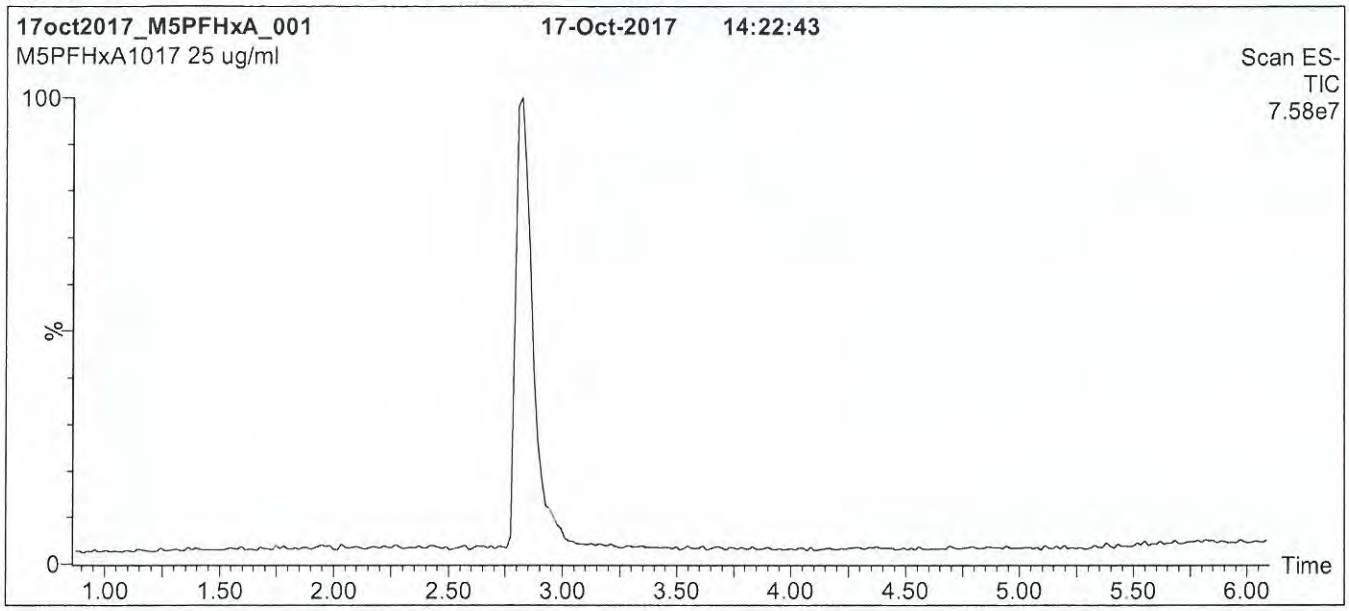
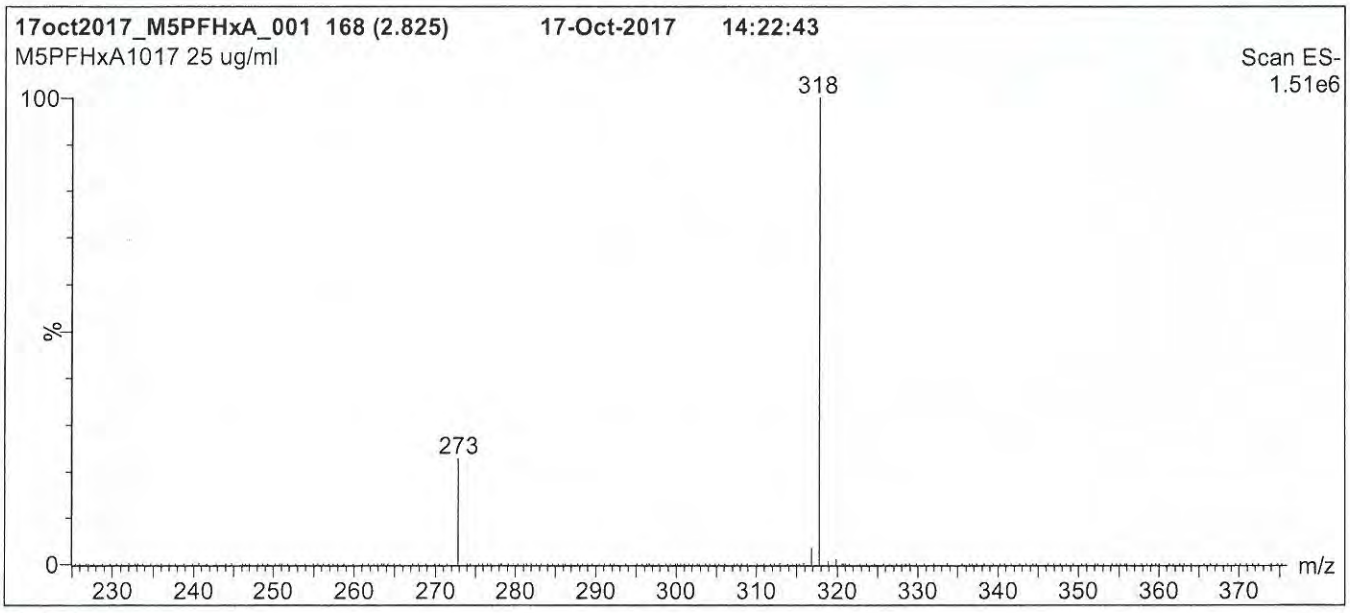
18B1534

Figure 1: **M5PFHxA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 40% (80:20 MeOH:ACN) / 60% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

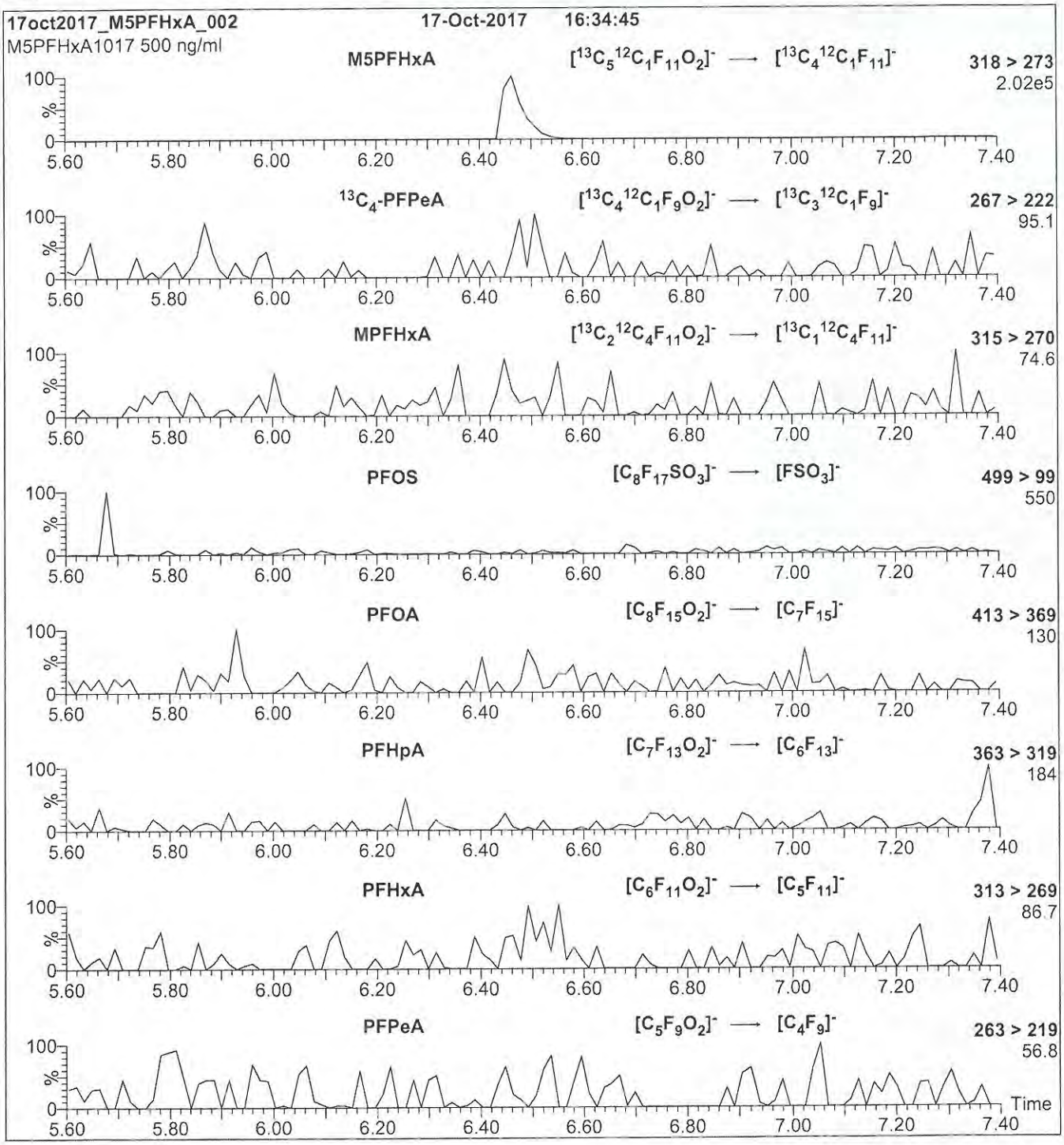
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1534

Figure 2: **M5PFHxA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M5PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

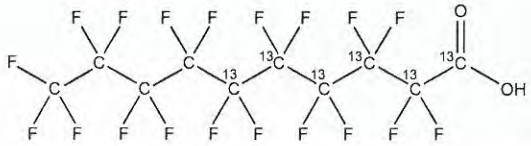
Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

18B1535

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	M6PFDA	**LOT NUMBER:**	M6PFDA1017
COMPOUND:	Perfluoro-n-[1,2,3,4,5,6-$^{13}C_6$]decanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_6{}^{12}C_4HF_{19}O_2$	**MOLECULAR WEIGHT:**	520.04
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4,5,6-$^{13}C_6$)
LAST TESTED: (mm/dd/yyyy)	10/17/2017		
EXPIRY DATE: (mm/dd/yyyy)	10/17/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 10/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1535

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2,...x_n on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

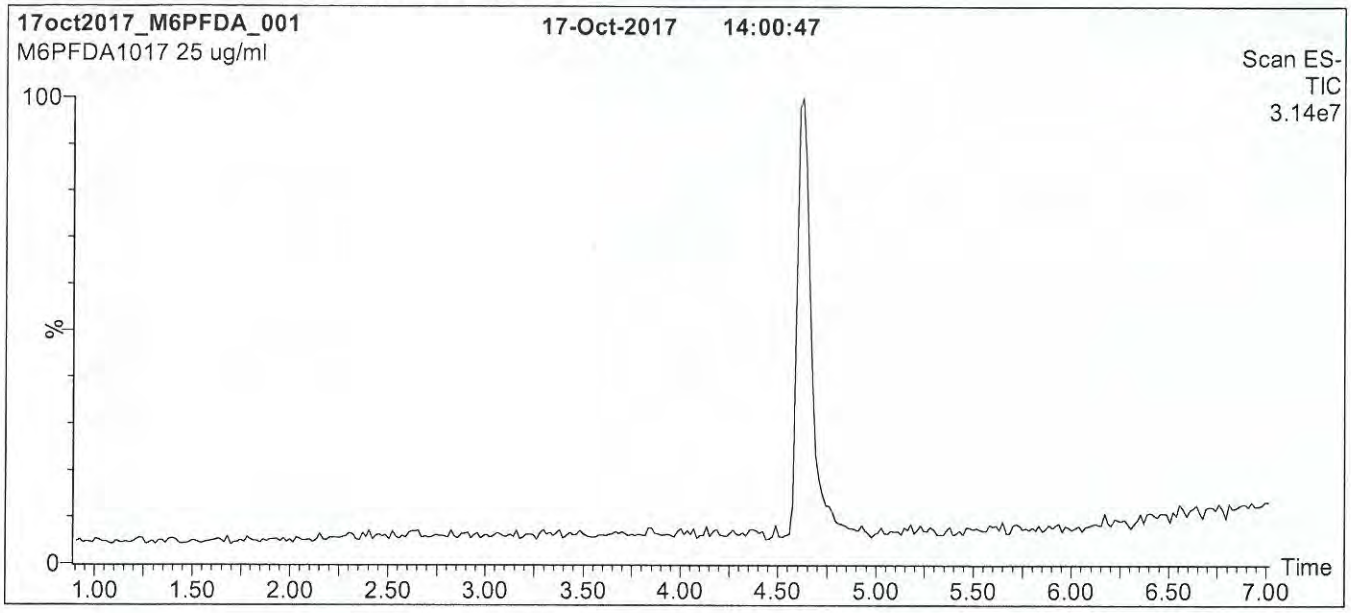
CALA

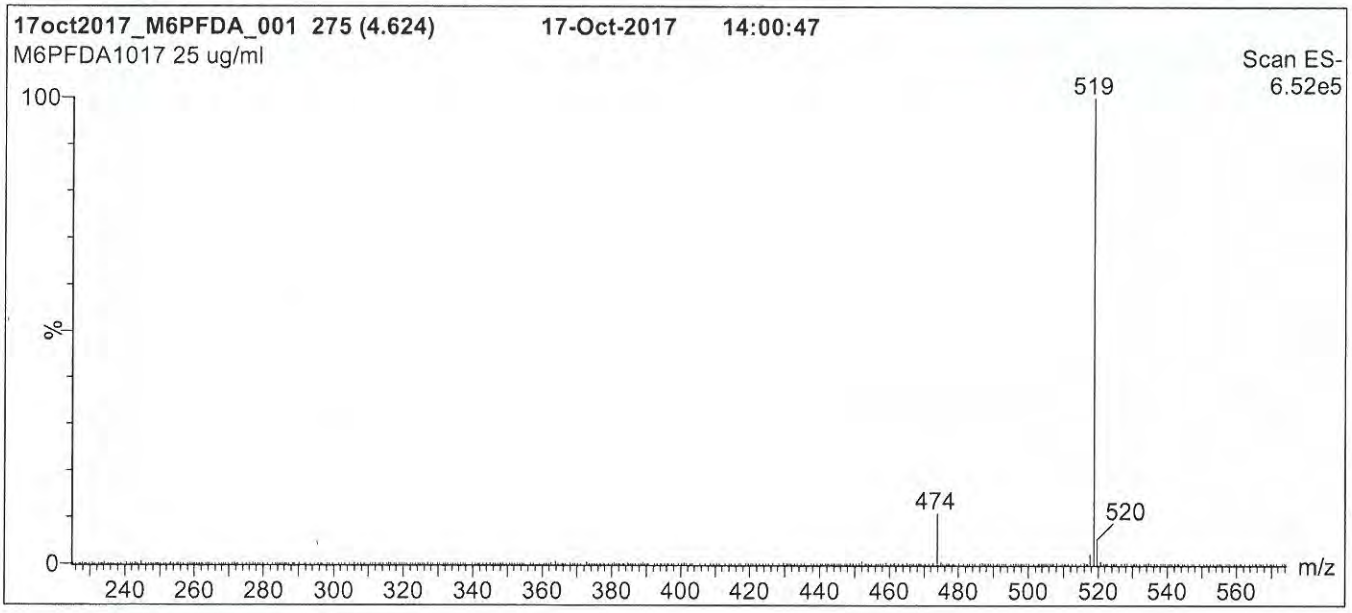
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1535

Figure 1: **M6PFDA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

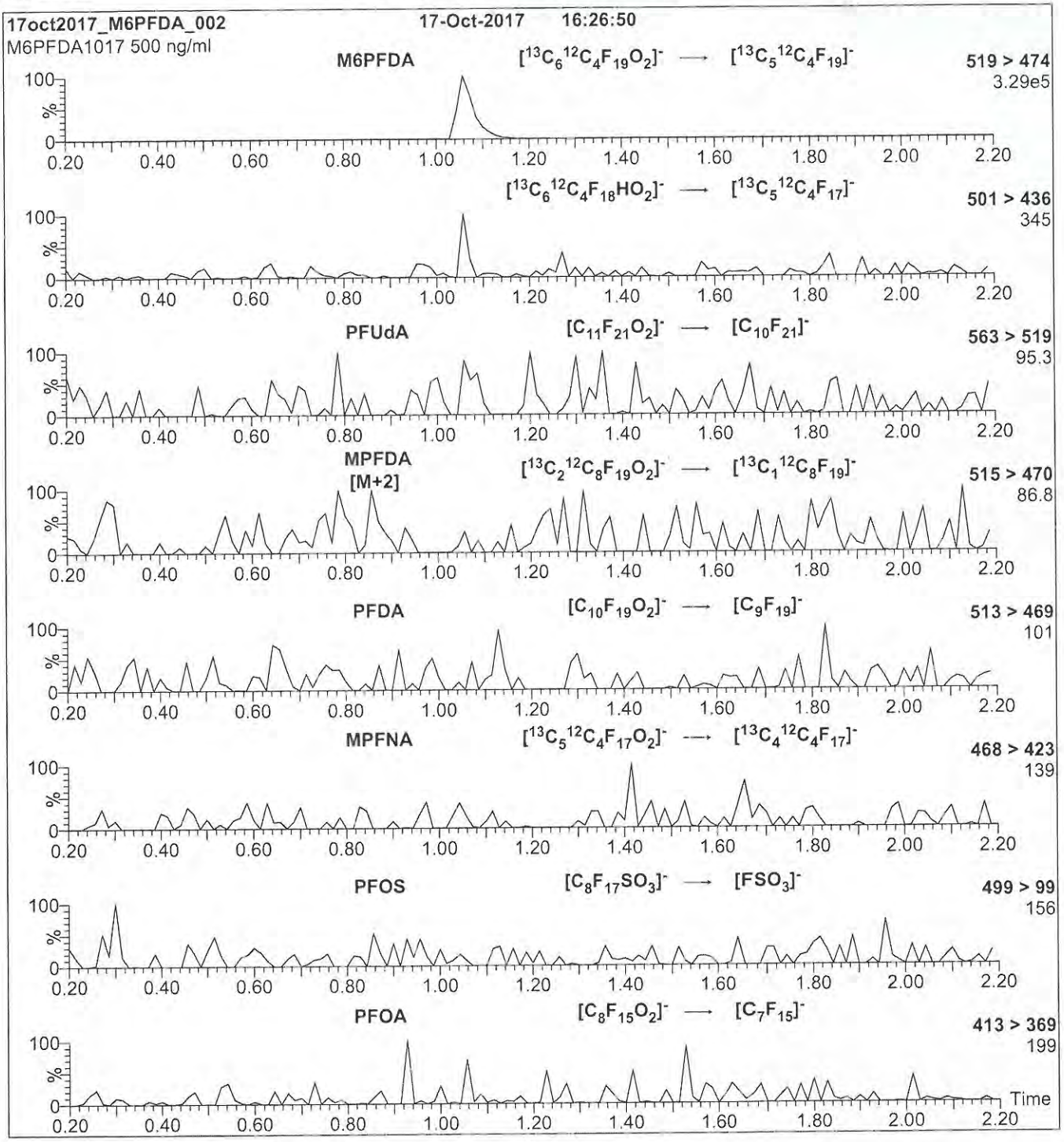
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1535

Figure 2: **M6PFDA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M6PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 13

18B1536

WELLINGTON LABORATORIES

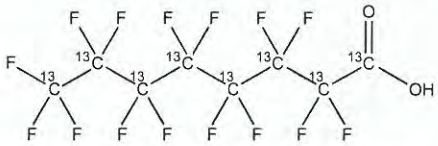
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8PFOA
COMPOUND: Perfluoro-n-[$^{13}C_8$]octanoic acid

LOT NUMBER: M8PFOA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_8HF_{15}O_2$	**MOLECULAR WEIGHT:**	422.01
CONCENTRATION:	49 ± 2.45 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	97.9% (M8PFOA) 2.1% (MPFOA [M+4])	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_8$)
LAST TESTED: (mm/dd/yyyy)	07/05/2017		
EXPIRY DATE: (mm/dd/yyyy)	07/05/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of native perfluoro-n-octanoic acid (PFOA) and ~ 2.1% of [M+4] perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 07/14/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B536

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

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$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

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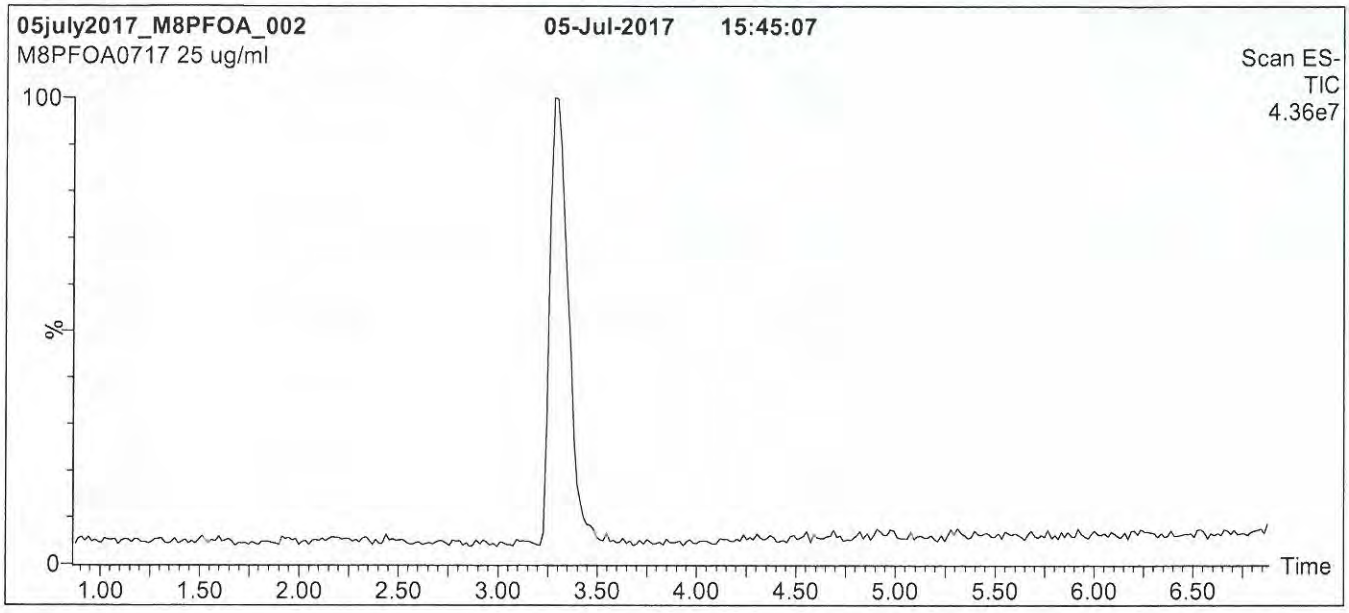
CALA

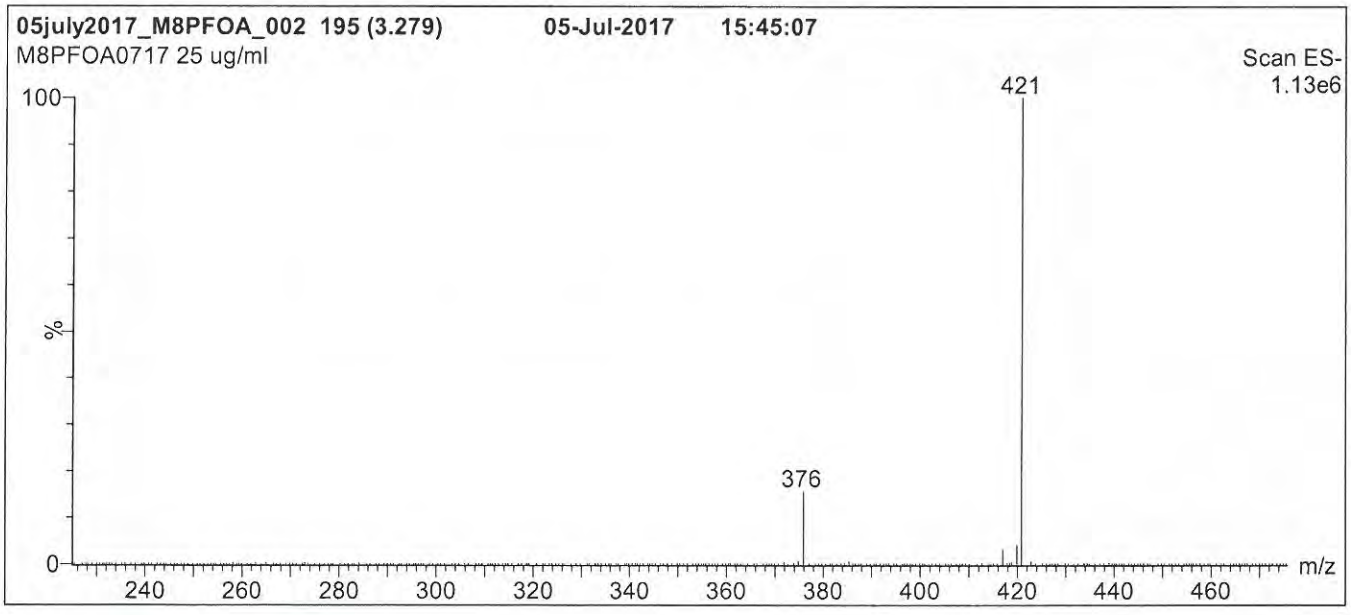
ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1536

Figure 1: **M8PFOA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

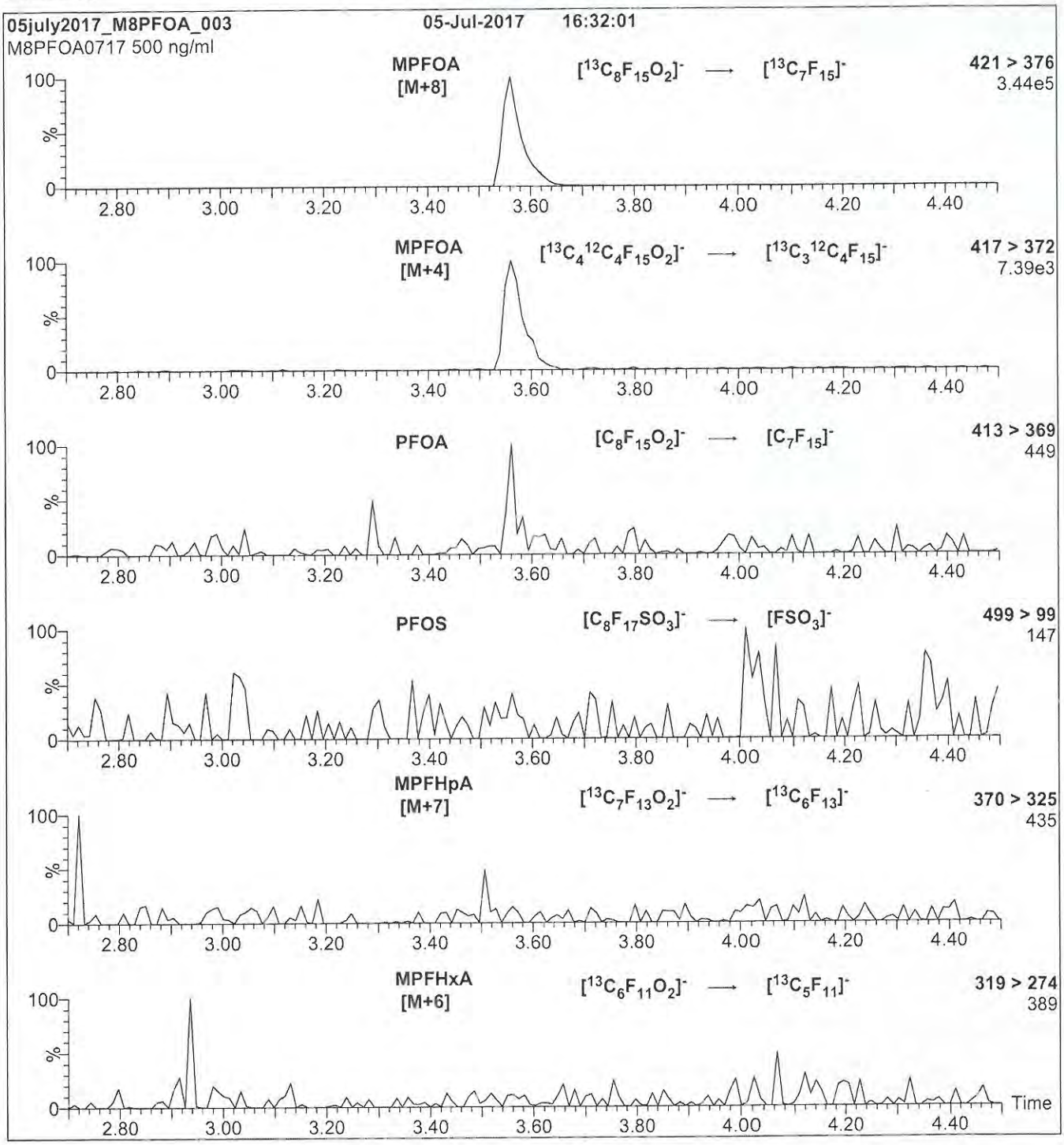
MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1536

Figure 2: **M8PFOA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml M8PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

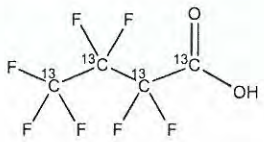
Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10

18B1537

WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:	MPFBA	**LOT NUMBER:**	MPFBA0417
COMPOUND:	Perfluoro-n-[1,2,3,4-$^{13}C_4$]butanoic acid		
STRUCTURE:		**CAS #:**	Not available



MOLECULAR FORMULA:	$^{13}C_4HF_7O_2$	**MOLECULAR WEIGHT:**	218.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C (1,2,3,4-$^{13}C_4$)
LAST TESTED: (mm/dd/yyyy)	04/12/2017		
EXPIRY DATE: (mm/dd/yyyy)	04/12/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 04/20/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1537

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CALA

ANAB ACCREDITED

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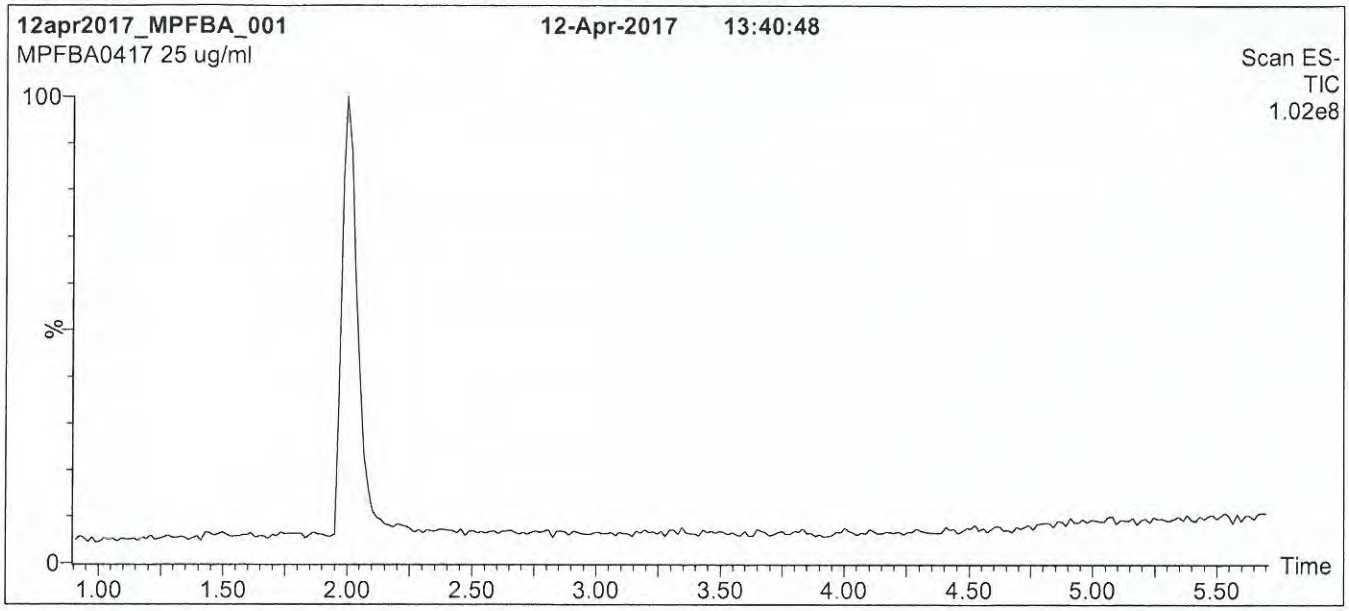
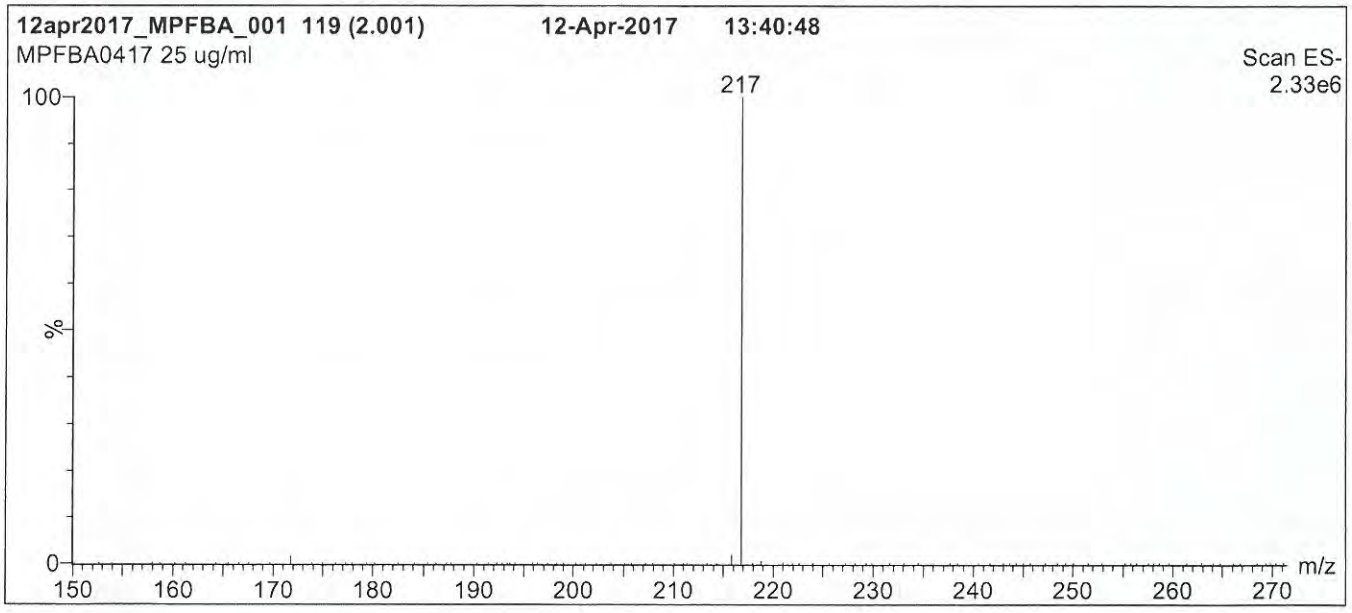
18B1537

Figure 1: **MPFBA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 30% (80:20 MeOH:ACN) / 70% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

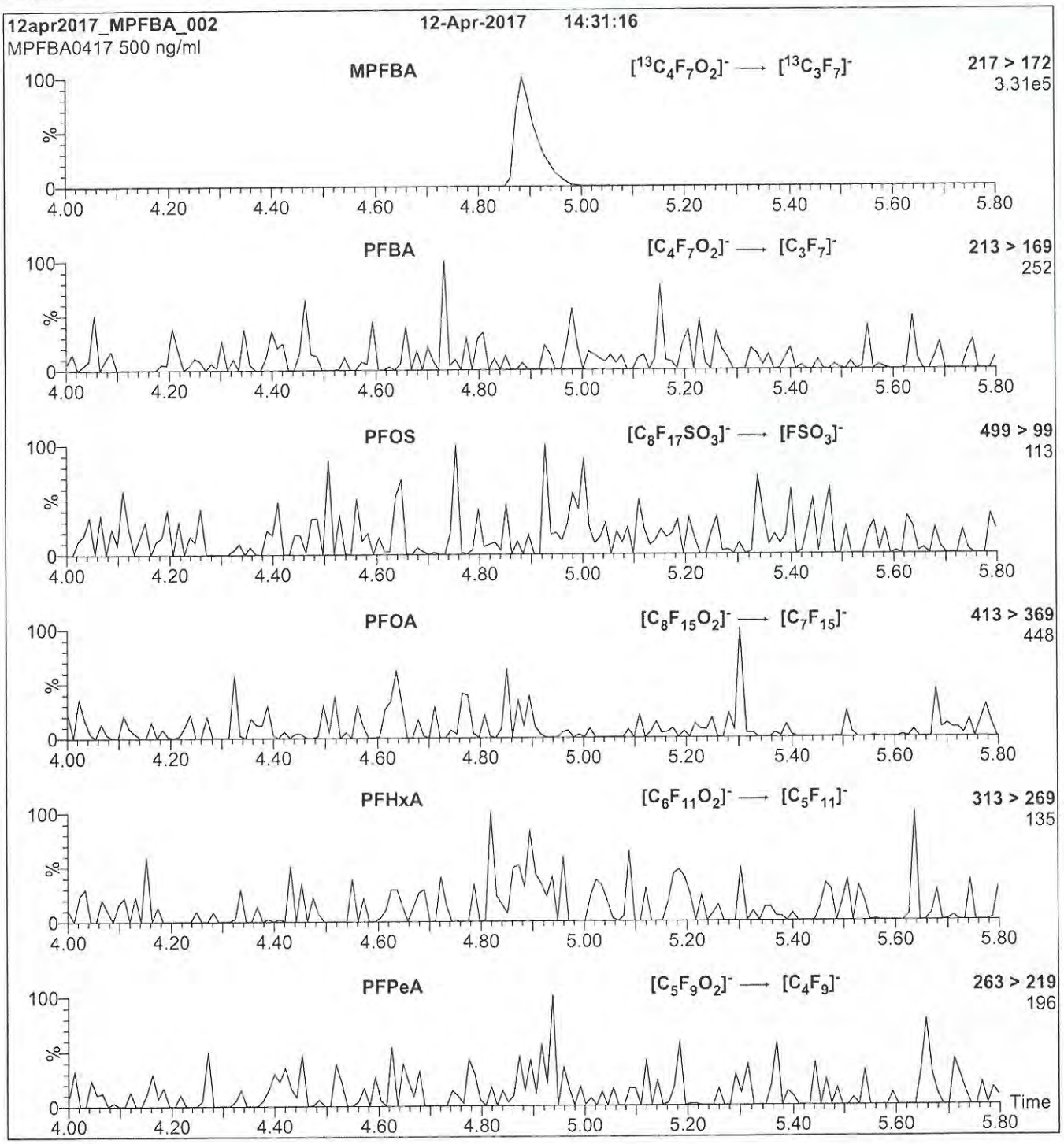
MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 10.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1537

Figure 2: **MPFBA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection: Direct loop injection
10 µl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 µl/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

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WELLINGTON LABORATORIES

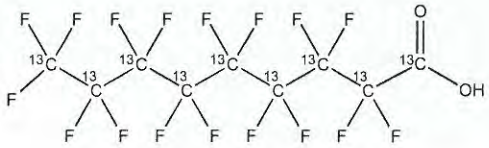
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M9PFNA
COMPOUND: Perfluoro-n-[$^{13}C_9$]nonanoic acid

LOT NUMBER: M9PFNA0517

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA:	$^{13}C_9HF_{17}O_2$	**MOLECULAR WEIGHT:**	473.01
CONCENTRATION:	50 ± 2.5 µg/ml	**SOLVENT(S):**	Methanol Water (<1%)
CHEMICAL PURITY:	>98%	**ISOTOPIC PURITY:**	≥99% ^{13}C ($^{13}C_9$)
LAST TESTED: (mm/dd/yyyy)	05/23/2017		
EXPIRY DATE: (mm/dd/yyyy)	05/23/2022		
RECOMMENDED STORAGE:	Store ampoule in a cool, dark place		

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.9% of $^{13}C_5{}^{12}C_4HF_{17}O_2$ (MPFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: _____ **Date:** 05/25/2017 (mm/dd/yyyy)
B.G. Chittim, General Manager

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters $x_1, x_2, \ldots x_n$ on which it depends is:

$$u_c(y(x_1, x_2, \ldots x_n)) = \sqrt{\sum_{i=1}^{n} u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of ±5% (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).

CALA

ANAB ACCREDITED

For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

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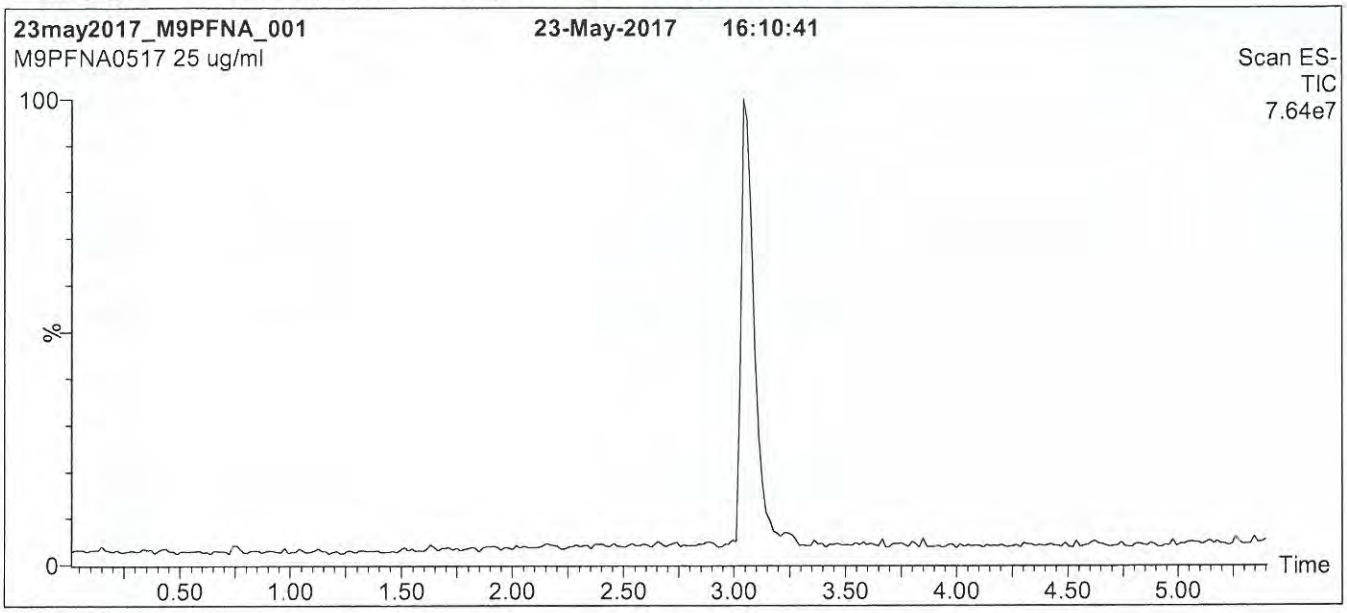
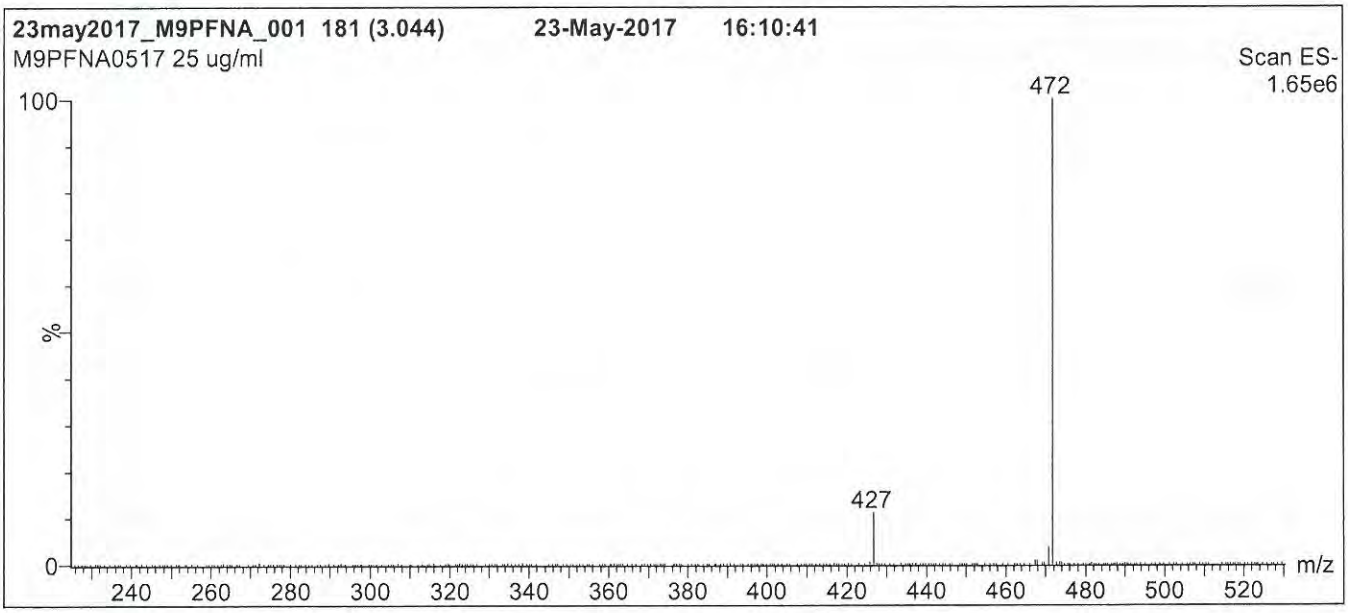
Figure 1: **M9PFNA; LC/MS Data (TIC and Mass Spectrum)**





Conditions for Figure 1:

LC: **Waters Acquity Ultra Performance LC**
MS: **Micromass Quattro *micro* API MS**

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP_{18}
1.7 µm, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% (80:20 MeOH:ACN) / 40% H_2O
(both with 10 mM NH_4OAc buffer)
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 µl/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

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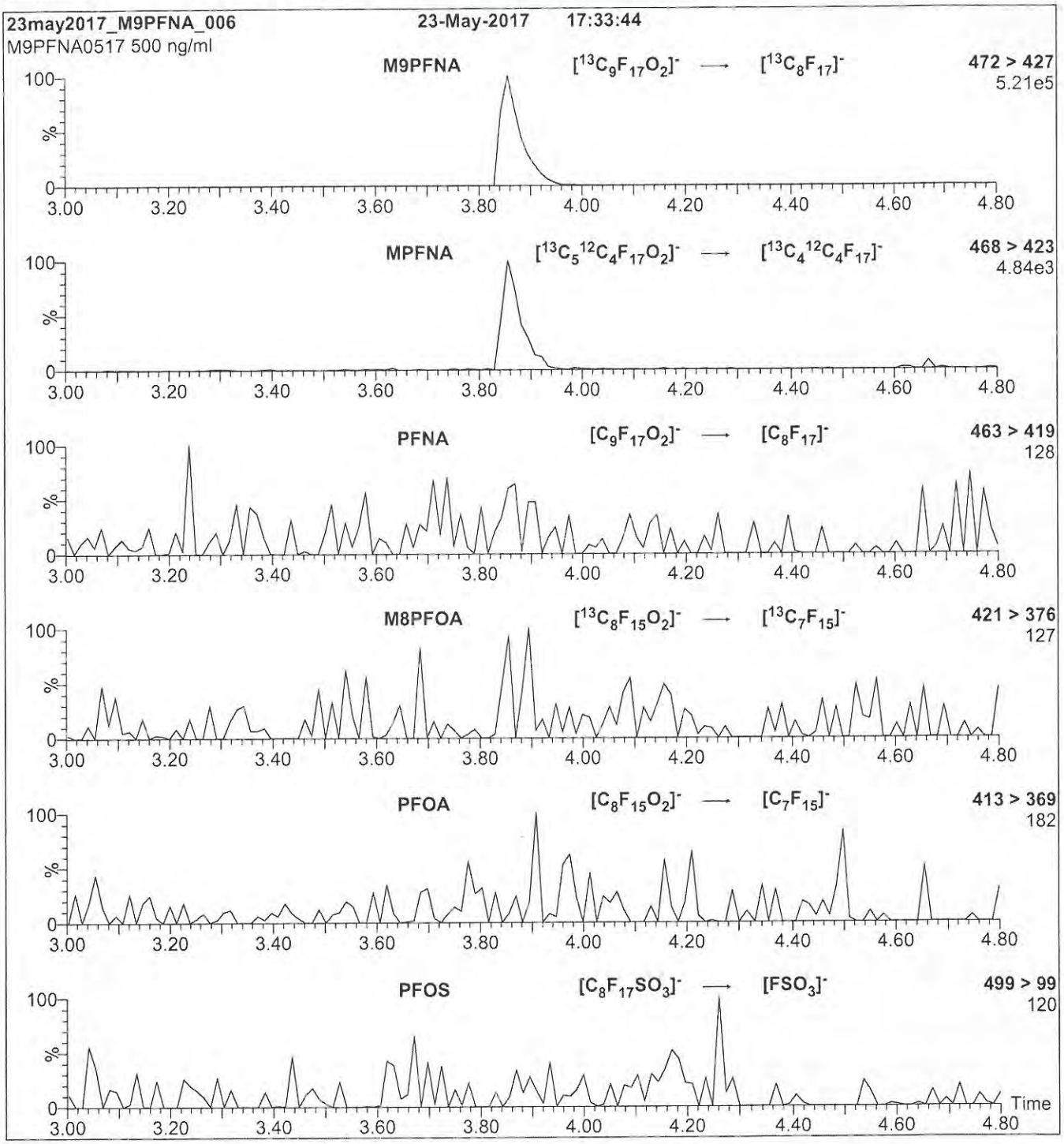
Figure 2: **M9PFNA; LC/MS/MS Data (Selected MRM Transitions)**



Conditions for Figure 2:

Injection:	Direct loop injection 10 µl (500 ng/ml M9PFNA)
Mobile phase:	Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O (both with 10 mM NH_4OAc buffer)
Flow:	300 µl/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 11

"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","375-73-
5","PFBS","0.0613","ug/L","","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.00187"
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4","PFHxA","0.142","ug/L","","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.00228"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","375-85-
9","PFHpA","0.0156","ug/L","","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000618"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","355-46-
4","PFHxS","0.0918","ug/L","","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000990"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","335-67-
1","PFOA","0.0148","ug/L","","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000680"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","375-95-
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1","PFOS","0.00303","ug/L","J","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000843"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","335-76-
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9","NMeFOSAA","0.00836","ug/L","U","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.00172"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","2991-50-
6","NEtFOSAA","0.00836","ug/L","U","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.00143"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","2058-94-
8","PFUnA","0.00836","ug/L","U","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.00110"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","307-55-
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"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","72629-94-
8","PFTrDA","0.00836","ug/L","U","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000516"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","376-06-
7","PFTeDA","0.00836","ug/L","U","0.00521","CRDL","","TRG","","","0.00836","CRDL","YES","0.000789"
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C3-PFBS","13C3-
PFBS","247","%R","H","","CRDL","","IS","247","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C2-PFHxA","13C2-
PFHxA","95.7","%R","","","CRDL","","IS","95.7","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C4-PFHpA","13C4-
PFHpA","90.6","%R","","","CRDL","","IS","90.6","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","18O2-PFHxS","18O2-
PFHxS","98.3","%R","","","CRDL","","IS","98.3","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C2-PFOA","13C2-
PFOA","81.9","%R","","","CRDL","","IS","81.9","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C5-PFNA","13C5-
PFNA","71.3","%R","","","CRDL","","IS","71.3","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C8-PFOS","13C8-
PFOS","88.2","%R","","","CRDL","","IS","88.2","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C2-PFDA","13C2-
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"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","d3-MeFOSAA","d3-
MeFOSAA","147","%R","","","CRDL","","IS","147","","","CRDL","",""
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EtFOSAA","151","%R","H","","CRDL","","IS","151","","","CRDL","",""
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PFUnA","84.5","%R","","","CRDL","","IS","84.5","","","CRDL","",""
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PFDoA","83.4","%R","","","CRDL","","IS","83.4","","","CRDL","",""
"A1-MW-51-SA1","537 MOD","RES","1801024-01","Vista","13C2-PFTeDA","13C2-

PFTeDA","97.4","%R","","","CRDL","","IS","97.4","","","CRDL","",""
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5","PFBS","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00185"
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4","PFHxA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00226"
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9","PFHpA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000611"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","355-46-
4","PFHxS","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000980"
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1","PFOA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000674"
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1","PFNA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000838"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","1763-23-
1","PFOS","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000835"
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2","PFDA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00154"
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9","NMeFOSAA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00171"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","2991-50-
6","NEtFOSAA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00142"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","2058-94-
8","PFUnA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.00109"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","307-55-
1","PFDoA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000819"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","72629-94-
8","PFTrDA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000511"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","376-06-
7","PFTeDA","0.00828","ug/L","U","0.00517","CRDL","","TRG","","","0.00828","CRDL","YES","0.000781"
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C3-PFBS","13C3-
PFBS","106","%R","","","CRDL","","IS","106","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFHxA","13C2-
PFHxA","86.1","%R","","","CRDL","","IS","86.1","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C4-PFHpA","13C4-
PFHpA","92.4","%R","","","CRDL","","IS","92.4","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","18O2-PFHxS","18O2-
PFHxS","85.4","%R","","","CRDL","","IS","85.4","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFOA","13C2-
PFOA","81.5","%R","","","CRDL","","IS","81.5","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C5-PFNA","13C5-
PFNA","77.8","%R","","","CRDL","","IS","77.8","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C8-PFOS","13C8-
PFOS","80.4","%R","","","CRDL","","IS","80.4","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFDA","13C2-
PFDA","66.6","%R","","","CRDL","","IS","66.6","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","d3-MeFOSAA","d3-
MeFOSAA","72.5","%R","","","CRDL","","IS","72.5","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","d5-EtFOSAA","d5-
EtFOSAA","82.0","%R","","","CRDL","","IS","82.0","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFUnA","13C2-
PFUnA","69.1","%R","","","CRDL","","IS","69.1","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFDoA","13C2-
PFDoA","66.5","%R","","","CRDL","","IS","66.5","","","CRDL","",""
"A1-MW-50-SA1","537 MOD","RES","1801024-02","Vista","13C2-PFTeDA","13C2-

PFTeDA","85.5","%R","","","CRDL","","IS","85.5","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","375-73-
5","PFBS","0.00627","ug/L","J","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00182"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","307-24-
4","PFHxA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00221"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","375-85-
9","PFHpA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000600"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","355-46-
4","PFHxS","0.0277","ug/L","","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000961"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","335-67-
1","PFOA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000661"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","375-95-
1","PFNA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000822"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","1763-23-
1","PFOS","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000819"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","335-76-
2","PFDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00151"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","2355-31-
9","NMeFOSAA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00167"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","2991-50-
6","NEtFOSAA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00139"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","2058-94-
8","PFUnA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00107"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","307-55-
1","PFDoA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000804"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","72629-94-
8","PFTrDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000501"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","376-06-
7","PFTeDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000766"
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C3-PFBS","13C3-
PFBS","113","%R","","","CRDL","","IS","113","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFHxA","13C2-
PFHxA","96.3","%R","","","CRDL","","IS","96.3","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C4-PFHpA","13C4-
PFHpA","91.2","%R","","","CRDL","","IS","91.2","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","18O2-PFHxS","18O2-
PFHxS","94.5","%R","","","CRDL","","IS","94.5","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFOA","13C2-
PFOA","89.4","%R","","","CRDL","","IS","89.4","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C5-PFNA","13C5-
PFNA","76.8","%R","","","CRDL","","IS","76.8","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C8-PFOS","13C8-
PFOS","93.7","%R","","","CRDL","","IS","93.7","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFDA","13C2-
PFDA","74.3","%R","","","CRDL","","IS","74.3","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","d3-MeFOSAA","d3-
MeFOSAA","81.5","%R","","","CRDL","","IS","81.5","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","d5-EtFOSAA","d5-
EtFOSAA","88.8","%R","","","CRDL","","IS","88.8","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFUnA","13C2-
PFUnA","73.6","%R","","","CRDL","","IS","73.6","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFDoA","13C2-
PFDoA","68.8","%R","","","CRDL","","IS","68.8","","","CRDL","",""
"A1-MW-49-SA1","537 MOD","RES","1801024-03","Vista","13C2-PFTeDA","13C2-

PFTeDA","65.7","%R","","","CRDL","","IS","65.7","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","375-73-
5","PFBS","0.0284","ug/L","","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00188"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","307-24-
4","PFHxA","0.0866","ug/L","","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00229"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","375-85-
9","PFHpA","0.000917","ug/L","J","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000622"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","355-46-
4","PFHxS","0.00278","ug/L","J","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000997"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","335-67-
1","PFOA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000685"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","375-95-
1","PFNA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000853"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","1763-23-
1","PFOS","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000849"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","335-76-
2","PFDA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00157"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","2355-31-
9","NMeFOSAA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00174"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","2991-50-
6","NEtFOSAA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00144"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","2058-94-
8","PFUnA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.00111"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","307-55-
1","PFDoA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000834"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","72629-94-
8","PFTrDA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000520"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","376-06-
7","PFTeDA","0.00842","ug/L","U","0.00525","CRDL","","TRG","","","0.00842","CRDL","YES","0.000795"
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C3-PFBS","13C3-
PFBS","107","%R","","","CRDL","","IS","107","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFHxA","13C2-
PFHxA","90.1","%R","","","CRDL","","IS","90.1","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C4-PFHpA","13C4-
PFHpA","89.8","%R","","","CRDL","","IS","89.8","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","18O2-PFHxS","18O2-
PFHxS","96.2","%R","","","CRDL","","IS","96.2","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFOA","13C2-
PFOA","83.6","%R","","","CRDL","","IS","83.6","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C5-PFNA","13C5-
PFNA","86.6","%R","","","CRDL","","IS","86.6","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C8-PFOS","13C8-
PFOS","92.8","%R","","","CRDL","","IS","92.8","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFDA","13C2-
PFDA","74.5","%R","","","CRDL","","IS","74.5","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","d3-MeFOSAA","d3-
MeFOSAA","76.7","%R","","","CRDL","","IS","76.7","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","d5-EtFOSAA","d5-
EtFOSAA","87.2","%R","","","CRDL","","IS","87.2","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFUnA","13C2-
PFUnA","70.5","%R","","","CRDL","","IS","70.5","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFDoA","13C2-
PFDoA","61.2","%R","","","CRDL","","IS","61.2","","","CRDL","",""
"A1-MW-05-SA1","537 MOD","RES","1801024-04","Vista","13C2-PFTeDA","13C2-

PFTeDA","67.3","%R","","","CRDL","","IS","67.3","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","375-73-
5","PFBS","0.0229","ug/L","","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00182"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","307-24-
4","PFHxA","0.0825","ug/L","","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00221"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","375-85-
9","PFHpA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000600"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","355-46-
4","PFHxS","0.00898","ug/L","","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000961"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","335-67-
1","PFOA","0.00333","ug/L","J","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000661"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","375-95-
1","PFNA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000822"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","1763-23-
1","PFOS","0.00161","ug/L","J","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000819"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","335-76-
2","PFDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00151"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","2355-31-
9","NMeFOSAA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00167"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","2991-50-
6","NEtFOSAA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00139"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","2058-94-
8","PFUnA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.00107"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","307-55-
1","PFDoA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000804"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","72629-94-
8","PFTrDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000501"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","376-06-
7","PFTeDA","0.00812","ug/L","U","0.00508","CRDL","","TRG","","","0.00812","CRDL","YES","0.000766"
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C3-PFBS","13C3-
PFBS","146","%R","","","CRDL","","IS","146","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFHxA","13C2-
PFHxA","93.9","%R","","","CRDL","","IS","93.9","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C4-PFHpA","13C4-
PFHpA","84.7","%R","","","CRDL","","IS","84.7","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","18O2-PFHxS","18O2-
PFHxS","96.2","%R","","","CRDL","","IS","96.2","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFOA","13C2-
PFOA","75.7","%R","","","CRDL","","IS","75.7","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C5-PFNA","13C5-
PFNA","78.1","%R","","","CRDL","","IS","78.1","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C8-PFOS","13C8-
PFOS","81.8","%R","","","CRDL","","IS","81.8","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFDA","13C2-
PFDA","59.8","%R","","","CRDL","","IS","59.8","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","d3-MeFOSAA","d3-
MeFOSAA","92.3","%R","","","CRDL","","IS","92.3","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","d5-EtFOSAA","d5-
EtFOSAA","101","%R","","","CRDL","","IS","101","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFUnA","13C2-
PFUnA","61.2","%R","","","CRDL","","IS","61.2","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFDoA","13C2-
PFDoA","62.5","%R","","","CRDL","","IS","62.5","","","CRDL","",""
"A1-MW-04-SA1","537 MOD","RES","1801024-05","Vista","13C2-PFTeDA","13C2-

PFTeDA","73.4","%R","","","CRDL","","IS","73.4","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","375-73-
5","PFBS","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00185"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","307-24-
4","PFHxA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00226"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","375-85-
9","PFHpA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000612"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","355-46-
4","PFHxS","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000981"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","335-67-
1","PFOA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000674"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","375-95-
1","PFNA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000839"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","1763-23-
1","PFOS","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000836"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","335-76-
2","PFDA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00154"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","2355-31-
9","NMeFOSAA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00171"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","2991-50-
6","NEtFOSAA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00142"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","2058-94-
8","PFUnA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.00109"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","307-55-
1","PFDoA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000820"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","72629-94-
8","PFTrDA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000512"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","376-06-
7","PFTeDA","0.00829","ug/L","U","0.00517","CRDL","","TRG","","","0.00829","CRDL","YES","0.000782"
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C3-PFBS","13C3-
PFBS","117","%R","","","CRDL","","IS","117","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFHxA","13C2-
PFHxA","96.4","%R","","","CRDL","","IS","96.4","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C4-PFHpA","13C4-
PFHpA","89.7","%R","","","CRDL","","IS","89.7","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","18O2-PFHxS","18O2-
PFHxS","89.5","%R","","","CRDL","","IS","89.5","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFOA","13C2-
PFOA","84.8","%R","","","CRDL","","IS","84.8","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C5-PFNA","13C5-
PFNA","91.7","%R","","","CRDL","","IS","91.7","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C8-PFOS","13C8-
PFOS","84.9","%R","","","CRDL","","IS","84.9","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFDA","13C2-
PFDA","65.4","%R","","","CRDL","","IS","65.4","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","d3-MeFOSAA","d3-
MeFOSAA","76.7","%R","","","CRDL","","IS","76.7","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","d5-EtFOSAA","d5-
EtFOSAA","76.3","%R","","","CRDL","","IS","76.3","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFUnA","13C2-
PFUnA","69.2","%R","","","CRDL","","IS","69.2","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFDoA","13C2-
PFDoA","62.9","%R","","","CRDL","","IS","62.9","","","CRDL","",""
"FRB-20180522","537 MOD","RES","1801024-06","Vista","13C2-PFTeDA","13C2-

PFTeDA","67.9","%R","","","CRDL","","IS","67.9","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","375-73-
5","PFBS","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00179"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","307-24-
4","PFHxA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00218"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","375-85-
9","PFHpA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000591"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","355-46-
4","PFHxS","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000947"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","335-67-
1","PFOA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000651"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","375-95-
1","PFNA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000810"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","1763-23-
1","PFOS","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000807"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","335-76-
2","PFDA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00149"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","2355-31-
9","NMeFOSAA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00165"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","2991-50-
6","NEtFOSAA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00137"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","2058-94-
8","PFUnA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.00105"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","307-55-
1","PFDoA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000792"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","72629-94-
8","PFTrDA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000494"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","376-06-
7","PFTeDA","0.00800","ug/L","U","0.00500","CRDL","","TRG","","","0.00800","CRDL","YES","0.000755"
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C3-PFBS","13C3-
PFBS","107","%R","","","CRDL","","IS","107","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFHxA","13C2-
PFHxA","96.3","%R","","","CRDL","","IS","96.3","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C4-PFHpA","13C4-
PFHpA","81.1","%R","","","CRDL","","IS","81.1","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","18O2-PFHxS","18O2-
PFHxS","94.0","%R","","","CRDL","","IS","94.0","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFOA","13C2-
PFOA","76.9","%R","","","CRDL","","IS","76.9","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C5-PFNA","13C5-
PFNA","75.0","%R","","","CRDL","","IS","75.0","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C8-PFOS","13C8-
PFOS","79.5","%R","","","CRDL","","IS","79.5","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFDA","13C2-
PFDA","65.1","%R","","","CRDL","","IS","65.1","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","d3-MeFOSAA","d3-
MeFOSAA","52.5","%R","","","CRDL","","IS","52.5","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","d5-EtFOSAA","d5-
EtFOSAA","58.0","%R","","","CRDL","","IS","58.0","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFUnA","13C2-
PFUnA","47.6","%R","H","","CRDL","","IS","47.6","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFDoA","13C2-
PFDoA","60.1","%R","","","CRDL","","IS","60.1","","","CRDL","",""
"B8E0250-BLK1","537 MOD","RES","B8E0250-BLK1","Vista","13C2-PFTeDA","13C2-

PFTeDA","61.1","%R","","","CRDL","","IS","61.1","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","375-73-
5","PFBS","0.0826","ug/L","","0.00500","CRDL","","SPK","103","","0.00800","CRDL","YES","0.00179"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","307-24-
4","PFHxA","0.0786","ug/L","","0.00500","CRDL","","SPK","98.3","","0.00800","CRDL","YES","0.00218"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","375-85-
9","PFHpA","0.0949","ug/L","","0.00500","CRDL","","SPK","119","","0.00800","CRDL","YES","0.000591"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","355-46-
4","PFHxS","0.0925","ug/L","","0.00500","CRDL","","SPK","116","","0.00800","CRDL","YES","0.000947"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","335-67-
1","PFOA","0.0863","ug/L","","0.00500","CRDL","","SPK","108","","0.00800","CRDL","YES","0.000651"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","375-95-
1","PFNA","0.0924","ug/L","","0.00500","CRDL","","SPK","115","","0.00800","CRDL","YES","0.000810"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","1763-23-
1","PFOS","0.0884","ug/L","","0.00500","CRDL","","SPK","110","","0.00800","CRDL","YES","0.000807"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","335-76-
2","PFDA","0.0914","ug/L","","0.00500","CRDL","","SPK","114","","0.00800","CRDL","YES","0.00149"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","2355-31-
9","NMeFOSAA","0.0836","ug/L","","0.00500","CRDL","","SPK","104","","0.00800","CRDL","YES","0.00165"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","2991-50-
6","NEtFOSAA","0.0782","ug/L","","0.00500","CRDL","","SPK","97.7","","0.00800","CRDL","YES","0.00137"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","2058-94-
8","PFUnA","0.0842","ug/L","","0.00500","CRDL","","SPK","105","","0.00800","CRDL","YES","0.00105"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","307-55-
1","PFDoA","0.0984","ug/L","","0.00500","CRDL","","SPK","123","","0.00800","CRDL","YES","0.000792"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","72629-94-
8","PFTrDA","0.111","ug/L","H","0.00500","CRDL","","SPK","138","","0.00800","CRDL","YES","0.000494"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","376-06-
7","PFTeDA","0.0867","ug/L","","0.00500","CRDL","","SPK","108","","0.00800","CRDL","YES","0.000755"
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C3-PFBS","13C3-
PFBS","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFHxA","13C2-
PFHxA","92.8","%R","","","CRDL","","IS","92.8","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C4-PFHpA","13C4-
PFHpA","90.5","%R","","","CRDL","","IS","90.5","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","18O2-PFHxS","18O2-
PFHxS","85.0","%R","","","CRDL","","IS","85.0","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFOA","13C2-
PFOA","92.2","%R","","","CRDL","","IS","92.2","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C5-PFNA","13C5-
PFNA","79.7","%R","","","CRDL","","IS","79.7","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C8-PFOS","13C8-
PFOS","87.9","%R","","","CRDL","","IS","87.9","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFDA","13C2-
PFDA","73.0","%R","","","CRDL","","IS","73.0","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","d3-MeFOSAA","d3-
MeFOSAA","73.3","%R","","","CRDL","","IS","73.3","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","d5-EtFOSAA","d5-
EtFOSAA","76.9","%R","","","CRDL","","IS","76.9","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFUnA","13C2-
PFUnA","67.6","%R","","","CRDL","","IS","67.6","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFDoA","13C2-
PFDoA","74.9","%R","","","CRDL","","IS","74.9","","","CRDL","",""
"B8E0250-BS1","537 MOD","RES","B8E0250-BS1","Vista","13C2-PFTeDA","13C2-

PFTeDA","79.4","%R","","","CRDL","","IS","79.4","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","375-73-
5","PFBS","0.0916","ug/L","","0.00500","CRDL","","SPK","114","10.3","0.00800","CRDL","YES","0.00179"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","307-24-
4","PFHxA","0.0879","ug/L","","0.00500","CRDL","","SPK","110","11.1","0.00800","CRDL","YES","0.00218"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","375-85-
9","PFHpA","0.0898","ug/L","","0.00500","CRDL","","SPK","112","5.46","0.00800","CRDL","YES","0.000591"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","355-46-
4","PFHxS","0.0819","ug/L","","0.00500","CRDL","","SPK","102","12.1","0.00800","CRDL","YES","0.000947"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","335-67-
1","PFOA","0.0940","ug/L","","0.00500","CRDL","","SPK","118","8.58","0.00800","CRDL","YES","0.000651"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","375-95-
1","PFNA","0.0798","ug/L","","0.00500","CRDL","","SPK","99.8","14.5","0.00800","CRDL","YES","0.000810"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","1763-23-
1","PFOS","0.0815","ug/L","","0.00500","CRDL","","SPK","102","8.05","0.00800","CRDL","YES","0.000807"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","335-76-
2","PFDA","0.101","ug/L","","0.00500","CRDL","","SPK","126","9.90","0.00800","CRDL","YES","0.00149"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","2355-31-
9","NMeFOSAA","0.0830","ug/L","","0.00500","CRDL","","SPK","104","0.705","0.00800","CRDL","YES","0.00165
"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","2991-50-
6","NEtFOSAA","0.0794","ug/L","","0.00500","CRDL","","SPK","99.2","1.48","0.00800","CRDL","YES","0.00137"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","2058-94-
8","PFUnA","0.0929","ug/L","","0.00500","CRDL","","SPK","116","9.78","0.00800","CRDL","YES","0.00105"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","307-55-
1","PFDoA","0.0820","ug/L","","0.00500","CRDL","","SPK","102","18.1","0.00800","CRDL","YES","0.000792"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","72629-94-
8","PFTrDA","0.0923","ug/L","","0.00500","CRDL","","SPK","115","18.0","0.00800","CRDL","YES","0.000494"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","376-06-
7","PFTeDA","0.0927","ug/L","","0.00500","CRDL","","SPK","116","6.70","0.00800","CRDL","YES","0.000755"
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C3-PFBS","13C3-
PFBS","105","%R","","","CRDL","","IS","105","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFHxA","13C2-
PFHxA","91.1","%R","","","CRDL","","IS","91.1","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C4-PFHpA","13C4-
PFHpA","88.2","%R","","","CRDL","","IS","88.2","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","18O2-PFHxS","18O2-
PFHxS","95.1","%R","","","CRDL","","IS","95.1","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFOA","13C2-
PFOA","73.2","%R","","","CRDL","","IS","73.2","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C5-PFNA","13C5-
PFNA","85.2","%R","","","CRDL","","IS","85.2","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C8-PFOS","13C8-
PFOS","87.4","%R","","","CRDL","","IS","87.4","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFDA","13C2-
PFDA","71.7","%R","","","CRDL","","IS","71.7","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","d3-MeFOSAA","d3-
MeFOSAA","81.4","%R","","","CRDL","","IS","81.4","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","d5-EtFOSAA","d5-
EtFOSAA","87.9","%R","","","CRDL","","IS","87.9","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFUnA","13C2-
PFUnA","73.2","%R","","","CRDL","","IS","73.2","","","CRDL","",""
"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFDoA","13C2-
PFDoA","78.0","%R","","","CRDL","","IS","78.0","","","CRDL","",""

"B8E0250-BSD1","537 MOD","RES","B8E0250-BSD1","Vista","13C2-PFTeDA","13C2-PFTeDA","93.6","%R","","","CRDL","","IS","93.6","","","CRDL","",""
"4663.3803","CTO 17F3803 Yuma","A1-MW-51-SA1","05/22/2018 10:14","AQ","1801024-01","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/04/2018 23:33","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","A1-MW-50-SA1","05/22/2018 11:30","AQ","1801024-02","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/05/2018 22:23","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","A1-MW-49-SA1","05/22/2018 12:20","AQ","1801024-03","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/04/2018 23:54","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","A1-MW-05-SA1","05/22/2018 13:19","AQ","1801024-04","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/05/2018 00:04","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","A1-MW-04-SA1","05/22/2018 14:06","AQ","1801024-05","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/05/2018 22:34","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","FRB-20180522","05/22/2018 14:45","AQ","1801024-06","","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/05/2018 00:25","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","05/23/2018 10:15","06/08/2018"
"4663.3803","CTO 17F3803 Yuma","B8E0250-BLK1","","AQ","B8E0250-BLK1","MB","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/04/2018 23:01","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","",""
"4663.3803","CTO 17F3803 Yuma","B8E0250-BS1","","AQ","B8E0250-BS1","LCS","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/04/2018 22:41","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","",""
"4663.3803","CTO 17F3803 Yuma","B8E0250-BSD1","","AQ","B8E0250-BSD1","LCSD","","","537 MOD","Gen Prep","RES","05/31/2018 12:35","06/04/2018 22:51","Vista","COA","","","1","","","","","B8E0250","B8E0250","S8F0012","S8F0012","1801024","",""

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Tetra Tech EC, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
ATTN: Ms. Sabina Sudoko

July 24, 2018

SUBJECT: MCAS Yuma, CTO 17F3803, Data Validation

Dear Ms. Sudoko,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on July 6, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #42613:

SDG #	Fraction
280-110058-1, 280-110112-1 280-110226-1, 280-110291-1 280-110353-1, L1818881 L1819087, L1819352 L1819562, L1820050 L1820175, 1801024 1801037, 1801039 1801054, 1801071 1801084	Volatiles, 1,4-Dioxane, Wet Chemistry, Perfluorinated Alkyl Acids

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona; April 2018
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1; 2017
- USEPA National Functional Guidelines for Superfund Organic Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
Project Manager/Chemist

ADR/Stage 4 NEDD 80/20 **LDC #42613 (Tetra Tech-EC, Inc.-Irvine, CA / MCAS Yuma, CTO 17F3803)** **PO# 1153059**

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) VOA (8260B)		1,4-Diox (8270D -SIM)		PFAs (537)		Cl,SO_4 NO_3-N (9056A)		Fe II (3500 -Fe B)		pH (9040C)																							
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	280-110058-1	07/06/18	07/27/18	6	0	-	-	-	-	5	0	5	0	5	0																				
B	280-110112-1	07/06/18	07/27/18	7	0	-	-	-	-	6	0	6	0	6	0																				
C	280-110226-1	07/06/18	07/27/18	9	0	-	-	-	-	6	0	6	0	6	0																				
D	280-110291-1	07/06/18	07/27/18	7	0	-	-	-	-	6	0	6	0	6	0																				
E	280-110353-1	07/06/18	07/27/18	5	0	-	-	-	-	3	0	3	0	3	0																				
F	L1818881	07/06/18	07/27/18	-	-	5	0	-	-	-	-	-	-	-	-																				
G	L1819087	07/06/18	07/27/18	-	-	6	0	-	-	-	-	-	-	-	-																				
H	L1819352	07/06/18	07/27/18	-	-	5	0	-	-	-	-	-	-	-	-																				
I	L1819562	07/06/18	07/27/18	-	-	8	0	-	-	-	-	-	-	-	-																				
J	L1820050	07/06/18	07/27/18	-	-	4	0	-	-	-	-	-	-	-	-																				
K	L1820175	07/06/18	07/27/18	-	-	1	0	-	-	-	-	-	-	-	-																				
L	1801024	07/06/18	07/27/18	-	-	-	-	6	0	-	-	-	-	-	-																				
M	1801037	07/06/18	07/27/18	-	-	-	-	1	0	-	-	-	-	-	-																				
M	1801037	07/06/18	07/27/18	-	-	-	-	8	0	-	-	-	-	-	-																				
N	1801039	07/06/18	07/27/18	-	-	-	-	6	0	-	-	-	-	-	-																				
O	1801054	07/06/18	07/27/18	-	-	-	-	9	0	-	-	-	-	-	-																				
P	1801071	07/06/18	07/27/18	-	-	-	-	5	0	-	-	-	-	-	-																				
Q	1801084	07/06/18	07/27/18	-	-	-	-	1	0	-	-	-	-	-	-																				
Total	T/SM			34	0	29	0	36	0	26	0	26	0	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	177

Shaded cells indicate Stage 4 validation (all other cells are ADR/Stage 2B validation).

Data Validation Report
MCAS Yuma, CTO 17F3803

SDGs: 280-110058-1, 280-110112-1, 280-110226-1, 280-110291-1, 280-110353-1, L1818881, L1819087, L1819352, L1819562, L1820050, L1820175, 1801024, 1801037, 1801039, 1801054, 1801071, and 1801084

Prepared for

Tetra Tech EC, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

July 24, 2018

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2B and Stage 4 data validation results for samples collected during the May 2018 sampling period. Data validation was performed in accordance with the Final Sampling and Analysis Plan (SAP) for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), a modified outline of the US EPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017), and a modified outline of the US EPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B
1,4-Dioxane by EPA SW 846 Method 8270D utilizing Selective Ion Monitoring (SIM)
Perfluorinated Alkyl Acids (PFAs) by EPA Method 537 Modified

Wet Chemistry:
Chloride, Nitrate as Nitrogen, and Sulfate by EPA SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

For samples reviewed by automated data review, the sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2B Automated Data Review outliers are presented in Enclosure I. DVRs for samples on which Stage 4 validation was performed are presented in Enclosure II. Validation for 1,4-Dioxane was performed manually and DVRs for Stage 2B and Stage 4 manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, initial and continuing calibrations, laboratory blanks, initial and continuing calibration blanks (ICB/CCBs), surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), ongoing precision recovery (OPR), internal standards, trip blanks, equipment blanks, field rinsate blanks, and field duplicates. Approximately 20 percent of samples were subjected to Stage 4 evaluation as indicated in Attachment 1, which comprises a review of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of the calibrations, ICB/CCBs, and internal standards, and all QC for 1,4-Dioxane, which were validated manually. Quality assurance (QA)/QC criteria specified in the SAP, DoD QSM, and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition with the following exceptions:

SDG/ Method	Sample	Compound	Finding	Criteria	Flag	A or P
280-110291-1/ 8260B	A1-MW-23-SA1	All compounds	A headspace of >6 mm was apparent in the sample containers.	There should be no headspace in the sample containers.	J (all detects) UJ (all non-detects)	A

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures upon receipt by the laboratory met validation criteria with the exception of one cooler in SDG L1818881 that was reported at 7.9°C. No data was qualified based on the cooler temperature.

All technical holding time requirements were met with the exception of twenty-five samples for pH and twenty-one samples for ferrous iron. Due to grossly exceeded holding times (e.g., >2x recommended holding time), 15 ferrous iron results were qualified as rejected (R). Additionally, the remainder of the data were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

II. Instrument Performance Check

A tune was performed at 12 hour intervals as required by the methods.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

All criteria for the initial calibration and initial calibration verifications of each method were met.

IV. Continuing Calibration

All criteria for the continuing calibration of each method were met with the exception of one continuing calibration for PFAs. Since the outlier was associated with laboratory QC and there were no associated client samples, no data were qualified.

V. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program with the exception of one blank for chloride and sulfate. The associated sample results were not detected or were significantly greater than the concentrations found in the blanks, therefore no data were qualified. The details are presented in Enclosure I.

No contaminant concentrations were detected in the initial or continuing calibration blanks with the following exceptions:

SDG/ Method	Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
280-110226-1/ 9056A	ICB/CCB	Nitrate as Nitrogen	0.04663 mg/L	A1-MW-42-SA1 A1-MW-54-SA1 A1-PZ-19-SA1 A1-MW-52-SA1 A1-MW-01-SA1 A1-MW-31-SA1
280-110291-1/ 9056A	ICB/CCB	Sulfate	0.2460 mg/L	A1-MW-14-SA1 A1-MW-23-SA1 A1-MW-55-SA1
280-110353-1/ 9056A	ICB/CCB	Chloride Sulfate	0.5385 mg/L 0.6554 mg/L	A1-MW-13-SA1 A1-MW-11-SA1 A1-MW-15-SA1

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were not detected or were significantly greater than the concentrations found in the associated blanks.

VI. Field Blank Samples

Five trip blanks were collected and analyzed for VOCs. No contaminants were found.

One equipment blank was collected and analyzed for VOCs and PFAs. No contaminants were found.

Five field rinsate blanks were collected and analyzed for PFAs. No contaminants were found.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the exception of sample 16-HS-03-SA1 in SDG 280-110112-1 for VOCs. The associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosure I.

IX. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for 1,1-dichloroethene, two MS/MSD pairs for several PFAs, three MS/MSD pairs for chloride and sulfate, and three MS/MSD pairs for ferrous iron. The ferrous iron results in samples 16-HS-03-SA1 and A1-MW-31-SA1 were qualified as rejected (R) due to MS/MSD %Rs grossly outside QC limits (i.e., ≤ 30%). The remainder of the associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. No data were qualified where sample concentrations were significantly greater (>4x) than the spike amount. The details regarding the qualification of data are provided in Enclosures I and II.

X. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

XII. Laboratory Control Samples/Ongoing Precision Recovery

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Ongoing precision recovery (OPR) samples were analyzed as required by Method 537 Mod. Percent recoveries (%R) were within QC limits with the exception of two OPR for PFTrDA. No data were qualified due to high %Rs since the associated results were non-detected. The details are presented in Enclosures I and II.

XIII. Field Duplicate Samples

Two field duplicate pairs were collected and analyzed for all methods. All RPDs were within QC limits. RPDs were not calculated when sample results in one or both samples were less than 5X the limit of quantitation (LOQ). The field duplicate result comparisons are provided in Enclosures I and II.

XIV. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801024/ 537	A1-MW-51-SA1	^{13}C3-PFBS	247 (50-150)	PFBS	J (all detects)	P
1801024/ 537	A1-MW-51-SA1	^{13}C3-NEtFOSAA	151 (50-150)	NEtFOSAA	UJ (all non-detects)	P
1801037/ 537	A1-MW-18-SA1	^{13}C3-PFBS	170 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-08-SA1	^{13}C3-PFBS	187 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-19-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-37-SA1	^{13}C3-PFBS	228 (50-150)	PFBS	J (all detects)	P
1801037/ 537	A1-MW-37-SA1D	^{13}C3-PFBS	161 (50-150)	PFBS	J (all detects)	P

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801037/ 537	16-HS-03-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-09-SA1	^{13}C3-PFBS	153 (50-150)	PFBS	J (all detects)	P
1801037/ 537	16-MW-06-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-13-SA1	^{13}C3-PFBS	419 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-11-SA1	^{13}C3-PFBS	271 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-14-SA1	^{13}C3-PFBS	527 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-15-SA1	^{13}C3-PFBS	235 (50-150)	PFBS	J (all detects)	P
1801039/ 537	A1-MW-25-SA1	^{13}C3-PFBS	428 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-42-SA1	^{13}C3-PFBS	310 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-54-SA1	^{13}C3-PFBS	175 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-53-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-PZ-19-SA1	^{13}C3-PFBS	182 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-52-SA1	^{13}C3-PFBS	211 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-01-SA1	^{13}C3-PFBS	192 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-01-SA1D	^{13}C3-PFBS	204 (50-150)	PFBS	J (all detects)	P
1801054/ 537	A1-MW-31-SA1	^{13}C3-PFBS	254 (50-150)	PFBS	J (all detects)	P
1801071/ 537	A1-MW-27-SA1	^{13}C3-PFBS	174 (50-150)	PFBS	J (all detects)	P

SDG/ Method	Sample	Internal Standards	%R (Limits)	Compound	Flag	A or P
1801071/ 537	A1-MW-07-SA1	$^{13}C3$-PFBS	209 (50-150)	PFBS	J (all detects)	P
1801071/ 537	A1-MW-55-SA1	$^{13}C3$-PFBS	165 (50-150)	PFBS	UJ (all non-detects)	P

XV. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosures I and II.

XVI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to severe holding time exceedances and MS/MSD %Rs, data were qualified as rejected in fifteen samples.

Due to headspace, data were qualified as estimated in one sample.

Due to holding time exceedances, data were qualified as estimated in twenty-five samples.

Due to surrogate %R, data were qualified as estimated in one sample.

Due to MS/MSD %R and RPD, data were qualified as estimated in three samples.

Due to internal standard %R, data were qualified as estimated in twenty-five samples.

Due to results below the LOQ, data were qualified as estimated in twenty-six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
22-May-2018	TB-20180522	280-110058-1	TB	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1	1801024-01	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-51-SA1	280-110058-2	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1DUP	280-110058-2DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1MS	280-110058-2MS	MS	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1MS	280-110058-2MS	MS	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-51-SA1MSD	280-110058-2MSD	MSD	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-51-SA1MSD	280-110058-2MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-50-SA1	1801024-02	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-50-SA1	280-110058-3	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-50-SA1DUP	280-110058-3DUP	DUP	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-49-SA1	1801024-03	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-49-SA1	280-110058-4	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-05-SA1	1801024-04	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	9056A	Stage 2B

N = Normal Sample
FD = Field Duplicate
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MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
22-May-2018	A1-MW-05-SA1	280-110058-5	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	A1-MW-04-SA1	1801024-05	N	Gen Prep	537 MOD	Stage 2B
22-May-2018	A1-MW-04-SA1	280-110058-6	N	METHOD	8260B	Stage 2B
22-May-2018	A1-MW-04-SA1	280-110058-6	N	METHOD	9040C	Stage 2B
22-May-2018	A1-MW-04-SA1	280-110058-6	N	METHOD	9056A	Stage 2B
22-May-2018	A1-MW-04-SA1	280-110058-6	N	METHOD	SM3500 Fe B D	Stage 2B
22-May-2018	FRB-20180522	1801024-06	FRB	Gen Prep	537 MOD	Stage 2B
23-May-2018	TB-20180523	280-110112-1	TB	METHOD	8260B	Stage 4
23-May-2018	A1-MW-18-SA1	1801037-01	N	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-18-SA1	280-110112-2	N	METHOD	8260B	Stage 4
23-May-2018	A1-MW-18-SA1	280-110112-2	N	METHOD	9040C	Stage 4
23-May-2018	A1-MW-18-SA1	280-110112-2	N	METHOD	9056A	Stage 4
23-May-2018	A1-MW-18-SA1	280-110112-2	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-18-SA1DUP	280-110112-2DUP	DUP	METHOD	9056A	Stage 4
23-May-2018	A1-MW-18-SA1MS	280-110112-2MS	MS	METHOD	9056A	Stage 4
23-May-2018	A1-MW-18-SA1MSD	280-110112-2MSD	MSD	METHOD	9056A	Stage 4
23-May-2018	16-MW-06-SA1	1801037-08	N	Gen Prep	537 MOD	Stage 4
23-May-2018	16-MW-09-SA1	1801037-07	N	Gen Prep	537 MOD	Stage 4
23-May-2018	16-MW-08-SA1	1801037-02	N	Gen Prep	537 MOD	Stage 4
23-May-2018	16-MW-08-SA1	280-110112-3	N	METHOD	8260B	Stage 4
23-May-2018	16-MW-08-SA1	280-110112-3	N	METHOD	9040C	Stage 4
23-May-2018	16-MW-08-SA1	280-110112-3	N	METHOD	9056A	Stage 4
23-May-2018	16-MW-08-SA1	280-110112-3	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-19-SA1	1801037-03	N	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	8260B	Stage 4
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	9040C	Stage 4

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	9056A	Stage 4
23-May-2018	A1-MW-19-SA1	280-110112-4	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-37-SA1	1801037-04	N	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	8260B	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	9040C	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	9056A	Stage 4
23-May-2018	A1-MW-37-SA1	280-110112-6	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	A1-MW-37-SA1D	1801037-05	FD	Gen Prep	537 MOD	Stage 4
23-May-2018	A1-MW-37-SA1D	280-110112-5	FD	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1	1801037-06	N	Gen Prep	537 MOD	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	9040C	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1	280-110112-7	N	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1DUP	280-110112-7DUP	DUP	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1DUP	280-110112-7DUP	DUP	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1MS	280-110112-7MS	MS	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	8260B	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	9056A	Stage 4
23-May-2018	16-HS-03-SA1MSD	280-110112-7MSD	MSD	METHOD	SM3500 Fe B D	Stage 4
23-May-2018	FRB-20180523	1801037-09	FRB	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-13-SA1	1801039-01	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-11-SA1	1801039-02	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-14-SA1	1801039-03	N	Gen Prep	537 MOD	Stage 2B

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
24-May-2018	A1-MW-15-SA1	1801039-04	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	A1-MW-25-SA1	1801039-07	N	Gen Prep	537 MOD	Stage 2B
24-May-2018	FRB-20180524	1801039-08	FRB	Gen Prep	537 MOD	Stage 2B
25-May-2018	TB-20180525	280-110226-12	TB	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-42-SA1	1801054-01	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-42-SA1	280-110226-1	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-54-SA1	1801054-02	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-54-SA1	280-110226-2	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-53-SA1	1801054-03	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-53-SA1	280-110226-3	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-53-SA1MS	280-110226-3MS	MS	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-53-SA1MSD	280-110226-3MSD	MSD	METHOD	8260B	Stage 2B
25-May-2018	A1-PZ-19-SA1	1801054-04	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	8260B	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	9040C	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	9056A	Stage 2B
25-May-2018	A1-PZ-19-SA1	280-110226-4	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-52-SA1	1801054-05	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	9040C	Stage 2B

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MSD = Matrix Spike Duplicate
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FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-52-SA1	280-110226-5	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-52-SA1DUP	280-110226-5DUP	DUP	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-52-SA1MS	280-110226-5MS	MS	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-52-SA1MSD	280-110226-5MSD	MSD	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-01-SA1	1801054-06	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-01-SA1	280-110226-6	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-01-SA1	280-110226-6	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-01-SA1	280-110226-6	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-01-SA1	280-110226-6	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-01-SA1D	1801054-07	FD	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-01-SA1D	280-110226-7	FD	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-31-SA1	1801054-08	N	Gen Prep	537 MOD	Stage 2B
25-May-2018	A1-MW-31-SA1	280-110226-8	N	METHOD	8260B	Stage 2B
25-May-2018	A1-MW-31-SA1	280-110226-8	N	METHOD	9040C	Stage 2B
25-May-2018	A1-MW-31-SA1	280-110226-8	N	METHOD	9056A	Stage 2B
25-May-2018	A1-MW-31-SA1	280-110226-8	N	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-31-SA1DUP	280-110226-8DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-31-SA1MS	280-110226-8MS	MS	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	A1-MW-31-SA1MSD	280-110226-8MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
25-May-2018	FRB-20180525	1801054-09	FRB	Gen Prep	537 MOD	Stage 2B
30-May-2018	TB-20180530	280-110291-1	TB	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-27-SA1	1801071-01	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	9056A	Stage 2B

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank
MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-27-SA1	280-110291-6	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-25-SA1	280-110291-5	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-55-SA1	1801071-02	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-55-SA1	280-110291-4	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-23-SA1	1801071-03	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-23-SA1	280-110291-3	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-07-SA1	1801071-04	N	Gen Prep	537 MOD	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-07-SA1	280-110291-7	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	8260B	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9040C	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1	280-110291-2	N	METHOD	SM3500 Fe B D	Stage 2B
30-May-2018	A1-MW-14-SA1DUP	280-110291-2DUP	DUP	METHOD	9056A	Stage 2B
30-May-2018	A1-MW-14-SA1MS	280-110291-2MS	MS	METHOD	9056A	Stage 2B

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank
MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-May-2018	A1-MW-14-SA1MSD	280-110291-2MSD	MSD	METHOD	9056A	Stage 2B
30-May-2018	FRB-20180530	1801071-05	FRB	Gen Prep	537 MOD	Stage 2B
31-May-2018	TB-20180531	280-110353-1	TB	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-13-SA1	280-110353-2	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-11-SA1	280-110353-3	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	A1-MW-11-SA1DUP	280-110353-3DUP	DUP	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	8260B	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9040C	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	9056A	Stage 2B
31-May-2018	A1-MW-15-SA1	280-110353-4	N	METHOD	SM3500 Fe B D	Stage 2B
31-May-2018	EB-20180531	1801084-01	EB	Gen Prep	537 MOD	Stage 2B
31-May-2018	EB-20180531	280-110353-5	EB	METHOD	8260B	Stage 2B
31-May-2018	16-HS-03-SA1MS	B8E0244-MS1	MS	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MS	B8E0244-MS2	MS	Gen Prep	537 MOD	Stage 2B
31-May-2018	16-HS-03-SA1MSD	B8E0244-MSD1	MSD	Gen Prep	537 MOD	Stage 4
31-May-2018	A1-MW-53-SA1MSD	B8E0244-MSD2	MSD	Gen Prep	537 MOD	Stage 2B

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank
MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110058-1

Method Category: EM

Method: 9040C **Matrix: AQ**

Sample ID: A1-MW-04-SA1 **Collected:** 5/22/2018 2:06:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-05-SA1 **Collected:** 5/22/2018 1:19:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-49-SA1 **Collected:** 5/22/2018 12:20:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-50-SA1 **Collected:** 5/22/2018 11:30:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-51-SA1 **Collected:** 5/22/2018 10:14:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A **Matrix: AQ**

Sample ID: A1-MW-49-SA1 **Collected:** 5/22/2018 12:20:00 PM **Analysis Type:** RE/TOT **Dilution:** 10

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	2.82	J	1.00	LOD	5.00	LOQ	mg/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110058-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-04-SA1** ***Collected:*** **5/22/2018 2:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0751	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-05-SA1** ***Collected:*** **5/22/2018 1:19:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0617	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-49-SA1** ***Collected:*** **5/22/2018 12:20:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	UJ	StoA

Sample ID: **A1-MW-50-SA1** ***Collected:*** **5/22/2018 11:30:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-51-SA1** ***Collected:*** **5/22/2018 10:14:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0563	J HF F1	0.0500	LOD	0.200	LOQ	mg/L	J	RI, Ms, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA1** ***Collected:*** **5/22/2018 11:30:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.643	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.903	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110058-1

Method Category: VOA

Method: 8260B **Matrix:** AQ

Sample ID: A1-MW-51-SA1 **Collected:** 5/22/2018 10:14:00 AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.629	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.571	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110112-1

Method Category: EM

Method: 9040C **Matrix:** AQ

Sample ID: 16-HS-03-SA1 **Collected:** 5/23/2018 2:19:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.2	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: 16-MW-08-SA1 **Collected:** 5/23/2018 11:09:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-18-SA1 **Collected:** 5/23/2018 9:00:00 AM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-19-SA1 **Collected:** 5/23/2018 12:03:00 PM **Analysis Type:** RES/TOT **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110112-1

Method Category: EM
Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.7	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM
Method: 9056A ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RE2/TOT ***Dilution:*** 50

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Sulfate	2120	F1	25.0	LOD	250	LOQ	mg/L	J	Ms

Method Category: GENCHEM
Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	Ms

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0403	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0215	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110112-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.166	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.800	U F1 F2	0.800	LOD	1.00	LOQ	ug/L	UJ	Ms, Surr
TETRACHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Surr
TRICHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Surr

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.669	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.452	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-19-SA1 ***Collected:*** 5/23/2018 12:03:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.424	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110112-1

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-37-SA1 ***Collected:*** 5/23/2018 1:16:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.624	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-37-SA1D ***Collected:*** 5/23/2018 1:26:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.652	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110226-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-01-SA1 ***Collected:*** 5/25/2018 1:56:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-31-SA1 ***Collected:*** 5/25/2018 2:49:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-42-SA1 ***Collected:*** 5/25/2018 7:56:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-52-SA1 ***Collected:*** 5/25/2018 1:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110226-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **9056A** ***Matrix:*** **AQ**

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RE/TOT** ***Dilution:*** **5**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLORIDE	500	F1	2.50	LOD	15.0	LOQ	mg/L	J	Ms

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	0.343	J	0.100	LOD	0.500	LOQ	mg/L	J	RI

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA1** ***Collected:*** **5/25/2018 1:56:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110226-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	Ms, StoA

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.198	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.353	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110226-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.298	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.415	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.507	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.627	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.269	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110291-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110291-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-25-SA1** ***Collected:*** **5/30/2018 9:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-27-SA1** ***Collected:*** **5/30/2018 8:18:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-55-SA1** ***Collected:*** **5/30/2018 10:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110291-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-23-SA1 ***Collected:*** 5/30/2018 11:10:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-25-SA1 ***Collected:*** 5/30/2018 9:12:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.123	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: A1-MW-27-SA1 ***Collected:*** 5/30/2018 8:18:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-55-SA1 ***Collected:*** 5/30/2018 10:16:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-07-SA1 ***Collected:*** 5/30/2018 12:06:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.405	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.797	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-14-SA1 ***Collected:*** 5/30/2018 1:38:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.898	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-110291-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-14-SA1** ***Collected:*** **5/30/2018 1:38:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.876	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.800	U	0.800	LOD	1.00	LOQ	ug/L	UJ	Headspace
TETRACHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Headspace
TRICHLOROETHENE	0.400	U	0.400	LOD	1.00	LOQ	ug/L	UJ	Headspace

Sample ID: **A1-MW-25-SA1** ***Collected:*** **5/30/2018 9:12:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.204	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.418	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-110353-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/31/2018 8:24:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/31/2018 7:43:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1, **Laboratory: TA DEN**

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-110353-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/31/2018 8:24:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/31/2018 7:43:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-15-SA1** ***Collected:*** **5/31/2018 9:16:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
TRICHLOROETHENE	0.321	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-110058-1, 280-110112-1,

Laboratory: TA DEN

EDD Filename: Prep280-110058-1, Prep280-110112-1, Prep280-110226-1, Prep280-110291-1, Prep280-110353-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

Reason Code Legend

Reason Code	*Description*
Headspace	Preservation
Mb	Method Blank Contamination
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
Preservation	Preservation
RI	Reporting Limit Trace Value
StoA	Sampling to Analysis Estimation
StoA	Sampling to Analysis Rejection
Surr	Surrogate/Tracer Recovery Lower Estimation

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801024

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-04-SA1** ***Collected:*** **5/22/2018 2:06:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00333	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI
PFOS	0.00161	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI

Sample ID: **A1-MW-05-SA1** ***Collected:*** **5/22/2018 1:19:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.000917	J	0.00525	LOD	0.00842	LOQ	ug/L	J	RI
PFHxS	0.00278	J	0.00525	LOD	0.00842	LOQ	ug/L	J	RI

Sample ID: **A1-MW-49-SA1** ***Collected:*** **5/22/2018 12:20:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.00627	J	0.00508	LOD	0.00812	LOQ	ug/L	J	RI

Sample ID: **A1-MW-51-SA1** ***Collected:*** **5/22/2018 10:14:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00521	U	0.00521	LOD	0.00836	LOQ	ug/L	UJ	Is
PFBS	0.0613		0.00521	LOD	0.00836	LOQ	ug/L	J	Is
PFOS	0.00303	J	0.00521	LOD	0.00836	LOQ	ug/L	J	RI

SDG: 1801037

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **16-HS-03-SA1** ***Collected:*** **5/23/2018 2:19:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.582		0.00500	LOD	0.00803	LOQ	ug/L	J	Is
PFHxS	0.150		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801037

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: 16-HS-03-SA1 ***Collected:*** 5/23/2018 2:19:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.0218		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms
PFHpA	0.198		0.00500	LOD	0.00803	LOQ	ug/L	J	Ms, Ms

Sample ID: 16-MW-06-SA1 ***Collected:*** 5/23/2018 9:50:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.112		0.00563	LOD	0.00897	LOQ	ug/L	J	Is
PFOS	0.00227	J	0.00563	LOD	0.00897	LOQ	ug/L	J	RI

Sample ID: 16-MW-08-SA1 ***Collected:*** 5/23/2018 11:09:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	1.29		0.00543	LOD	0.00870	LOQ	ug/L	J	Is
PFNA	0.00102	J	0.00543	LOD	0.00870	LOQ	ug/L	J	RI

Sample ID: 16-MW-09-SA1 ***Collected:*** 5/23/2018 10:15:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.124		0.00543	LOD	0.00871	LOQ	ug/L	J	Is
PFDA	0.00440	J	0.00543	LOD	0.00871	LOQ	ug/L	J	RI
PFNA	0.00326	J	0.00543	LOD	0.00871	LOQ	ug/L	J	RI

Sample ID: A1-MW-18-SA1 ***Collected:*** 5/23/2018 9:00:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0244		0.00553	LOD	0.00888	LOQ	ug/L	J	Is
PFOA	0.00187	J	0.00553	LOD	0.00888	LOQ	ug/L	J	RI
PFOS	0.00437	J	0.00553	LOD	0.00888	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801037

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-19-SA1** ***Collected:*** **5/23/2018 12:03:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0166		0.00530	LOD	0.00846	LOQ	ug/L	J	Is
PFDA	0.00727	J	0.00530	LOD	0.00846	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA1** ***Collected:*** **5/23/2018 1:16:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.230		0.00525	LOD	0.00839	LOQ	ug/L	J	Is
PFNA	0.00170	J	0.00525	LOD	0.00839	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA1D** ***Collected:*** **5/23/2018 1:26:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.252		0.00539	LOD	0.00862	LOQ	ug/L	J	Is
PFNA	0.00210	J	0.00539	LOD	0.00862	LOQ	ug/L	J	RI
PFUnA	0.00135	J	0.00539	LOD	0.00862	LOQ	ug/L	J	RI

SDG: 1801039

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-11-SA1** ***Collected:*** **5/24/2018 8:51:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00359	J	0.00539	LOD	0.00860	LOQ	ug/L	J	RI
PFBS	0.109		0.00539	LOD	0.00860	LOQ	ug/L	J	Is

Sample ID: **A1-MW-13-SA1** ***Collected:*** **5/24/2018 7:44:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.318		0.00568	LOD	0.00912	LOQ	ug/L	J	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039, **Laboratory: Vista**

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

SDG: 1801039

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: A1-MW-14-SA1 ***Collected:*** 5/24/2018 10:05:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.118		0.00558	LOD	0.00893	LOQ	ug/L	J	Is

Sample ID: A1-MW-15-SA1 ***Collected:*** 5/24/2018 11:11:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.523		0.00558	LOD	0.00889	LOQ	ug/L	J	Is

Sample ID: A1-MW-25-SA1 ***Collected:*** 5/24/2018 2:18:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.355		0.00553	LOD	0.00889	LOQ	ug/L	J	Is

SDG: 1801054

Method Category: SVOA

Method: 537 MOD ***Matrix:*** AQ

Sample ID: A1-MW-01-SA1 ***Collected:*** 5/25/2018 1:56:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0524		0.00568	LOD	0.00907	LOQ	ug/L	J	Is
PFHpA	0.00225	J	0.00568	LOD	0.00907	LOQ	ug/L	J	RI

Sample ID: A1-MW-01-SA1D ***Collected:*** 5/25/2018 2:06:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0557		0.00534	LOD	0.00854	LOQ	ug/L	J	Is
PFHpA	0.00273	J	0.00534	LOD	0.00854	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039, **Laboratory: Vista**

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

SDG: 1801054

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-31-SA1** ***Collected:*** **5/25/2018 2:49:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0634		0.00553	LOD	0.00887	LOQ	ug/L	J	Is
PFHpA	0.00851	J	0.00553	LOD	0.00887	LOQ	ug/L	J	RI

Sample ID: **A1-MW-42-SA1** ***Collected:*** **5/25/2018 7:56:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.292		0.00553	LOD	0.00887	LOQ	ug/L	J	Is
PFOS	0.00186	J	0.00553	LOD	0.00887	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA1** ***Collected:*** **5/25/2018 1:00:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.146		0.00543	LOD	0.00869	LOQ	ug/L	J	Is

Sample ID: **A1-MW-53-SA1** ***Collected:*** **5/25/2018 10:14:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.551		0.00548	LOD	0.00878	LOQ	ug/L	J	Is
PFOS	0.00188	J	0.00548	LOD	0.00878	LOQ	ug/L	J	RI

Sample ID: **A1-MW-54-SA1** ***Collected:*** **5/25/2018 9:09:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.536		0.00558	LOD	0.00892	LOQ	ug/L	J	Is
PFOS	0.00652	J	0.00558	LOD	0.00892	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0152		0.00534	LOD	0.00852	LOQ	ug/L	J	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1801054

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-PZ-19-SA1** ***Collected:*** **5/25/2018 11:59:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00326	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI
PFOA	0.00756	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI
PFOS	0.00115	J	0.00534	LOD	0.00852	LOQ	ug/L	J	RI

SDG: 1801071

Method Category: **SVOA**

Method: **537 MOD** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA1** ***Collected:*** **5/30/2018 12:06:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.112		0.00525	LOD	0.00840	LOQ	ug/L	J	Is

Sample ID: **A1-MW-23-SA1** ***Collected:*** **5/30/2018 11:10:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00581	J	0.00548	LOD	0.00874	LOQ	ug/L	J	RI

Sample ID: **A1-MW-27-SA1** ***Collected:*** **5/30/2018 8:18:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.0819		0.00534	LOD	0.00854	LOQ	ug/L	J	Is

Sample ID: **A1-MW-55-SA1** ***Collected:*** **5/30/2018 10:16:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFBS	0.00548	U	0.00548	LOD	0.00875	LOQ	ug/L	UJ	Is

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 1801024, 1801037, 1801039,

Laboratory: Vista

EDD Filename: 1801024, 1801037, 1801039, 1801054, 1801071, 1801084

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

Reason Code Legend

Reason Code	*Description*
Is	Internal Standard Estimation
Lcs	Laboratory Control Spike Upper Estimation
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
Ms	Matrix Spike Upper Estimation
RI	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Enclosure I

Stage 2B ADR Outliers

(Including Manual Review Outliers)

Quality Control
Outlier Reports

280-110058-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA1 (RES/TOT)	Sampling To Analysis	226.00	24.00	HOURS	J (all detects)
A1-MW-05-SA1 (RES/TOT)		319.25	24.00	HOURS	
A1-MW-49-SA1 (RES/TOT)		227.75	24.00	HOURS	
A1-MW-50-SA1 (RES/TOT)		228.25	24.00	HOURS	
A1-MW-50-SA1DUP (RES/TOT)		228.50	24.00	HOURS	
A1-MW-51-SA1 (RES/TOT)		229.25	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA1 (RES/TOT)	Sampling To Analysis	45.75	24.00	HOURS	J(all detects)
A1-MW-05-SA1 (RES/TOT)		46.50	24.00	HOURS	UJ(all non-detects)
A1-MW-49-SA1 (RES/TOT)		47.50	24.00	HOURS	
A1-MW-50-SA1 (RES/TOT)	Sampling To Analysis	48.25	24.00	HOURS	J(all detects)
A1-MW-51-SA1 (RES/TOT)		49.50	24.00	HOURS	R(all non-detects)
A1-MW-51-SA1DUP (RES/TOT)		49.50	24.00	HOURS	
A1-MW-51-SA1MS (RES/TOT)		49.50	24.00	HOURS	
A1-MW-51-SA1MSD (RES/TOT)		49.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-51-SA1MS A1-MW-51-SA1MSD (A1-MW-51-SA1)	Ferrous Iron	38	39	85.00-113.00	-	Ferrous Iron	J (all detects) UJ (all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110058-1 **Laboratory: TA DEN**

EDD Filename: 280-110058-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-50-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.643 0.903	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-51-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.629 0.571	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: 9056A

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-49-SA1	NITRATE	J	2.82	5.00	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-04-SA1	Ferrous Iron	J HF	0.0751	0.200	LOQ	mg/L	J (all detects)
A1-MW-05-SA1	Ferrous Iron	J HF	0.0617	0.200	LOQ	mg/L	J (all detects)
A1-MW-51-SA1	Ferrous Iron	J HF F1	0.0563	0.200	LOQ	mg/L	J (all detects)

LDC #: 42613A1
SDG #: 280-110058-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/13/18
Page: 1 of 1
Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤20%
IV.	Continuing calibration	A	CCV≤20/60%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB=1.
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180522	280-110058-1	Water	05/22/18
2	A1-MW-51-SA1	280-110058-2	Water	05/22/18
3	A1-MW-50-SA1	280-110058-3	Water	05/22/18
4	A1-MW-49-SA1	280-110058-4	Water	05/22/18
5	A1-MW-05-SA1	280-110058-5	Water	05/22/18
6	A1-MW-04-SA1	280-110058-6	Water	05/22/18
7	A1-MW-51-SA1MS	280-110058-2MS	Water	05/22/18
8	A1-MW-51-SA1MSD	280-110058-2MSD	Water	05/22/18
9				
10				

Notes:

LDC #: 42613A6
SDG #: 280-110058-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: a
2nd Reviewer: KC

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	280-110058-2	Water	05/22/18
2	A1-MW-50-SA1	280-110058-3	Water	05/22/18
3	A1-MW-49-SA1	280-110058-4	Water	05/22/18
4	A1-MW-05-SA1	280-110058-5	Water	05/22/18
5	A1-MW-04-SA1	280-110058-6	Water	05/22/18
6	A1-MW-51-SA1MS	280-110058-2MS	Water	05/22/18
7	A1-MW-51-SA1MSD	280-110058-2MSD	Water	05/22/18
8	A1-MW-51-SA1DUP	280-110058-2DUP	Water	05/22/18
9	A1-MW-50-SA1DUP	280-110058-3DUP	Water	05/22/18
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 42613A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KW

All circled methods are applicable to each sample.

Sample ID	Parameter
1-5	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe3+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC:6,7	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
8	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
9	(pH) TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

Quality Control
Outlier Reports

280-110112-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**
EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**
Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA1 (RES/TOT)	Sampling To Analysis	201.25	24.00	HOURS	J (all detects)
16-MW-08-SA1 (RES/TOT)		204.25	24.00	HOURS	
A1-MW-18-SA1 (RES/TOT)		206.25	24.00	HOURS	
A1-MW-19-SA1 (RES/TOT)		203.25	24.00	HOURS	
A1-MW-37-SA1 (RES/TOT)		202.25	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**
Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-18-SA1 (RES/TOT)	Sampling To Analysis	26.85	24.00	HOURS	J(all detects) UJ(all non-detects)

Surrogate Outlier Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**
Matrix: **AQ**

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
16-HS-03-SA1	TOLUENE-D8	75	89.00-112.00	All Target Analytes	J (all detects) UJ (all non-detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	Ferrous Iron	1	0	85.00-113.00	-	Ferrous Iron	J (all detects) R (all non-detects)

Method: 8260B
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	1,1-DICHLOROETHENE	56	33	71.00-131.00	53 (20.00)	1,1-DICHLOROETHENE	J(all detects) UJ(all non-detects)

Method: 9056A
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-HS-03-SA1MSD (16-HS-03-SA1)	Sulfate	-	86	87.00-112.00	-	Sulfate	J(all detects) UJ(all non-detects)
A1-MW-18-SA1MS A1-MW-18-SA1MSD (A1-MW-18-SA1)	CHLORIDE Sulfate	50 73	45 72	87.00-111.00 87.00-112.00	- -	CHLORIDE Sulfate	No Qual, >4x

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-08-SA1	TETRACHLOROETHENE	J	0.669	1.00	LOQ	ug/L	J (all detects)
A1-MW-18-SA1	1,1-DICHLOROETHENE	J	0.452	1.00	LOQ	ug/L	J (all detects)
A1-MW-19-SA1	TRICHLOROETHENE	J	0.424	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA1	TRICHLOROETHENE	J	0.624	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA1D	TRICHLOROETHENE	J	0.652	1.00	LOQ	ug/L	J (all detects)

Method: **SM3500 Fe B D**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-08-SA1	Ferrous Iron	J HF	0.0403	0.200	LOQ	mg/L	J (all detects)
A1-MW-18-SA1	Ferrous Iron	J HF	0.0215	0.200	LOQ	mg/L	J (all detects)
A1-MW-37-SA1	Ferrous Iron	J HF	0.166	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-110112-1 **Laboratory: TA DEN**

EDD Filename: 280-110112-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA1	A1-MW-37-SA1D			
TRICHLOROETHENE	0.624	0.652	NC	30.00	No Qualifiers Applied

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Quality Control
Outlier Reports

280-110226-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA1 (RES/TOT)	Sampling To Analysis	154.50	24.00	HOURS	J (all detects)
A1-MW-31-SA1 (RES/TOT)		154.00	24.00	HOURS	
A1-MW-42-SA1 (RES/TOT)		160.25	24.00	HOURS	
A1-MW-52-SA1 (RES/TOT)		155.50	24.00	HOURS	
A1-MW-54-SA1 (RES/TOT)		159.25	24.00	HOURS	
A1-PZ-19-SA1 (RES/TOT)		156.50	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA1 (RES/TOT)	Sampling To Analysis	452.25	24.00	HOURS	J(all detects)
A1-MW-31-SA1 (RES/TOT)		451.25	24.00	HOURS	R(all non-detects)
A1-MW-31-SA1DUP (RES/TOT)		451.25	24.00	HOURS	
A1-MW-31-SA1DUP (RE/TOT)		452.25	24.00	HOURS	
A1-MW-31-SA1MS (RES/TOT)		451.25	24.00	HOURS	
A1-MW-31-SA1MS (RE/TOT)		452.25	24.00	HOURS	
A1-MW-31-SA1MSD (RES/TOT)		451.50	24.00	HOURS	
A1-MW-31-SA1MSD (RE/TOT)		452.25	24.00	HOURS	
A1-MW-42-SA1 (RES/TOT)		458.25	24.00	HOURS	
A1-MW-52-SA1 (RES/TOT)		453.25	24.00	HOURS	
A1-MW-54-SA1 (RES/TOT)		457.00	24.00	HOURS	
A1-PZ-19-SA1 (RES/TOT)		454.25	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9056A
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-52-SA1MS A1-MW-52-SA1MSD (A1-MW-52-SA1)	CHLORIDE Sulfate	- 75	84 70	87.00-111.00 87.00-112.00	- -	CHLORIDE Sulfate**	J (all detects) ** No Qual, >4x

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-31-SA1MS A1-MW-31-SA1MSD (A1-MW-31-SA1)	Ferrous Iron	21	21	85.00-113.00	-	Ferrous Iron	J(all detects) R(all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110226-1 **Laboratory: TA DEN**

EDD Filename: 280-110226-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-31-SA1	TRICHLOROETHENE	J	0.353	1.00	LOQ	ug/L	J (all detects)
A1-MW-42-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.298 0.415	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-52-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.507 0.627	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-PZ-19-SA1	TRICHLOROETHENE	J	0.269	1.00	LOQ	ug/L	J (all detects)

Method: 9056A

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-54-SA1	NITRATE	J	0.343	0.500	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-PZ-19-SA1	Ferrous Iron	J HF	0.198	0.200	LOQ	mg/L	J (all detects)

LDC #: 42613C1
SDG #: 280-110226-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/19/18
Page: 1 of 1
Reviewer: 1
2nd Reviewer: RW

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/20%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 9
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	ND	D = 6+7
XI.	Internal standards	A	(MS/MSD - FSaut)
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	280-110226-1	Water	05/25/18
2	A1-MW-54-SA1	280-110226-2	Water	05/25/18
3	A1-MW-53-SA1	280-110226-3	Water	05/25/18
4	A1-PZ-19-SA1	280-110226-4	Water	05/25/18
5	A1-MW-52-SA1	280-110226-5	Water	05/25/18
6	A1-MW-01-SA1	280-110226-6	Water	05/25/18
7	A1-MW-01-SA1D	280-110226-7	Water	05/25/18
8	A1-MW-31-SA1	280-110226-8	Water	05/25/18
9	TB-20180525	280-110226-12	Water	05/25/18
10	A1-MW-53-SA1MS	280-110226-3MS	Water	05/25/18
11	A1-MW-53-SA1MSD	280-110226-3MSD	Water	05/25/18
12				
13				

LDC #: 42613C6
SDG #: 280-110226-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: G
2nd Reviewer: KW

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B)
pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/-	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	ASW	
V	Field blanks	-	
VI.	Matrix Spike/Matrix Spike Duplicates	N	7/8:SO4 7/x
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	-	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	280-110226-1	Water	05/25/18
2	A1-MW-54-SA1	280-110226-2	Water	05/25/18
3	A1-PZ-19-SA1	280-110226-4	Water	05/25/18
4	A1-MW-52-SA1	280-110226-5	Water	05/25/18
5	A1-MW-01-SA1	280-110226-6	Water	05/25/18
6	A1-MW-31-SA1	280-110226-8	Water	05/25/18
7	A1-MW-52-SA1MS	280-110226-5MS	Water	05/25/18
8	A1-MW-52-SA1MSD	280-110226-5MSD	Water	05/25/18
9	A1-MW-52-SA1DUP	280-110226-5DUP	Water	05/25/18
10	A1-MW-31-SA1MS1	280-110226-8MS1	Water	05/25/18
11	A1-MW-31-SA1MSD1	280-110226-8MSD1	Water	05/25/18
12	A1-MW-31-SA1DUP1	280-110226-8DUP2	Water	05/25/18
13	A1-MW-31-SA1MS2	280-110226-8MS2	Water	05/25/18
14	A1-MW-31-SA1MSD2	280-110226-8MSD2	Water	05/25/18
15	A1-MW-31-SA1DUP2	280-110226-8DUP2	Water	05/25/18
16				

Notes:

LDC #: 42613C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
10,11	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
12	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
13,14	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
15	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613C6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** All

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No qual (>5x)								
NO3-N		0.04663	0.23315									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-110291-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110291-1 **Laboratory: TA DEN**

EDD Filename: 280-110291-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA1 (RES/TOT)	Sampling To Analysis	78.25	24.00	HOURS	J (all detects)
A1-MW-14-SA1 (RES/TOT)		76.25	24.00	HOURS	
A1-MW-23-SA1 (RES/TOT)		79.00	24.00	HOURS	
A1-MW-25-SA1 (RES/TOT)		81.00	24.00	HOURS	
A1-MW-27-SA1 (RES/TOT)		82.00	24.00	HOURS	
A1-MW-55-SA1 (RES/TOT)		79.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA1 (RES/TOT)	Sampling To Analysis	334.25	24.00	HOURS	J(all detects)
A1-MW-14-SA1 (RES/TOT)		332.50	24.00	HOURS	R(all non-detects)
A1-MW-23-SA1 (RES/TOT)		335.00	24.00	HOURS	
A1-MW-25-SA1 (RES/TOT)		337.00	24.00	HOURS	
A1-MW-27-SA1 (RES/TOT)		338.00	24.00	HOURS	
A1-MW-55-SA1 (RES/TOT)		336.00	24.00	HOURS	

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110291-1 **Laboratory: TA DEN**

EDD Filename: 280-110291-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-07-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.405 0.797	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-14-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.898 0.876	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-25-SA1	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.204 0.418	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: **SM3500 Fe B D**

Matrix: **AQ**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-25-SA1	Ferrous Iron	J HF	0.123	0.200	LOQ	mg/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613D1

SDG #: 280-110291-1

Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET

ADR

Date: 7/18/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration / Endrin	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180530	280-110291-1	Water	05/30/18
2	A1-MW-14-SA1	280-110291-2	Water	05/30/18
3	A1-MW-23-SA1	280-110291-3	Water	05/30/18
4	A1-MW-55-SA1	280-110291-4	Water	05/30/18
5	A1-MW-25-SA1	280-110291-5	Water	05/30/18
6	A1-MW-27-SA1	280-110291-6	Water	05/30/18
7	A1-MW-07-SA1	280-110291-7	Water	05/30/18
8				
9				

Notes:

LDC #: 43613D1

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RK

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?
(Y) N N/A Were air bubbles > 1/4 inch or was headspace present in the vials?

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
3 (ND)	Headspace		> 6 mm				J (ND)

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Within 14 days of sample collection.
Soil:	Within 14 days of sample collection.

LDC #: 42613D6
SDG #: 280-110291-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/18/18
Page: 1 of 1
Reviewer: a
2nd Reviewer: KK

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/-	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-14-SA1	280-110291-2	Water	05/30/18
2	A1-MW-23-SA1	280-110291-3	Water	05/30/18
3	A1-MW-55-SA1	280-110291-4	Water	05/30/18
4	A1-MW-25-SA1	280-110291-5	Water	05/30/18
5	A1-MW-27-SA1	280-110291-6	Water	05/30/18
6	A1-MW-07-SA1	280-110291-7	Water	05/30/18
7	A1-MW-14-SA1MS	280-110291-2MS	Water	05/30/18
8	A1-MW-14-SA1MSD	280-110291-2MSD	Water	05/30/18
9	A1-MW-14-SA1DUP	280-110291-2DUP	Water	05/30/18
10				
11				
12				
13				
14				
15				
16				

Notes:

LDC #: 42613O6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: RW

All circled methods are applicable to each sample.

Sample ID	Parameter
1-6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments: _____

LDC #: 42613D6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-3

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No qual (>5x)								
SO4		0.2460	1.23									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-110353-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA1 (RES/TOT)	Sampling To Analysis	111.75	24.00	HOURS	J (all detects)
A1-MW-11-SA1DUP (RES/TOT)		111.75	24.00	HOURS	
A1-MW-13-SA1 (RES/TOT)		112.50	24.00	HOURS	
A1-MW-15-SA1 (RES/TOT)		110.50	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA1 (RES/TOT)	Sampling To Analysis	313.75	24.00	HOURS	J(all detects)
A1-MW-13-SA1 (RES/TOT)		314.50	24.00	HOURS	R(all non-detects)
A1-MW-15-SA1 (RES/TOT)		313.00	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-417070/6	6/1/2018 12:10:00 PM	CHLORIDE Sulfate	0.5189 mg/L 0.6146 mg/L	A1-MW-11-SA1 A1-MW-13-SA1 A1-MW-15-SA1

Reporting Limit Outliers

Lab Reporting Batch ID: 280-110353-1 **Laboratory: TA DEN**

EDD Filename: 280-110353-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-15-SA1	TRICHLOROETHENE	J	0.321	1.00	LOQ	ug/L	J (all detects)

LDC #: 42613E1 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/12/18
SDG #: 280-110353-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	TB = 1. EB = 5
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180531	280-110353-1	Water	05/31/18
2	A1-MW-13-SA1	280-110353-2	Water	05/31/18
3	A1-MW-11-SA1	280-110353-3	Water	05/31/18
4	A1-MW-15-SA1	280-110353-4	Water	05/31/18
5	EB-20180531	280-110353-5	Water	05/31/18
6				
7				
8				

Notes:

LDC #: 42613E6
SDG #: 280-110353-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 7/8/18
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/—	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	—	
VI.	Matrix Spike/Matrix Spike Duplicates	N	
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	—	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	280-110353-2	Water	05/31/18
2	A1-MW-11-SA1	280-110353-3	Water	05/31/18
3	A1-MW-15-SA1	280-110353-4	Water	05/31/18
4	A1-MW-11-SA1DUP	280-110353-3DUP	Water	05/31/18
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Notes:

LDC #: 42613E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC:4	(pH) TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613E6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: G
2nd Reviewer: KK

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** All

Analyte	Blank ID	Blank ID	Blank Action Limit										
	PB	ICB/CCB (mg/L)		No qual (>5x)									
Cl		0.5385	2.6925										
SO4		0.6554	3.277										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control Outlier Reports

1801024

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801024 **Laboratory: Vista**

EDD Filename: 1801024 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0250-BS1 (A1-MW-04-SA1 A1-MW-05-SA1 A1-MW-49-SA1 A1-MW-50-SA1 A1-MW-51-SA1 FRB-20180522)	PFTrDA	138	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801024 **Laboratory: Vista**

EDD Filename: 1801024 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-04-SA1	PFOA PFOS	J J	0.00333 0.00161	0.00812 0.00812	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-05-SA1	PFHpA PFHxS	J J	0.000917 0.00278	0.00842 0.00842	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-49-SA1	PFBS	J	0.00627	0.00812	LOQ	ug/L	J (all detects)
A1-MW-51-SA1	PFOS	J	0.00303	0.00836	LOQ	ug/L	J (all detects)

LDC #: 42613L96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801024 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 2nd Reviewer: KLC

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD<20% r². True/ICV = 30%
IV.	Continuing calibration	A	CCV = 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB = 6
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	1801024-01	Water	05/22/18
2	A1-MW-50-SA1	1801024-02	Water	05/22/18
3	A1-MW-49-SA1	1801024-03	Water	05/22/18
4	A1-MW-05-SA1	1801024-04	Water	05/22/18
5	A1-MW-04-SA1	1801024-05	Water	05/22/18
6	FRB-20180522	1801024-06	Water	05/22/18
7				
8				
9				

Notes:

	BBE0250-BK1						

LDC #: 26132L96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A Were all internal standard area counts within 50-150% limits?

Y/N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		BBE0250-BA	13C2-PFUnA	AT. 6 (50-150)		Y/N/A
		1 (dets)	13C3-PFBS	247		(PFBS)
		(ND)	d5-Et FOSAA	151		(Et FOSAA)

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Quality Control
Outlier Reports

1801037

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	NMeFOSAA	-	-	70.00-130.00	41.1 (30.00)	NMeFOSAA	J (all detects)
	PFDA	132	-	70.00-130.00	-	PFDA	
	PFDoA	136	-	70.00-130.00	-	PFDoA	
	PFHpA	140	-	70.00-130.00	49.6 (30.00)	PFHpA	
	PFHxS	146	-	70.00-130.00	-	PFHxS	
	PFOA	131	-	70.00-130.00	-	PFOA	
	PFTrDA	136	133	70.00-130.00	-	PFTrDA	
16-HS-03-SA1MS 16-HS-03-SA1MSD (16-HS-03-SA1)	PFHxA	-21	-	70.00-130.00	329 (30.00)	PFHxA	No Qual, >4x
	PFBS	182	-	70.00-130.00	45.9 (30.00)	PFBS	

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0244-BS1 (16-HS-03-SA1 16-MW-06-SA1 16-MW-08-SA1 16-MW-09-SA1 A1-MW-18-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D FRB-20180523)	PFTrDA	153	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA1	PFOS	J	0.00227	0.00897	LOQ	ug/L	J (all detects)
16-MW-08-SA1	PFNA	J	0.00102	0.00870	LOQ	ug/L	J (all detects)
16-MW-09-SA1	PFDA PFNA	J J	0.00440 0.00326	0.00871 0.00871	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-18-SA1	PFOA PFOS	J J	0.00187 0.00437	0.00888 0.00888	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-19-SA1	PFDA	J	0.00727	0.00846	LOQ	ug/L	J (all detects)
A1-MW-37-SA1	PFNA	J	0.00170	0.00839	LOQ	ug/L	J (all detects)
A1-MW-37-SA1D	PFNA PFUnA	J J	0.00210 0.00135	0.00862 0.00862	LOQ LOQ	ug/L ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1801037 **Laboratory: Vista**

EDD Filename: 1801037 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	A1-MW-37-SA1	A1-MW-37-SA1D			
PFBS	0.230	0.252	9	30.00	No Qualifiers Applied
PFHpA	0.0328	0.0322	NC	30.00	
PFHxA	1.66	1.71	3	30.00	
PFHxS	0.155	0.152	2	30.00	
PFNA	0.00170	0.00210	NC	30.00	
PFOA	0.0196	0.0203	NC	30.00	
PFOS	0.0458	0.0416	NC	30.00	
PFUnA	0.00839 U	0.00135	NC	30.00	

LDC #: 42613M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801037 ADR/Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 1
2nd Reviewer: KC

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	Not reviewed for ADR validation
VI.	Field blanks	ND	FRB = 9
VII.	Surrogate spikes	N	Not reviewed for ADR validation
VIII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation
IX.	Laboratory control samples		Not reviewed for ADR validation
X.	Field duplicates	SW	D = 4+5
XI.	Internal standards	SW	Not reviewed for ADR validation
XII.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation
XIII.	Target compound identification		Not reviewed for ADR validation
XIV.	System performance		Not reviewed for ADR validation
XV.	Overall assessment of data		Not reviewed for ADR validation

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1**	1801037-01**	Water	05/23/18
2	16-MW-08-SA1**	1801037-02**	Water	05/23/18
3	A1-MW-19-SA1**	1801037-03**	Water	05/23/18
4	A1-MW-37-SA1**	1801037-04**	Water	05/23/18
5	A1-MW-37-SA1D**	1801037-05**	Water	05/23/18
6	16-HS-03-SA1**	1801037-06**	Water	05/23/18
7	16-MW-09-SA1**	1801037-07**	Water	05/23/18
8	16-MW-06-SA1**	1801037-08**	Water	05/23/18
9	FRB-20180523	1801037-09	Water	05/23/18
10	16-HS-03-SA1MS	1801037-06MS	Water	05/23/18
11	16-HS-03-SA1MSD	1801037-06MSD	Water	05/23/18
12				
13	B8E0244-BLK1			
14				

LDC #: 423496

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (lab)	13C3-PFBS	170 (50-150)		J (PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8		214		
		10 (MS)		167		No Qual
		11 (MSD)		165		

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LDC#: 42613M96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: RK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	4	5		
PFBS	0.230	0.252	9	
PFHxA	1.66	1.71	3	
PFHpA	0.0328	0.0322	~~2~~ NC	
PFHxS	0.155	0.152	2	
PFOA	0.0196	0.0203	~~4~~ NC	
PFNA	0.00170	0.00210	~~21~~ NC	
PFOS	0.0458	0.0416	~~10~~ NC	
PFUnA	0.00525U	0.00135	NC	

Quality Control
Outlier Reports

1801039

Reporting Limit Outliers

Lab Reporting Batch ID: 1801039 **Laboratory: Vista**

EDD Filename: 1801039 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-11-SA1	PFOS	J	0.00359	0.00860	LOQ	ug/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613N96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/12/18
SDG #: 1801039 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB=6
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	1801039-01	Water	05/24/18
2	A1-MW-11-SA1	1801039-02	Water	05/24/18
3	A1-MW-14-SA1	1801039-03	Water	05/24/18
4	A1-MW-15-SA1	1801039-04	Water	05/24/18
5	A1-MW-25-SA1	1801039-07	Water	05/24/18
6	FRB-20180524	1801039-08	Water	05/24/18
7				
8				
9				

Notes:

	BBF0004-BK1						

LDC #: ~~26363N96~~

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: [illegible]

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dob)	13C3-PFBS	419 (50-150)		Y/N/A (PFBS)
		2		271		
		3		527		
		4		235		
		5 (~~ND~~) (Det)		428		

Privileged and Confidential

Quality Control Outlier Reports

1801054

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-53-SA1MS A1-MW-53-SA1MSD (A1-MW-53-SA1)	NMeFOSAA PFTrDA	- 141	- 148	70.00-130.00 70.00-130.00	32.9 (30.00) -	NMeFOSAA PFTrDA	J (all detects)
A1-MW-53-SA1MS A1-MW-53-SA1MSD (A1-MW-53-SA1)	PFBS PFHxS PFHxA	- 141 232	37.7 58.4 175	70.00-130.00 70.00-130.00 70.00-130.00	96.5 (30.00) 82.8 (30.00) -	PFBS PFHxS PFHxA	No Qual, >4x

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8E0244-BS1 (A1-MW-01-SA1 A1-MW-01-SA1D A1-MW-31-SA1 A1-MW-42-SA1 A1-MW-52-SA1 A1-MW-53-SA1 A1-MW-54-SA1 A1-PZ-19-SA1 FRB-20180525)	PFTrDA	153	-	70.00-130.00	-	PFTrDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-01-SA1	PFHpA	J	0.00225	0.00907	LOQ	ug/L	J (all detects)
A1-MW-01-SA1D	PFHpA	J	0.00273	0.00854	LOQ	ug/L	J (all detects)
A1-MW-31-SA1	PFHpA	J	0.00851	0.00887	LOQ	ug/L	J (all detects)
A1-MW-42-SA1	PFOS	J	0.00186	0.00887	LOQ	ug/L	J (all detects)
A1-MW-53-SA1	PFOS	J	0.00188	0.00878	LOQ	ug/L	J (all detects)
A1-MW-54-SA1	PFOS	J	0.00652	0.00892	LOQ	ug/L	J (all detects)
A1-PZ-19-SA1	PFHpA	J	0.00326	0.00852	LOQ	ug/L	J (all detects)
	PFOA	J	0.00756	0.00852	LOQ	ug/L	
	PFOS	J	0.00115	0.00852	LOQ	ug/L	

Field Duplicate RPD Report

Lab Reporting Batch ID: 1801054 **Laboratory: Vista**

EDD Filename: 1801054 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-01-SA1	A1-MW-01-SA1D			
PFBS	0.0524	0.0557	6	30.00	No Qualifiers Applied
PFHpA	0.00225	0.00273	NC	30.00	
PFHxA	0.101	0.0971	4	30.00	
PFHxS	0.0230	0.0238	NC	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613O96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801054 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	RSD ≤ 20% . r^2 . TMC/ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	NO	FRB = 9
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	SW	D = 6+7
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	1801054-01	Water	05/25/18
2	A1-MW-54-SA1	1801054-02	Water	05/25/18
3	A1-MW-53-SA1	1801054-03	Water	05/25/18
4	A1-PZ-19-SA1	1801054-04	Water	05/25/18
5	A1-MW-52-SA1	1801054-05	Water	05/25/18
6	A1-MW-01-SA1	1801054-06	Water	05/25/18
7	A1-MW-01-SA1D	1801054-07	Water	05/25/18
8	A1-MW-31-SA1	1801054-08	Water	05/25/18
9	FRB-20180525	1801054-09	Water	05/25/18
10	A1-MW-53-SA1MS	1801054-03MS	Water	05/25/18
11	A1-MW-53-SA1MSD	1801054-03MSD	Water	05/25/18
12				
13				
14	B8E0244-B4[illegible]			

LDC#: 42613096

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: WK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	6	7		
PFBS	0.0524	0.0557	6	
PFHxA	0.101	0.0971	4	
PFHpA	0.00225	0.00273	~~19~~ NC	
PFHxS	0.0230	0.0238	~~3~~ NC	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613O96.wpd

LDC #: 42613096

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: MK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C3-PFBS	310 (50-150)		J (all dets) UJ (PFBS)
		2 (dets)		175		
		3		154		
		10 (MS)		169		No qual
		11 (MSD)		161		
		4 (dets)		182		J (all dets) UJ (PFBS)
		5		211		
		6		192		
		7		204		
		8		254		

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Quality Control Outlier Reports

1801071

Reporting Limit Outliers

Lab Reporting Batch ID: 1801071 **Laboratory: Vista**

EDD Filename: 1801071 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-23-SA1	PFHxS	J	0.00581	0.00874	LOQ	ug/L	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 42613P96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801071 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	
IV.	Continuing calibration	A	
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	FRB = 5
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	N	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-27-SA1	1801071-01	Water	05/30/18
2	A1-MW-55-SA1	1801071-02	Water	05/30/18
3	A1-MW-23-SA1	1801071-03	Water	05/30/18
4	A1-MW-07-SA1	1801071-04	Water	05/30/18
5	FRB-20180530	1801071-05	Water	05/30/18
6				
7				
8				
9				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42613P96

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within 50-150% limits?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C8-PFBS	174 (50-150)		J/UJ (PFBS)
		2 (ND)	↓	165		↓
		4 (dets)	↓	209		↓

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Quality Control
Outlier Reports

1801084

LDC #: 42613Q96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18

SDG #: 1801084 ADR Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	~~RSD≤20%~~. r^2 TMO/ICV ≤ 30%
IV.	Continuing calibration	SW	CCV ≤ 30% ~~≤20%~~
V.	Laboratory Blanks	N	
VI.	Field blanks	ND	EB=1
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EB-20180531	1801084-01	Water	05/31/18
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	RBF0069-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 1H, 1H, 2H, 2H-perfluorooctane sulfonate (6:2FTS)			
S. 1H, 1H, 2H, 2H-perfluorodecane sulfonate (8:2 FTS)			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: ~~42638~~ 96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Q
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	6/18/18	180617M1-10	d3-T	55.2 (~~>50%~~)		MB	J/UJ/P (T)

Enclosure II

Manual Stage 2B and Stage 4 Data Validation Reports

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-110112-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-20180523	280-110112-1	Water	05/23/18
A1-MW-18-SA1	280-110112-2	Water	05/23/18
16-MW-08-SA1	280-110112-3	Water	05/23/18
A1-MW-19-SA1	280-110112-4	Water	05/23/18
A1-MW-37-SA1D	280-110112-5	Water	05/23/18
A1-MW-37-SA1	280-110112-6	Water	05/23/18
16-HS-03-SA1	280-110112-7	Water	05/23/18
16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-20180523 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
16-HS-03-SA1	Toluene-d8	75 (89-112)	All compounds	UJ (all non-detects)	A

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	1,1-Dichloroethene	56 (71-131)	33 (71-131)	UJ (all non-detects)	A

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	1,1-Dichloroethene	53 (≤20)	NA	-

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA1D	A1-MW-37-SA1			
Trichloroethene	0.652	0.624	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1D A1-MW-37-SA1	All compounds reported below the LOQ.	J (all detects)	A

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to surrogate %R, MS/MSD %R, and results below the LOQ, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Volatiles - Data Qualification Summary - SDG 280-110112-1

Sample	Compound	Flag	A or P	Reason
16-HS-03-SA1	All compounds	UJ (all non-detects)	A	Surrogates (%R)
16-HS-03-SA1	1,1-Dichloroethene	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1D A1-MW-37-SA1	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Volatiles - Field Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

LDC #: 42613B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18

SDG #: 280-110112-1 Stage 4 Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: Q

2nd Reviewer: KLC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration Level 3	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	TB = 1
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	SW	D = 5+6
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	TB-20180523	280-110112-1	Water	05/23/18
2	A1-MW-18-SA1	280-110112-2	Water	05/23/18
3	16-MW-08-SA1	280-110112-3	Water	05/23/18
4	A1-MW-19-SA1	280-110112-4	Water	05/23/18
5	A1-MW-37-SA1D	280-110112-5	Water	05/23/18
6	A1-MW-37-SA1	280-110112-6	Water	05/23/18
7	16-HS-03-SA1	280-110112-7	Water	05/23/18
8	16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
9	16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
10				
11				
12				
13				

LDC #: 42613B1

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: RV

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?		✓		
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?	✓			

LDC #: 42613B1

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data	✓			
Overall assessment of data was found to be acceptable.				

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer:
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

#	Date	Sample ID	Surrogate	%Recovery (Limits)	Qualifications
		7	TOL	75 (89-112)	J/UH/A (ND)
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

(TOL) = Toluene-d8 (DCE) = 1,2-Dichloroethane-d4
(BFB) = Bromofluorobenzene (DFM) = Dibromofluoromethane

LDC #: 43633

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		8/9	H	56 (71-131)	33 (71-131)	( )	7 (ND)	J (H) / A
			H	( )	( )	53 (≤20)		J (all det.) / A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )	

LDC#: 42613B1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GCMS VOA 8260B

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	5	6		
S	0.652	0.624	4 NC	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613B1.wpd

LDC #: ~~42643B~~

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL (R1)	5/16/18	H (1st internal standard)	0.3187	0.3187	0.3149	0.3149	4.8	4.8
			AA (2nd internal standard)	1.3348	1.3348	1.3251	1.3251	3.5	3.5
			(3rd internal standard)						
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	R1735	6/4/18	H (1st internal standard)	0.3149	0.3312	0.3312	5.2	5.2
			AA (2nd internal standard)	1.325	1.401	1.401	5.7	5.7
			(3rd internal standard)					
			(4th internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
			(4th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 40413B1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	11.5	12.2	106	106	0
1,2-Dichloroethane-d4	↓	12.4	108	108	↓
Toluene-d8		11.5	100	100	
Bromofluorobenzene		11.6	100	102	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 42438J

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 8/9

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	ND	2.795	1.629	56	56	33	33	53	53
Trichloroethene	V	V	V	4.863	4.489	97	97	90	90	8	8
Benzene											
Toluene											
Chlorobenzene											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: 280-417198/4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	5.615	NA	112	112				
Trichloroethene	↓	↓	5.111	↓	102	102				
Benzene										
Toluene										
Chlorobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 26138

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: A
2nd reviewer: KK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 2 , H :

Conc. = $\frac{(22988)(12.5)(1)}{(201941)(0.3149)(\quad)(\quad)}$

= 0.452 µg/L

#	Sample ID	Compound	Reported Concentration (µg/L)	Calculated Concentration ( )	Qualification
	2	H	0.452		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-110112-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA1	280-110112-2	Water	05/23/18
16-MW-08-SA1	280-110112-3	Water	05/23/18
A1-MW-19-SA1	280-110112-4	Water	05/23/18
A1-MW-37-SA1	280-110112-6	Water	05/23/18
16-HS-03-SA1	280-110112-7	Water	05/23/18
A1-MW-18-SA1MS	280-110112-2MS	Water	05/23/18
A1-MW-18-SA1MSD	280-110112-2MSD	Water	05/23/18
A1-MW-18-SA1DUP	280-110112-2DUP	Water	05/23/18
16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
16-HS-03-SA1DUP	280-110112-7DUP	Water	05/23/18
16-HS-03-SA1DLMS	280-110112-7DLMS	Water	05/23/18
16-HS-03-SA1DLMSD	280-110112-7DLMSD	Water	05/23/18
16-HS-03-SA1DLDUP	280-110112-7DLDUP	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 16-HS-03-SA1	pH	8 days	24 hours	J (all detects)	P
A1-MW-18-SA1	Ferrous Iron	26.85 hours	24 hours	J (all detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	Sulfate	88 (87-112)	86 (87-112)	J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	Ferrous Iron	1 (85-113)	0 (85-113)	R (all non-detects)	A

For A1-MW-18-SA1MS/MSD, no data were qualified for Chloride and Sulfate percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable.

All analytes reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-37-SA1	All analytes reported below the LOQ.	J (all detects)	A

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

Due to MS/MSD %R, data were rejected in one sample.

Due to technical holding time, MS/MSD %R, and results below the LOQ, data were qualified as estimated in five samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Wet Chemistry - Data Qualification Summary - SDG 280-110112-1

Sample	Analyte	Flag	A or P	Reason
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 16-HS-03-SA1	pH	J (all detects)	P	Technical holding times
A1-MW-18-SA1	Ferrous Iron	J (all detects)	P	Technical holding times
16-HS-03-SA1	Sulfate	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
16-HS-03-SA1	Ferrous Iron	R (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-37-SA1	All analytes reported below the LOQ.	J (all detects)	A	Sample result verification

MCAS Yuma, CTO 17F3803
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-110112-1

No Sample Data Qualified in this SDG

LDC #: 42613B6
SDG #: 280-110112-1
Laboratory: Test America, Inc.

VALIDATION COMPLETENESS WORKSHEET
Statge 4

Date: 7/18/18
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: KK

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B) pH (EPA SW846 Method (9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	SW	~~10/11~~: Cl, SO_4: 7/8 >4x
VII.	Duplicate sample analysis	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	~~(4,5)~~ a
X.	Sample result verification	A	
XI.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1	280-110112-2	Water	05/23/18
2	16-MW-08-SA1	280-110112-3	Water	05/23/18
3	A1-MW-19-SA1	280-110112-4	Water	05/23/18
~~4~~	~~A1-MW-37-SA1D~~	~~280-110112-5~~	~~Water~~	~~05/23/18~~ 02
5	A1-MW-37-SA1	280-110112-6	Water	05/23/18
6	16-HS-03-SA1	280-110112-7	Water	05/23/18
7	A1-MW-18-SA1MS	280-110112-2MS	Water	05/23/18
8	A1-MW-18-SA1MSD	280-110112-2MSD	Water	05/23/18
9	A1-MW-18-SA1DUP	280-110112-2DUP	Water	05/23/18
10	16-HS-03-SA1MS	280-110112-7MS	Water	05/23/18
11	16-HS-03-SA1MSD	280-110112-7MSD	Water	05/23/18
12	16-HS-03-SA1DUP	280-110112-7DUP	Water	05/23/18
13	#6 DL MS			
14	↓ MSD			
15	↓ DUP			

Notes:

LDC #: 47961386

VALIDATION FINDINGS CHECKLIST

Reviewer: 01
2nd Reviewer: KK

Method: Inorganics (EPA Method Sel cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 4296B86

VALIDATION FINDINGS CHECKLIST

Reviewer: 02
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 42653B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: CR
2nd reviewer: KK

All circled methods are applicable to each sample.

Sample ID	Parameter
1-3,5,6	(pH) TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
QC: 7,8	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
9	pH TDS (Cl) F NO3 NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
10,11	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
12	pH TDS (Cl) F (NO3) NO2 (SO4) O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4 (Fe2+)
13,14	pH TDS (Cl) F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
15	pH TDS (Cl) F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4
	pH TDS Cl F NO3 NO2 SO4 O-PO4 Alk CN NH3 TKN TOC Cr6+ ClO4

Comments:

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: CA
2nd reviewer: KK

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method ?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	9040C				SM 3500 FE B		
Parameters:	pH				Ferrous Iron		
Technical holding time:	~~48 HRS~~ 24 hrs				24 hrs		
Sample ID	Sampling date	Analysis date	Time ~~Exceeded~~	Qualifier	Analysis date	Time Exceeded	Qualifier
All (Det)	5/23/18	5/31/18	8days	J/UJ/P			
1 (Det)	5/23/18				5/24/18	26.85 hrs	J/UJ/P
	(09:00)				(11:51)		

HTTETRA.wpd

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer:
2nd Reviewer: KK

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	10/11		SO_4	88(87-112)	86		6	J/UJ/A (Det)
			~~Ferrous Fe~~	1(85-113)	0		6	J/R/A (MD)
			Ferrous Iron					

Comments: 7/8: Cl, SO_4 74X

LDC #: 42623B6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: G
2nd Reviewer: KK

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 3/21/18

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cl	s1	1.0	16911296	*1.000*	*1.000*	Y
		s2	2.5	43759132			
		s3	5	85841374			
		s4	60	1053445301			
		s5	120	2068634717			
		s6	200	3433898767			
Calibration verification	NO_3N	ICV	4	3.93	98	98	
Calibration verification	SO_4	CCV	100	102.1	102	102	
Calibration verification	Fe^{2+}	CCV	1.0	10686	107	107	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613B6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: OR
2nd Reviewer: KK

METHOD: Inorganics, Method See cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Ferrous Iron	2.2416	2.00	112	112	Y
10	Matrix spike sample	NO3N	(SSR-SR) 10.0	10	100	100	
12	Duplicate sample	SO4	42.4	38.4	10	10	

Comments: _____

LDC #: 42613 B6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: CR
2nd reviewer: KK

METHOD: Inorganics, Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for Cl reported with a positive detect were recalculated and verified using the following equation:

Concentration = $y = 1655360x - 440112$

Recalculation: $\frac{1079969301 + 440112}{1655360} \times 50 = 3263.3 mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
	1	pH (SU)	7.7	7.7	Y
	2	Ferrous Iron	0.0403	0.0403	↓
	3	Cl	3260	3260	↓
	5	NO_3N	7.26	7.26	↓
	6	SO_4	2120	2120	✓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1818881

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-51-SA1	L1818881-01	Water	05/22/18
A1-MW-50-SA1	L1818881-02	Water	05/22/18
A1-MW-49-SA1	L1818881-03	Water	05/22/18
A1-MW-05-SA1	L1818881-04	Water	05/22/18
A1-MW-04-SA1	L1818881-05	Water	05/22/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

The chain-of-custodies were reviewed for documentation of cooler temperatures. Cooler temperatures for all samples were reported at 7.9°C upon receipt by the laboratory. No data was qualified based on the cooler temperature.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1818881

No Sample Data Qualified in this SDG

LDC #: 42613F2b

SDG #: L1818881

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KW

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	Temp @ 7.9°C
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration / 2nd Col	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	⊂
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-51-SA1	L1818881-01	Water	05/22/18
2	A1-MW-50-SA1	L1818881-02	Water	05/22/18
3	A1-MW-49-SA1	L1818881-03	Water	05/22/18
4	A1-MW-05-SA1	L1818881-04	Water	05/22/18
5	A1-MW-04-SA1	L1818881-05	Water	05/22/18
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819087

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA	L1819087-01	Water	05/23/18
16-MW-08-SA1	L1819087-02	Water	05/23/18
A1-MW-19-SA1	L1819087-03	Water	05/23/18
A1-MW-37-SA1	L1819087-04	Water	05/23/18
A1-MW-37-SA1D	L1819087-05	Water	05/23/18
16-HS-03-SA1	L1819087-06	Water	05/23/18
16-HS-03-SA1MS	L1819087-06MS	Water	05/23/18
16-HS-03-SA1MSD	L1819087-06MSD	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ng/L)				
Compound	A1-MW-37-SA1	A1-MW-37-SA1D	RPD (Limits)	Flag	A or P
1,4-Dioxane	7780	7500	4 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations were within validation criteria.

XIII. Target Compound Identifications

All target compound identifications were within validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819087

No Sample Data Qualified in this SDG

LDC #: 42613G2b **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: L1819087 Stage 4 Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD≤ 15%. ICV≤ 20%
IV.	Continuing calibration / Endrin	A	CCV≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D=4+5
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA	L1819087-01	Water	05/23/18
2	16-MW-08-SA1	L1819087-02	Water	05/23/18
3	A1-MW-19-SA1	L1819087-03	Water	05/23/18
4	A1-MW-37-SA1	L1819087-04	Water	05/23/18
5	A1-MW-37-SA1D	L1819087-05	Water	05/23/18
6	16-HS-03-SA1	L1819087-06	Water	05/23/18
7	16-HS-03-SA1MS	L1819087-06MS	Water	05/23/18
8	16-HS-03-SA1MSD	L1819087-06MSD	Water	05/23/18
9				

Notes:

LDC #: 42613F26

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Semivolatiles (EPA SW 846 Method 8270C-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 42613B6

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: MK

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	AA. 2-Chloronaphthalene	AAA. Butylbenzylphthalate	AAAA. Dibenzothiophene	A1.
B. Bis (2-chloroethyl) ether	BB. 2-Nitroaniline	BBB. 3,3'-Dichlorobenzidine	BBBB. Benzo(a)fluoranthene	B1.
C. 2-Chlorophenol	CC. Dimethylphthalate	CCC. Benzo(a)anthracene	CCCC. Benzo(b)fluorene	C1.
D. 1,3-Dichlorobenzene	DD. Acenaphthylene	DDD. Chrysene	DDDD. cis/trans-Decalin	D1.
E. 1,4-Dichlorobenzene	EE. 2,6-Dinitrotoluene	EEE. Bis(2-ethylhexyl)phthalate	EEEE. Biphenyl	E1.
F. 1,2-Dichlorobenzene	FF. 3-Nitroaniline	FFF. Di-n-octylphthalate	FFFF. Retene	F1.
G. 2-Methylphenol	GG. Acenaphthene	GGG. Benzo(b)fluoranthene	GGGG. C30-Hopane	G1.
H. 2,2'-Oxybis(1-chloropropane)	HH. 2,4-Dinitrophenol	HHH. Benzo(k)fluoranthene	HHHH. 1-Methylphenanthrene	H1.
I. 4-Methylphenol	II. 4-Nitrophenol	III. Benzo(a)pyrene	IIII. 1,4-Dioxane	I1.
J. N-Nitroso-di-n-propylamine	JJ. Dibenzofuran	JJJ. Indeno(1,2,3-cd)pyrene	JJJJ. Acetophenone	J1.
K. Hexachloroethane	KK. 2,4-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	KKKK. Atrazine	K1.
L. Nitrobenzene	LL. Diethylphthalate	LLL. Benzo(g,h,i)perylene	LLLL. Benzaldehyde	L1.
M. Isophorone	MM. 4-Chlorophenyl-phenyl ether	MMM. Bis(2-Chloroisopropyl)ether	MMMM. Caprolactam	M1.
N. 2-Nitrophenol	NN. Fluorene	NNN. Aniline	NNNN. 2,6-Dichlorophenol	N1.
O. 2,4-Dimethylphenol	OO. 4-Nitroaniline	OOO. N-Nitrosodimethylamine	OOOO. 1,2-Diphenylhydrazine	O1.
P. Bis(2-chloroethoxy)methane	PP. 4,6-Dinitro-2-methylphenol	PPP. Benzoic Acid	PPPP. 3-Methylphenol	P1.
Q. 2,4-Dichlorophenol	QQ. N-Nitrosodiphenylamine	QQQ. Benzyl alcohol	QQQQ. 3&4-Methylphenol	Q1.
R. 1,2,4-Trichlorobenzene	RR. 4-Bromophenyl-phenylether	RRR. Pyridine	RRRR. 4-Dimethyldibenzothiophene (4MDT)	R1.
S. Naphthalene	SS. Hexachlorobenzene	SSS. Benzidine	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	S1.
T. 4-Chloroaniline	TT. Pentachlorophenol	TTT. 1-Methylnaphthalene	TTTT. 1-Methyldibenzothiophene (1MDT)	T1.
U. Hexachlorobutadiene	UU. Phenanthrene	UUU.Benzo(b)thiophene	UUUU.	U1.
V. 4-Chloro-3-methylphenol	VV. Anthracene	VVV.Benzonaphthothiophene	VVVV.	V1.
W. 2-Methylnaphthalene	WW. Carbazole	WWW.Benzo(e)pyrene	WWWW.	W1.
X. Hexachlorocyclopentadiene	XX. Di-n-butylphthalate	XXX. 2,6-Dimethylnaphthalene	XXXX.	X1.
Y. 2,4,6-Trichlorophenol	YY. Fluoranthene	YYY. 2,3,5-Trimethylnaphthalene	YYYY.	Y1.
Z. 2,4,5-Trichlorophenol	ZZ. Pyrene	ZZZ. Perylene	ZZZZ.	Z1.

LDC#: 42613G2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GCMS SVOA 8270D-SIM

Compound	Concentration (ng/L)		(≤30) RPD	Qual
	4	5		
1,4-Dioxane	7780	7500	4	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613G2b.wpd

LDC #: [illegible]

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: Q
2nd Reviewer: KK

METHOD: GC/MS BNA (EPA SW 846 Method 8270C-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (500 std)	Recalculated RRF (500 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	5/29/18	IIII (1st internal standard)	1.618	1.618	1.686	1.686	7.57	7.57
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
2	ICAL	6/1/18	IIII (1st internal standard)	1.471	1.471	1.437	1.437	4.02	4.02
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						
3			(1st internal standard)						
			Naphthalene (2nd internal standard)						
			Fluorene (3rd internal standard)						
			Phenanthrene (4th internal standard)						
			Chrysene (5th internal standard)						
			Benzo(a)pyrene (6th internal standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: ~~46613~~6

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: A
2nd Reviewer: KK

METHOD: GC/MS BNA (EPA SW 846 Method 8270C-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	F6060118 02	6/1/18	1111 (1st internal standard)	1.686	1.767	1.767	4.8	4.8
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
2	F1606058 07	6/5/18	1111 (1st internal standard)	1.437	1.538	1.538	7	7
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					
3	~~F~~		(1st internal standard)					
			Naphthalene (2nd internal standard)					
			Fluorene (3rd internal standard)					
			Phenanthrene (4th internal standard)					
			Chrysene (5th internal standard)					
			Benzo(a)pyrene (6th internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42436-b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: KK

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
1,4-Dioxane-d8	500	98.32	20	20	0

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID: _____

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

LDC #: 36154-D

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: GC/MS (EPA SW 846 Method 8270C-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 7/8

Compound	Spike Added (NS/L)		Sample Concentration (NS/L)	Spiked Sample Concentration (NS/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene											
Pyrene											
1,4-Dioxane	5100	5100	3270	8340	8660	99	99	106	106	4	4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: KK

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA)

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: NG1120650-2/-3

Compound	Spike Added (ug/L)		Spike Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene										
Pyrene										
1,4-Dioxane	5000	5000	5640	5660	113	113	113	113	0	0

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 42613-26

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: KK

METHOD: GC/MS PAHs (EPA SW 846 Method 8270D-SIM)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, 1,4-Dioxane

Conc. = $\frac{(2376)(500)(5)(1)(\quad)}{(5587)(1.686)(0.5)(\quad)(\quad)}$

= 1261.1 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
	1	1,4-Dioxane	1260		

LDC Report# 42613H2b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819352

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-13-SA1	L1819352-01	Water	05/24/18
A1-MW-11-SA1	L1819352-02	Water	05/24/18
A1-MW-14-SA1	L1819352-03	Water	05/24/18
A1-MW-15-SA1	L1819352-04	Water	05/24/18
A1-MW-25-SA1	L1819352-07	Water	05/24/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819352

No Sample Data Qualified in this SDG

LDC #: 42613H2b

SDG #: L1819352

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCSB
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-13-SA1	L1819352-01	Water	05/24/18
2	A1-MW-11-SA1	L1819352-02	Water	05/24/18
3	A1-MW-14-SA1	L1819352-03	Water	05/24/18
4	A1-MW-15-SA1	L1819352-04	Water	05/24/18
5	A1-MW-25-SA1	L1819352-07	Water	05/24/18
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1819562

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-42-SA1	L1819562-01	Water	05/25/18
A1-MW-54-SA1	L1819562-02	Water	05/25/18
A1-MW-53-SA1	L1819562-03	Water	05/25/18
A1-PZ-19-SA1	L1819562-04	Water	05/25/18
A1-MW-52-SA1	L1819562-05	Water	05/25/18
A1-MW-01-SA1	L1819562-06	Water	05/25/18
A1-MW-01-SA1D	L1819562-07	Water	05/25/18
A1-MW-31-SA1	L1819562-08	Water	05/25/18
A1-MW-53-SA1MS	L1819562-03MS	Water	05/25/18
A1-MW-53-SA1MSD	L1819562-03MSD	Water	05/25/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-01-SA1 and A1-MW-01-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)				
Compound	A1-MW-01-SA1	A1-MW-01-SA1D	RPD (Limits)	Flag	A or P
1,4-Dioxane	1840	1880	2 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1819562

No Sample Data Qualified in this SDG

LDC #: 42613I2b

SDG #: L1819562

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer:

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	SW	D = 6+7
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-42-SA1	L1819562-01	Water	05/25/18
2	A1-MW-54-SA1	L1819562-02	Water	05/25/18
3	A1-MW-53-SA1	L1819562-03	Water	05/25/18
4	A1-PZ-19-SA1	L1819562-04	Water	05/25/18
5	A1-MW-52-SA1	L1819562-05	Water	05/25/18
6	A1-MW-01-SA1	L1819562-06	Water	05/25/18
7	A1-MW-01-SA1D	L1819562-07	Water	05/25/18
8	A1-MW-31-SA1	L1819562-08	Water	05/25/18
9	A1-MW-53-SA1MS	L1819562-03MS	Water	05/25/18
10	A1-MW-53-SA1MSD	L1819562-03MSD	Water	05/25/18
11				
12				
13				

LDC#: 42613I2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Q
2nd Reviewer: KK

METHOD: GCMS SVOA 8270D-SIM

Compound	Concentration (ng/L)		(≤30) RPD	Qual
	6	7		
1,4-Dioxane	1840	1880	2	

V:\FIELD DUPLICATES\Field Duplicates\FD_Organics\2018\42613I2b.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1820050

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-27-SA1	L1820050-01	Water	05/30/18
A1-MW-55-SA1	L1820050-02	Water	05/30/18
A1-MW-23-SA1	L1820050-03	Water	05/30/18
A1-MW-07-SA1	L1820050-04	Water	05/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compounds reported below the reporting limit (RL) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-23-SA1	All compounds reported below the RL.	J (all detects)	A

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the RL, data were qualified as estimated in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1820050

Sample	Compound	Flag	A or P	Reason
A1-MW-23-SA1	All compounds reported below the RL.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1820050

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1820050

No Sample Data Qualified in this SDG

LDC #: 42613J2b

SDG #: L1820050

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/12/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: KK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤15%. ICV≤20%
IV.	Continuing calibration	A	CCV≤20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	N	
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-27-SA1	L1820050-01	Water	05/30/18
2	A1-MW-55-SA1	L1820050-02	Water	05/30/18
3	A1-MW-23-SA1	L1820050-03	Water	05/30/18
4	A1-MW-07-SA1	L1820050-04	Water	05/30/18
5				
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 19, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1820175

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
EB-20180531	L1820175-01	Water	05/31/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-20180531 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1820175

No Sample Data Qualified in this SDG

LDC #: 42613K2b

SDG #: L1820175

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 7/13/18

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: RK

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB=1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	A	LCS/6
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	EB-20180531	L1820175-01	Water	05/31/18
2				
3				
4				
5				
6				
7				
8				

Notes:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: July 16, 2018

Parameters: Perfluorinated Alkyl Acids

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1801037

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-18-SA1	1801037-01	Water	05/23/18
16-MW-08-SA1	1801037-02	Water	05/23/18
A1-MW-19-SA1	1801037-03	Water	05/23/18
A1-MW-37-SA1	1801037-04	Water	05/23/18
A1-MW-37-SA1D	1801037-05	Water	05/23/18
16-HS-03-SA1	1801037-06	Water	05/23/18
16-MW-09-SA1	1801037-07	Water	05/23/18
16-MW-06-SA1	1801037-08	Water	05/23/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, the percent relative standard deviations (%RSD) were less than or equal to 20.0%.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

For each calibration point, the percent differences (%D) for their true value were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample FRB-20180523 was identified as a field rinsate blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFHpA PFHxS PFOA	140 (70-130) 146 (70-130) 131 (70-130)	- - -	J (all detects) J (all detects) J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFDA PFDoA PFTrDA	132 (70-130) 136 (70-130) 136 (70-130)	- - 133 (70-130)	NA	-

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	PFHpA	49.6 (≤30)	J (all detects)	A
16-HS-03-SA1MS/MSD (16-HS-03-SA1)	NMeFOSAA	41.1 (≤30)	NA	-

For 16-HS-03-SA1MS/MSD, no data were qualified for PFBS and PFHxA percent recoveries (%R) and relative percent differences (RPD) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits with the following exceptions:

OPR ID (Associated Samples)	Compound	%R (Limits)	Flag	A or P
B8E0244-BS1 (All samples in SDG 1801037)	PFTrDA	153 (70-130)	NA	-

IX. Field Duplicates

Samples A1-MW-37-SA1 and A1-MW-37-SA1D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA1	A1-MW-37-SA1D			
PFBS	0.230	0.252	9 (≤30)	-	-
PFHxA	1.66	1.71	3 (≤30)	-	-
PFHpA	0.0328	0.0322	Not calculable	-	-
PFHxS	0.155	0.152	2 (≤30)	-	-
PFOA	0.0196	0.0203	Not calculable	-	-
PFNA	0.00170	0.00210	Not calculable	-	-
PFOS	0.0458	0.0416	Not calculable	-	-
PFUnA	0.00525U	0.00135	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Affected Compound	Flag	A or P
A1-MW-18-SA1	^{13}C3-PFBS	170 (50-150)	PFBS	J (all detects)	P
16-MW-08-SA1	^{13}C3-PFBS	187 (50-150)	PFBS	J (all detects)	P
A1-MW-19-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P
A1-MW-37-SA1	^{13}C3-PFBS	228 (50-150)	PFBS	J (all detects)	P
A1-MW-37-SA1D	^{13}C3-PFBS	161 (50-150)	PFBS	J (all detects)	P
16-HS-03-SA1	^{13}C3-PFBS	154 (50-150)	PFBS	J (all detects)	P
16-MW-09-SA1	^{13}C3-PFBS	153 (50-150)	PFBS	J (all detects)	P
16-MW-06-SA1	^{13}C3-PFBS	214 (50-150)	PFBS	J (all detects)	P

XI. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-MW-09-SA1 16-MW-06-SA1	All compounds reported below the LOQ.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R and RPD, internal standard %R, and results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG 1801037

Sample	Compound	Flag	A or P	Reason
16-HS-03-SA1	PFHpA PFHxS PFOA	J (all detects) J (all detects) J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
16-HS-03-SA1	PFHpA	J (all detects)	A	Matrix spike/Matrix spike duplicate (RPD)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-HS-03-SA1 16-MW-09-SA1 16-MW-06-SA1	PFBS	J (all detects)	P	Internal standards (%R)
A1-MW-18-SA1 16-MW-08-SA1 A1-MW-19-SA1 A1-MW-37-SA1 A1-MW-37-SA1D 16-MW-09-SA1 16-MW-06-SA1	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG 1801037

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG 1801037

No Sample Data Qualified in this SDG

LDC #: 42613M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 7/13/18
SDG #: 1801037 Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: [illegible]
2nd Reviewer: IKK

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537 Modified)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSD ≤ 20% or r^2 True value/ICV ≤ 30%
IV.	Continuing calibration	A	CCV ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	FRB = 9
~~VII.~~	~~Surrogate spikes~~	N	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	SW	OPR
X.	Field duplicates	SW	D = 1-5
XI.	Internal standards	SW	
XII.	Compound quantitation RL/LOQ/LODs	A	
XIII.	Target compound identification	A	
XIV.	System performance	A	
XV.	Overall assessment of data	A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-18-SA1**	1801037-01**	Water	05/23/18
2	16-MW-08-SA1**	1801037-02**	Water	05/23/18
3	A1-MW-19-SA1**	1801037-03**	Water	05/23/18
4	A1-MW-37-SA1**	1801037-04**	Water	05/23/18
5	A1-MW-37-SA1D**	1801037-05**	Water	05/23/18
6	16-HS-03-SA1**	1801037-06**	Water	05/23/18
7	16-MW-09-SA1**	1801037-07**	Water	05/23/18
8	16-MW-06-SA1**	1801037-08**	Water	05/23/18
9	FRB-20180523	1801037-09	Water	05/23/18
10	16-HS-03-SA1MS	1801037-06MS	Water	05/23/18
11	16-HS-03-SA1MSD	1801037-06MSD	Water	05/23/18
12				
13				
14				

LDC #: 42613496

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: WC

Method: LC/MS PFOS/PFOAs (EPA Method 537M)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
IIIb.Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 30%	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 30%	✓			
Were the S/N ratio for all compounds within validation criteria?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.		✓		
VII. Surrogate spikes				
Were all surrogate %R within the QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VIII. Matrix spike/Matrix spike duplicates				

LDC #: 42613M96

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: KK

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IV. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XI. Internal standards				
Were internal standard area counts within acceptance limits?	✓			
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. Perfluorohexanoic acid (PFHxA)			
B. Perfluoroheptanoic acid (PFHpA)			
C. Perfluorooctanoic acid (PFOA)			
D. Perfluorononanoic acid (PFNA)			
E. Perfluorodecanoic acid (PFDA)			
F. Perfluoroundecanoic acid (PFUnA)			
G. Perfluorododecanoic acid (PFDoA)			
H. Perfluorotridecanoic acid (PFTriDA)			
I. Perfluorotetradecanoic acid (PFTeDA)			
J. Perfluorobutanesulfonic acid (PFBS)			
K. Perfluorohexanesulfonic acid (PFHxS)			
L. Perfluoroheptanesulfonic acid (PFHpS)			
M. Perfluorooctanesulfonic acid (PFOS)			
N.Perfluorodecanesulfonic acid (PFDS)			
O. Perfluorooctane Sulfonamide (FOSA)			
P. Perfluorobutanoic acid (PFBA)			
Q. Perfluoropentanoic acis (PFPeA)			
R. 6:2FTS			
S. 8:2 FTS			
T. N-methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)			
U. N-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)			

LDC #: 42613M96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates/Duplicates

Reviewer: [illegible]
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
Y N N/A Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD/DUP ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		10/11	PFBS	182 (70-130)		45.9 (≤30)	6 (dets)	No Qual >4xSA
			PFHxA	-21.0 (↓)		32.9 (↓)	↓	↓
			PFHpA	140 (70-130)			↓	dets/A
			PFHxS	146 (↓)			↓	↓
			PFOA	131 (↓)			↓	↓
			PFDA	132 (↓)			(ND)	↓
			PFDoA	136 (↓)			↓	↓
			PFTxDA	136 (↓)	133 (70-130)		↓	↓
			PFHpA			49.6 (≤30)	(dets)	dets/A
			MeFOSAA			41.1 (↓)	(ND)	↓

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LDC #: 42623M96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Was a LCS required?

Y (N) N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	BBE0244-BS1		( )	( )	( )		
	B		( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
	BBE0244-BS1	PFTeDA	153 (70-130)	( )	( )	All (ND)	J+ (all samples)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )	

LDC#: 42613M96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: KK

METHOD: PFCs

Compound	Concentration (ug/L)		(≤30) RPD	Qual
	4	5		
PFBS	0.230	0.252	9	
PFHxA	1.66	1.71	3	
PFHpA	0.0328	0.0322	~~2~~ NC	
PFHxS	0.155	0.152	2	
PFOA	0.0196	0.0203	~~4~~ NC	
PFNA	0.00170	0.00210	~~21~~ NC	
PFOS	0.0458	0.0416	~~10~~ NC	
PFUnA	0.00525U	0.00135	NC	

LDC #: 4-163496

VALIDATION FINDINGS WORKSHEET
Internal Standards

Page: 1 of 1
Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFCs

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within 50-150% limits?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Sample ID	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
		1 (dets)	13C3-PFBS	170 (50-150)		J (4 PFBS)
		2		187		
		3		214		
		4		228		
		5		161		
		6		154		
		7		153		
		8		214		
		10 (MS)		167		No qual
		11 (MSD)		165		

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LDC #: 46634 96

Validation Findings Worksheet
Initial Calibration Calculation Verification

Reviewer: 9
2nd Reviewer: KK

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/6/2018	M2	PFBS	0	0.51953	0.25	0.0625
			s1	0.9040925	0.5	0.25
			s2	1.9572675	1	1
			s3	3.7049862	2	4
			s4	10.06541	5	25
			s5	19.886856	10	100
			s6	99.722347	50	2500
			s7	204.60758	100	10000
			s8	513.09516	250	62500
			s9	1017.3084	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	-0.63805	c	-0.0700934
Std Err of Y Est				
R Squared		0.9999897		0.9999340
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	2.063159148	-5.34413E-05	2.03725	2.30679E-06
Std Err of Coef.				
Correlation Coefficient		0.999995		
Coefficient of Determination (r^2)		0.999990		

Validation Findings Worksheet
Initial Calibration Calculation Verification

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/6/2018	M2	PFOA	0	0.2482712	0.25	0.0625
			s1	0.5747737	0.5	0.25
			s2	1.0592625	1	1
			s3	1.846235	2	4
			s4	4.6900387	5	25
			s5	10.243193	10	100
			s6	51.521462	50	2500
			s7	93.85144027	100	10000
			s8	228.044994	250	62500
			s9	451.7265496	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	0.76340	c	0.0441882
Std Err of Y Est				
R Squared		0.9998726		0.9994240
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	0.931889278	-6.1517E-05	0.964706	-0.000132122
Std Err of Coef.				
Correlation Coefficient		0.999936		
Coefficient of Determination (r^2)		0.999873		

Validation Findings Worksheet
Initial Calibration Calculation Verification

Method: PFCs (EPA Method 537)

Calibration Date	Instrument/Column	Compound	Standard	(Y) Response	(X) Conc.	(X^2) Conc.
6/13/2018	M2	PFHxA	0	0.4266035	0.25	0.0625
			s1	0.97093	0.5	0.25
			s2	1.9639255	1	1
			s3	3.6634565	2	4
			s4	8.4481905	5	25
			s5	15.881127	10	100
			s6	85.352945	50	2500
			s7	154.4073192	100	10000
			s8	412.8312447	250	62500
			s9	789.7483287	500	250000

Regression Output	Calculated		*Reported*	
Constant	c	-0.57068	c	0.0713566
Std Err of Y Est				
R Squared		0.9997320		0.9993330
Degrees of Freedom				
	b	a	b	a
X Coefficient(s)	1.676648676	-0.000187679	1.64736	-0.000124659
Std Err of Coef.				
Correlation Coefficient		0.999866		
Coefficient of Determination (r^2)		0.999732		

LDC #: 26BU96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 1
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
$RRF = (A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	18060TM2_3	6/7/18	PFBS (1st internal standard)	1.0	0.913	0.911	8.7	8.9
			PFOA (2nd internal standard)	1.0	1.05	1.06	5.4	5.8
			(3rd internalstandard)					
2	18060TM2_28	6/7/18	PFBS (1st internal standard)	10.0	9.27	9.27	7.3	7.3
			PFOA (2nd internal standard)	10.0	9.52	9.53	4.8	4.7
			(3rd internalstandard)					
3	18060TM2_45	6/7/18	PFBS (1st internal standard)	1.0	0.885	0.884	11.5	11.8
			PFOA (2nd internal standard)	1.0	1.10	1.10	9.8	10.1
			(3rd internalstandard)					
4	18061TM2_40	6/13/18	PFHxA (1st internal standard)	10.0	10.4	10.4	4.2	4.5
			(2nd internal standard)					
			(3rd internalstandard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

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LDC #: 4963M90

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
PFBS	0.0907	0.0883	0.582	0.746	0.682	182	181	114	113	~~45.9~~	45.9
PFOA	↓	↓	0.0218	0.141	0.113	131	131	103	103	23.9	23.9

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Privileged and Confidential

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BBE0244-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFBS	0.0800	NA	0.0918	NA	115	115				
PFOA	↓	↓	0.0941	↓	118	118				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Privileged and Confidential

LDC #: 426BH96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: [illegible]
2nd reviewer: KK

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOA:

Conc. = $\frac{-0.964706 + \sqrt{(0.964706)^2 - 4 \times (-0.00013212)\left(\frac{-180 \times 12^5}{9070} + 0.0448\right)}}{(2)(-0.00013212)(2)(0.113)}$

= 1.87 ng/L

= 0.00187 µg/L

#	Sample ID	Compound	Reported Concentration (µg/L)	Calculated Concentration ( )	Qualification
	1	PFOA	0.00187		

LABORATORY DATA CONSULTANTS, INC.
2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Tetra Tech EC, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
ATTN: Ms. Sabina Sudoko

January 2, 2019

SUBJECT: MCAS Yuma, CTO 3803, Data Validation

Dear Ms. Sudoko,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on December 10, 2018. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #43888:

SDG #	Fraction
280-116898-1, 280-116942-1 280-117007-1, 280-117103-1 280-117110-1, L1846366 L1846592, L1846856 L1847243, L1847316 1803615, 1803626 1803659, 1803676 1803678	Volatiles, 1,4-Dioxane, Wet Chemistry, Perfluoroalkyl and Polyfluoroalkyl Substances

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona; April 2018
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1; 2017
- USEPA National Functional Guidelines for Superfund Organic Methods Data Review; January 2017
- USEPA National Functional Guidelines for Inorganic Superfund Data Review; January 2017
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar
Project Manager/Chemist

Stage 2B/4 ADR/NEDD 80/20

LDC #43888 (Tetra Tech-EC, Inc.-Irvine, CA / MCAS Yuma, CTO 3803)

PO# 1153059

LDC	SDG#	DATE REC'D	(3) DATE DUE	(3) VOA (8260B)		1,4-Diox (8270D -SIM)		PFAs (537)		Cl,SO_4 NO_3-N (9056A)		Fe II (3500 -Fe B)		pH (9040C)																							
Matrix: Water/Soil				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	280-116898-1	12/10/18	01/02/19	1	0	-	-	-	-	1	0	1	0	1	0																				
A	280-116898-1	12/10/18	01/02/19	8	0	-	-	-	-	6	0	6	0	6	0																				
B	280-116942-1	12/10/18	01/02/19	9	0	-	-	-	-	7	0	7	0	7	0																				
C	280-117007-1	12/10/18	01/02/19	7	0	-	-	-	-	6	0	6	0	6	0																				
D	280-117103-1	12/10/18	01/02/19	8	0	-	-	-	-	6	0	6	0	6	0																				
E	280-117110-1	12/10/18	01/02/19	4	0	-	-	-	-	2	0	2	0	2	0																				
F	L1846366	12/10/18	01/02/19	-	-	1	0	-	-	-	-	-	-	-	-																				
F	L1846366	12/10/18	01/02/19	-	-	7	0	-	-	-	-	-	-	-	-																				
G	L1846592	12/10/18	01/02/19	-	-	8	0	-	-	-	-	-	-	-	-																				
H	L1846856	12/10/18	01/02/19	-	-	6	0	-	-	-	-	-	-	-	-																				
I	L1847243	12/10/18	01/02/19	-	-	7	0	-	-	-	-	-	-	-	-																				
J	L1847316	12/10/18	01/02/19	-	-	3	0	-	-	-	-	-	-	-	-																				
K	1803615	12/10/18	01/02/19	-	-	-	-	1	0	-	-	-	-	-	-																				
K	1803615	12/10/18	01/02/19	-	-	-	-	8	0	-	-	-	-	-	-																				
L	1803626	12/10/18	01/02/19	-	-	-	-	9	0	-	-	-	-	-	-																				
M	1803659	12/10/18	01/02/19	-	-	-	-	7	0	-	-	-	-	-	-																				
N	1803676	12/10/18	01/02/19	-	-	-	-	8	0	-	-	-	-	-	-																				
O	1803678	12/10/18	01/02/19	-	-	-	-	4	0	-	-	-	-	-	-																				
Total	T/SM			37	0	32	0	37	0	28	0	28	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	190

Shaded cells indicate Stage 4 validation (all other cells are ADR validation).

Data Validation Report
MCAS Yuma, CTO 3803

SDGs: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1, L1846366, L1846592, L1846856, L1847243, L1847316, 1803615, 1803626, 1803659, 1803676, and 1803678

Prepared for

Tetra Tech EC, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614

Prepared by

Laboratory Data Consultants, Inc
2701 Loker Ave West, Suite 220
Carlsbad, CA 92010

January 2, 2019

INTRODUCTION

This Data Validation Report (DVR) presents Stage 2B and Stage 4 data validation results for samples collected during the November 2018 sampling period. Data validation was performed in accordance with the Final Sampling and Analysis Plan (SAP) for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), a modified outline of the US EPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017), and a modified outline of the US EPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B
1,4-Dioxane by EPA SW 846 Method 8270D utilizing Selective Ion Monitoring (SIM)
Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by EPA Method 537 Modified

Wet Chemistry:
Chloride, Nitrate as Nitrogen, and Sulfate by EPA SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

For samples reviewed by automated data review, the sample identification and methods of analyses performed on each sample is presented in Attachment 1. Overall data qualification summary is presented in Attachment 2. Stage 2B Automated Data Review outliers are presented in Enclosure I. DVRs for samples on which Stage 4 validation was performed are presented in Enclosure II. Validation for 1,4-Dioxane was performed manually and DVRs for Stage 2B and Stage 4 manual validation are also presented in Enclosure II.

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results for sample holding times, initial and continuing calibrations, laboratory blanks, initial and continuing calibration blanks (ICB/CCBs), surrogates, matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD), ongoing precision recovery (OPR), internal standards, trip blanks, equipment blanks, field rinsate blanks, and field duplicates. Approximately 20 percent of samples were subjected to Stage 4 evaluation as indicated in Attachment 1, which comprises a review of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

Automated data review was performed on all QC summary results using the Automated Data Review (ADR) software program (LDC, 2013) with the exception of the calibrations, ICB/CCBs, and internal standards, and all QC for 1,4-Dioxane, which were validated manually. Quality assurance (QA)/QC criteria specified in the SAP, DoD QSM, and NFGs were incorporated with the program's reference library to assess compliance with project requirements.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not applicable): Data did not warrant qualification since detected results only are affected and the compound was not detected in the associated samples.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt & Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met with the exception of eight samples for PFAs, twenty-eight samples for pH, one sample for nitrate as N, and twenty-eight samples for ferrous iron. Due to grossly exceeded holding times (e.g., >2x recommended holding time), 23 ferrous iron results were qualified as rejected (R). The remainder of the data were qualified as detected estimated (J) and non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

II. Instrument Performance Check

A tune was performed at 12 hour intervals as required by the methods.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

All criteria for the initial calibration and initial calibration verifications of each method were met.

IV. Continuing Calibration

All criteria for the continuing calibration verifications of each method were met with the following exceptions:

SDG/ Method	Date	Compound	%D (Limits)	Associated Samples	Flag	A or P
1803676/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-37-SA2D FRB-20181115 A1-MW-31-SA2	UJ (all non-detects)	A
1803678/ 537 Mod.	12/03/18	PFTeDA	42.4 (≤30)	A1-MW-01-SA2 A1-MW-42-SA2 FRB-20181116 EB-20181116	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were performed as required by the methods. No contaminant concentrations were detected in the laboratory blanks reviewed by the ADR software program with the exception of several blanks for chloride, nitrate as N, and sulfate. The associated sample results were not detected or were significantly greater than the concentrations found in the blanks, therefore no data were qualified. The details are presented in Enclosures I and II.

No contaminant concentrations were detected in the initial or continuing calibration blanks with the following exceptions:

SDG/ Method	Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
280-116898-1/ 9056A	ICB/CCB	Nitrate as Nitrogen Sulfate	0.04526 mg/L 0.3841 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2
280-116942-1/ 9056A	ICB/CCB	Sulfate	0.6931 mg/L	16-HS-03-SA2 16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-19-SA2
280-116942-1/ 9056A	ICB/CCB	Chloride	0.3086 mg/L	16-MW-06-SA2 16-MW-08-SA2 16-MW-09-SA2 A1-MW-53-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2558 mg/L	A1-MW-07-SA2 A1-MW-23-SA2 A1-MW-25-SA2 A1-MW-27-SA2 A1-MW-55-SA2
280-117007-1/ 9056A	ICB/CCB	Chloride	0.2618 mg/L	A1-MW-54-SA2
280-117103-1/ 9056A	ICB/CCB	Chloride Sulfate	0.2982 mg/L 0.4094 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2 A1-MW-31-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04805 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-37-SA2
280-117103-1/ 9056A	ICB/CCB	Nitrate as N	0.04749 mg/L	A1-MW-31-SA2
280-117110-1/ 9056A	ICB/CCB	Chloride Sulfate	0.6147 mg/L 0.3987 mg/L	A1-MW-42-SA2

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were not detected or were significantly greater than the concentrations found in the associated blanks.

VI. Field Blank Samples

Five trip blanks were collected and analyzed for VOCs. No contaminants were found.
One equipment blank was collected and analyzed for VOCs and PFAs. No contaminants were found.

Five field rinsate blanks were collected and analyzed for PFAs. No contaminants were found.

VII. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the exception of sample EB-20181116 in SDG 280-117110-1 for VOCs. No data were qualified due to high %Rs since the associated results were non-detected.

IX. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the exception of one MS/MSD pair for 1,1-dichloroethene, one MS/MSD pair for PFTeDA, one MS/MSD pair for sulfate, three MS/MSD pairs for ferrous iron. The ferrous iron results in sample A1-MW-42-SA2 was qualified as rejected (R) due to MS/MSD %Rs grossly outside QC limits (i.e., < 30%). The remainder of the associated sample results were qualified as detected estimated (J) or non-detected estimated (UJ) as applicable. The details regarding the qualification of data are provided in Enclosures I and II.

X. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

XII. Laboratory Control Samples/Ongoing Precision Recovery

Laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

Ongoing precision recovery (OPR) samples were analyzed as required by Method 537 Mod. Percent recoveries (%R) were within QC limits with the exception of two OPR samples for PFTeDA. No data were qualified due to high %Rs since the associated results were non-detected. The details are presented in Enclosure I.

XIII. Field Duplicate Samples

Three field duplicate pairs were collected and analyzed for all methods. All RPDs were within QC limits. RPDs were not calculated when sample results in one or both samples were less than 5X the limit of quantitation (LOQ). The field duplicate result comparisons are provided in Enclosures I and II.

XIV. Internal Standards/Labeled Compounds

All internal standard areas and retention times were within QC limits. All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XV. Compound Quantitation

The laboratory reporting limits were evaluated. All laboratory reporting limits met the specified requirements.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

SDG/Method	Sample	Compound	Finding
1803615/537M	A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803626/537M	A1-MW-53-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803659/537M	A1-MW-25-SA2 A1-MW-54-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.
1803678/537M	A1-MW-01-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the LOQ as detected by the laboratory were qualified as detected estimated (J). The details regarding the qualification of data are provided in Enclosures I and II.

XVI. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to severe holding time exceedances, data were qualified as rejected in twenty-three samples.

Due to gross MS/MSD %R exceedance, data were qualified as rejected in one sample.

Due to holding time exceedances, data were qualified as estimated in thirty samples.

Due to CCV %D, data were qualified as estimated in twelve samples.

Due to MS/MSD %R, data were qualified as estimated in one sample.

Due to results below the LOQ, data were qualified as estimated in twenty-two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Data flags are summarized and are presented as Attachment 2.

Attachment 1

Sample Cross Reference

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	TB-20181112	280-116898-7	TB	METHOD	8260B	Stage 2B
12-Nov-2018	A1-MW-49-SA2	1803615-03	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-49-SA2	280-116898-3	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2	1803615-04	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2	280-116898-4	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-50-SA2DUP	280-116898-4DUP	DUP	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MS	280-116898-4MS	MS	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-50-SA2MSD	280-116898-4MSD	MSD	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-50-SA2D	1803615-05	FD	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-50-SA2D	280-116898-5	FD	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	1803615-06	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9040C	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	9056A	Stage 2B
12-Nov-2018	A1-MW-51-SA2	280-116898-6	N	METHOD	SM3500 Fe B D	Stage 2B
12-Nov-2018	A1-MW-04-SA2	1803615-01	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9040C	Stage 4

N = Normal Sample
FD = Field Duplicate
TB = Trip Blank
MS = Matrix Spike
MSD = Matrix Spike Duplicate
EB = Equipment Blank
DUP = Laboratory Duplicate
FRB = Field Rinsate Blank

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-04-SA2	280-116898-1	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-PZ-19-SA2	1803615-09	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-PZ-19-SA2	280-116898-8	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-52-SA2	1803615-07	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-52-SA2	280-116898-9	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	A1-MW-05-SA2	1803615-02	N	Gen Prep	537 MOD	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	8260B	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9040C	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	9056A	Stage 4
12-Nov-2018	A1-MW-05-SA2	280-116898-2	N	METHOD	SM3500 Fe B D	Stage 4
12-Nov-2018	FRB-20181112	1803615-08	FRB	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	TB-20181113	280-116942-7	TB	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	1803626-02	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2	280-116942-2	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-06-SA2DUP	280-116942-2DUP	DUP	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-06-SA2MS	280-116942-2MS	MS	METHOD	9056A	Stage 2B

N = Normal Sample *MS = Matrix Spike* *DUP = Laboratory Duplicate*
FD = Field Duplicate *MSD = Matrix Spike Duplicate*
TB = Trip Blank *EB = Equipment Blank* *FRB = Field Rinsate Blank*

Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
13-Nov-2018	16-MW-06-SA2MSD	280-116942-2MSD	MSD	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-18-SA2	1803626-05	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-18-SA2	280-116942-5	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	A1-MW-19-SA2	1803626-06	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-19-SA2	280-116942-6	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-HS-03-SA2	1803626-01	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-HS-03-SA2	280-116942-1	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-HS-03-SA2D	1803626-09	FD	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-HS-03-SA2D	280-116942-9	FD	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-08-SA2	1803626-03	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	9040C	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-08-SA2	280-116942-3	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2	1803626-04	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	8260B	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	9040C	Stage 2B

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	9056A	Stage 2B
13-Nov-2018	16-MW-09-SA2	280-116942-4	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2DUP	280-116942-4DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2MS	280-116942-4MS	MS	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	16-MW-09-SA2MSD	280-116942-4MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	A1-MW-53-SA2	1803626-08	N	Gen Prep	537 MOD	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	8260B	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	9040C	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	9056A	Stage 2B
13-Nov-2018	A1-MW-53-SA2	280-116942-8	N	METHOD	SM3500 Fe B D	Stage 2B
13-Nov-2018	FRB-20181113	1803626-07	FRB	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	TB-20181114	280-117007-6	TB	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2	1803659-01	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-07-SA2	280-117007-1	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-07-SA2MS	280-117007-1MS	MS	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-07-SA2MSD	280-117007-1MSD	MSD	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-23-SA2	1803659-02	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-23-SA2	280-117007-2	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-55-SA2	1803659-05	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-55-SA2	280-117007-5	N	METHOD	8260B	Stage 2B

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DUP = Laboratory Duplicate
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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
14-Nov-2018	A1-MW-55-SA2	280-117007-5	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-55-SA2	280-117007-5	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-55-SA2	280-117007-5	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-25-SA2	1803659-03	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-25-SA2	280-117007-3	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-25-SA2	280-117007-3	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-25-SA2	280-117007-3	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-25-SA2	280-117007-3	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-27-SA2	1803659-04	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-27-SA2	280-117007-4	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-27-SA2	280-117007-4	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-27-SA2	280-117007-4	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-27-SA2	280-117007-4	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	FRB-20181114	1803659-07	FRB	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-54-SA2	1803659-06	N	Gen Prep	537 MOD	Stage 2B
14-Nov-2018	A1-MW-54-SA2	280-117007-7	N	METHOD	8260B	Stage 2B
14-Nov-2018	A1-MW-54-SA2	280-117007-7	N	METHOD	9040C	Stage 2B
14-Nov-2018	A1-MW-54-SA2	280-117007-7	N	METHOD	9056A	Stage 2B
14-Nov-2018	A1-MW-54-SA2	280-117007-7	N	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-54-SA2DUP	280-117007-7DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-54-SA2MS	280-117007-7MS	MS	METHOD	SM3500 Fe B D	Stage 2B
14-Nov-2018	A1-MW-54-SA2MSD	280-117007-7MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	TB-20181115	280-117103-7	TB	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-13-SA2	1803676-02	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	9040C	Stage 2B

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-13-SA2	280-117103-2	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-11-SA2	1803676-01	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-11-SA2	280-117103-1	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-15-SA2	1803676-04	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-15-SA2	280-117103-4	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2	1803676-03	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-14-SA2	280-117103-3	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-14-SA2DUP	280-117103-3DUP	DUP	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	1803676-05	N	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-37-SA2	280-117103-5	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	1803676-06	FD	Gen Prep	537 MOD	Stage 2B
15-Nov-2018	A1-MW-37-SA2D	280-117103-6	FD	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-31-SA2	1803676-08	N	Gen Prep	537 MOD	Stage 2B

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	8260B	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	9040C	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	9056A	Stage 2B
15-Nov-2018	A1-MW-31-SA2	280-117103-8	N	METHOD	SM3500 Fe B D	Stage 2B
15-Nov-2018	FRB-20181115	1803676-07	FRB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	TB-20181116	280-117110-3	TB	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2	1803678-01	N	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	9040C	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	9056A	Stage 2B
16-Nov-2018	A1-MW-01-SA2	280-117110-1	N	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-01-SA2MS	280-117110-1MS	MS	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-01-SA2MSD	280-117110-1MSD	MSD	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-42-SA2	1803678-02	N	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	8260B	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	9040C	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	9056A	Stage 2B
16-Nov-2018	A1-MW-42-SA2	280-117110-2	N	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2DUP	280-117110-2DUP	DUP	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2MS	280-117110-2MS	MS	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	A1-MW-42-SA2MSD	280-117110-2MSD	MSD	METHOD	SM3500 Fe B D	Stage 2B
16-Nov-2018	FRB-20181116	1803678-03	FRB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	EB-20181116	1803678-04	EB	Gen Prep	537 MOD	Stage 2B
16-Nov-2018	EB-20181116	280-117110-4	EB	METHOD	8260B	Stage 2B
19-Nov-2018	A1-MW-50-SA2MS	B8K0091-MS1	MS	Gen Prep	537 MOD	Stage 4
19-Nov-2018	A1-MW-50-SA2MSD	B8K0091-MSD1	MSD	Gen Prep	537 MOD	Stage 4

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Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
30-Nov-2018	A1-MW-01-SA2MS	B8K0153-MS1	MS	Gen Prep	537 MOD	Stage 2B
30-Nov-2018	A1-MW-01-SA2MSD	B8K0153-MSD1	MSD	Gen Prep	537 MOD	Stage 2B

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Attachment 2

Overall Data Qualification Summary

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

11/12/2018 11:40:00

Sample ID: **A1-MW-04-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 2:24:00

Sample ID: **A1-MW-05-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 8:32:00

Sample ID: **A1-MW-49-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 9:25:00

Sample ID: **A1-MW-50-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 10:46:00

Sample ID: **A1-MW-51-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/12/2018 1:39:00

Sample ID: **A1-MW-52-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-PZ-19-SA2 ***Collected:*** 11/12/2018 12:43:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A ***Matrix:*** AQ

Sample ID: A1-PZ-19-SA2 ***Collected:*** 11/12/2018 12:43:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 2

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	0.896	J B	0.200	LOD	1.00	LOQ	mg/L	J	RI

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-04-SA2 ***Collected:*** 11/12/2018 11:40:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-05-SA2 ***Collected:*** 11/12/2018 2:24:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.119	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: A1-MW-49-SA2 ***Collected:*** 11/12/2018 8:32:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2** ***Collected:*** **11/12/2018 9:25:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.380	HF	0.0500	LOD	0.200	LOQ	mg/L	J	StoA

Sample ID: **A1-MW-51-SA2** ***Collected:*** **11/12/2018 10:46:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0278	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Sample ID: **A1-MW-52-SA2** ***Collected:*** **11/12/2018 1:39:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: **A1-PZ-19-SA2** ***Collected:*** **11/12/2018 12:43:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0591	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2** ***Collected:*** **11/12/2018 9:25:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.564	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.780	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-50-SA2D** ***Collected:*** **11/12/2018 9:35:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.630	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116898-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-50-SA2D** ***Collected:*** **11/12/2018 9:35:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.949	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-52-SA2** ***Collected:*** **11/12/2018 1:39:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.458	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.811	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-PZ-19-SA2** ***Collected:*** **11/12/2018 12:43:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.430	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-116942-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **16-HS-03-SA2** ***Collected:*** **11/13/2018 12:00:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.4	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **16-MW-06-SA2** ***Collected:*** **11/13/2018 9:38:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.2	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: EM

Method: 9040C **Matrix: AQ**

Sample ID:16-MW-08-SA2 **Collected: 11/13/2018 1:00:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:16-MW-09-SA2 **Collected: 11/13/2018 1:44:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-18-SA2 **Collected: 11/13/2018 10:31:00 AM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-19-SA2 **Collected: 11/13/2018 11:15:00 AM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID:A1-MW-53-SA2 **Collected: 11/13/2018 2:54:00 PM** **Analysis Type: RES/TOT** **Dilution: 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: GENCHEM

Method: 9056A **Matrix: AQ**

Sample ID:16-MW-06-SA2 **Collected: 11/13/2018 9:38:00 AM** **Analysis Type: RE/TOT** **Dilution: 10**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Sulfate	695	F1	5.00	LOD	50.0	LOQ	mg/L	J	Ms

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: GENCHEM

Method: 9056A ***Matrix:*** AQ

Sample ID: A1-MW-18-SA2 ***Collected:*** 11/13/2018 10:31:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 5

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NITRATE	11.0	H	0.500	LOD	2.50	LOQ	mg/L	J	StoA

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: 16-HS-03-SA2 ***Collected:*** 11/13/2018 12:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-06-SA2 ***Collected:*** 11/13/2018 9:38:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-08-SA2 ***Collected:*** 11/13/2018 1:00:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: 16-MW-09-SA2 ***Collected:*** 11/13/2018 1:44:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-18-SA2 ***Collected:*** 11/13/2018 10:31:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-116942-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-19-SA2 ***Collected:*** 11/13/2018 11:15:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-53-SA2 ***Collected:*** 11/13/2018 2:54:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: 16-MW-06-SA2 ***Collected:*** 11/13/2018 9:38:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.195	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: 16-MW-08-SA2 ***Collected:*** 11/13/2018 1:00:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.538	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: 16-MW-09-SA2 ***Collected:*** 11/13/2018 1:44:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.271	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-19-SA2 ***Collected:*** 11/13/2018 11:15:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.545	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1,

Laboratory: TA DEN

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

SDG: 280-117007-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-07-SA2** ***Collected:*** **11/14/2018 9:07:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-23-SA2** ***Collected:*** **11/14/2018 10:03:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.9	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-25-SA2** ***Collected:*** **11/14/2018 12:15:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-27-SA2** ***Collected:*** **11/14/2018 1:03:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-54-SA2** ***Collected:*** **11/14/2018 3:17:00 PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-55-SA2** ***Collected:*** **11/14/2018 11:02:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117007-1

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

11/14/2018 9:07:00

Sample ID: **A1-MW-07-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 10:03:00

Sample ID: **A1-MW-23-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 12:15:00

Sample ID: **A1-MW-25-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 1:03:00

Sample ID: **A1-MW-27-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 3:17:00

Sample ID: **A1-MW-54-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/14/2018 11:02:00

Sample ID: **A1-MW-55-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117007-1

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-07-SA2 ***Collected:*** 11/14/2018 9:07:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.357	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.826	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-25-SA2 ***Collected:*** 11/14/2018 12:15:00 PM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.273	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.539	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-117103-1

Method Category: EM

Method: 9040C ***Matrix:*** AQ

Sample ID: A1-MW-11-SA2 ***Collected:*** 11/15/2018 9:06:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-13-SA2 ***Collected:*** 11/15/2018 8:20:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: A1-MW-14-SA2 ***Collected:*** 11/15/2018 10:53:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

11/15/2018 10:07:00

Sample ID: **A1-MW-15-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.1	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/15/2018 2:16:00

Sample ID: **A1-MW-31-SA2** ***Collected:*** **PM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

11/15/2018 11:54:00

Sample ID: **A1-MW-37-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	7.8	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

11/15/2018 9:06:00

Sample ID: **A1-MW-11-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/15/2018 8:20:00

Sample ID: **A1-MW-13-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

11/15/2018 10:53:00

Sample ID: **A1-MW-14-SA2** ***Collected:*** **AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-15-SA2 ***Collected:*** 11/15/2018 10:07:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-31-SA2 ***Collected:*** 11/15/2018 2:16:00 PM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

Sample ID: A1-MW-37-SA2 ***Collected:*** 11/15/2018 11:54:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.156	J HF	0.0500	LOD	0.200	LOQ	mg/L	J	RI, StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-14-SA2 ***Collected:*** 11/15/2018 10:53:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.635	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.728	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-15-SA2 ***Collected:*** 11/15/2018 10:07:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.426	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: A1-MW-37-SA2 ***Collected:*** 11/15/2018 11:54:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.379	J	0.800	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117103-1

Method Category: **VOA**

Method: **8260B** ***Matrix:*** **AQ**

Sample ID: **A1-MW-37-SA2** ***Collected:*** **11/15/2018 11:54:00 AM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROETHENE	0.914	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

Sample ID: **A1-MW-37-SA2D** ***Collected:*** **11/15/2018 12:04:00 PM** ***Analysis Type:*** **RES** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.373	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.909	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

SDG: 280-117110-1

Method Category: **EM**

Method: **9040C** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA2** ***Collected:*** **11/16/2018 8:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Sample ID: **A1-MW-42-SA2** ***Collected:*** **11/16/2018 9:17:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PH	8.0	HF	0.1	LOD	0.1	LOQ	SU	J	StoA

Method Category: **GENCHEM**

Method: **SM3500 Fe B D** ***Matrix:*** **AQ**

Sample ID: **A1-MW-01-SA2** ***Collected:*** **11/16/2018 8:12:00 AM** ***Analysis Type:*** **RES/TOT** ***Dilution:*** **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF	0.0500	LOD	0.200	LOQ	mg/L	R	StoA

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1, **Laboratory: TA DEN**

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

SDG: 280-117110-1

Method Category: GENCHEM

Method: SM3500 Fe B D ***Matrix:*** AQ

Sample ID: A1-MW-42-SA2 ***Collected:*** 11/16/2018 9:17:00 AM ***Analysis Type:*** RES/TOT ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
Ferrous Iron	0.0500	U HF F1	0.0500	LOD	0.200	LOQ	mg/L	R	Ms, StoA

Method Category: VOA

Method: 8260B ***Matrix:*** AQ

Sample ID: A1-MW-42-SA2 ***Collected:*** 11/16/2018 9:17:00 AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1-DICHLOROETHENE	0.238	J	0.800	LOD	1.00	LOQ	ug/L	J	RI
TRICHLOROETHENE	0.367	J	0.400	LOD	1.00	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

Lab Reporting Batch ID: 280-116898-1, 280-116942-1,

Laboratory: TA DEN

EDD Filename: 280-116898-1, 280-116942-1, 280-117007-1, 280-117103-1, 280-117110-1

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver

Reason Code Legend

Reason Code	*Description*
Mb	Method Blank Contamination
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Lower Rejection
Ms	Matrix Spike Precision
RI	Reporting Limit Trace Value
StoA	Sampling to Analysis Estimation
StoA	Sampling to Analysis Rejection
Surr	Surrogate/Tracer Recovery Upper Estimation

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803615

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/12/2018 11:40:

Sample ID: A1-MW-04-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00646	J	0.00442	LOD	0.00881	LOQ	ug/L	J	RI

11/12/2018 2:24:0

Sample ID: A1-MW-05-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00359	J, Q	0.00431	LOD	0.00864	LOQ	ug/L	J	RI

11/12/2018 9:25:0

Sample ID: A1-MW-50-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00474	J, Q	0.00446	LOD	0.00894	LOQ	ug/L	J	RI

11/12/2018 9:35:0

Sample ID: A1-MW-50-SA2D **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00494	J	0.00439	LOD	0.00874	LOQ	ug/L	J	RI

11/12/2018 1:39:0

Sample ID: A1-MW-52-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00356	J	0.00435	LOD	0.00872	LOQ	ug/L	J	RI

11/12/2018 12:43:

Sample ID: A1-PZ-19-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHpA	0.00548	J	0.00442	LOD	0.00884	LOQ	ug/L	J	RI
PFOS	0.00321	J, Q	0.00442	LOD	0.00884	LOQ	ug/L	J	RI

SDG: 1803626

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803626

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/13/2018 9:38:0
Sample ID:16-MW-06-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00582	J	0.00417	LOD	0.00835	LOQ	ug/L	J	RI

11/13/2018 1:44:0
Sample ID:16-MW-09-SA2 **Collected:**PM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00449	J	0.00427	LOD	0.00852	LOQ	ug/L	J	RI
PFOS	0.00503	J	0.00427	LOD	0.00852	LOQ	ug/L	J	RI

11/13/2018 10:31:
Sample ID:A1-MW-18-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOA	0.00309	J	0.00427	LOD	0.00856	LOQ	ug/L	J	RI

11/13/2018 11:15:
Sample ID:A1-MW-19-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFDA	0.00721	J	0.00431	LOD	0.00861	LOQ	ug/L	J	RI
PFNA	0.00398	J	0.00431	LOD	0.00861	LOQ	ug/L	J	RI

11/13/2018 2:54:0
Sample ID:A1-MW-53-SA2 **Collected:**PM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFOS	0.00400	J, Q	0.00420	LOD	0.00841	LOQ	ug/L	J	RI

SDG: 1803659

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/14/2018 10:03:
Sample ID:A1-MW-23-SA2 **Collected:**AM **Analysis Type:**RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFHxS	0.00594	J	0.00424	LOD	0.00849	LOQ	ug/L	J	RI

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA
Method: 537 MOD ***Matrix:*** AQ

11/15/2018 9:06:0

Sample ID: A1-MW-11-SA2 ***Collected:*** AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFBS	0.184		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFDoA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFHpA	0.0352		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxA	0.460		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxS	0.109		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFNA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOS	0.00916		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFTeDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFUnA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOA	0.0349		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE

11/15/2018 8:20:0

Sample ID: A1-MW-13-SA2 ***Collected:*** AM ***Analysis Type:*** RES ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFBS	0.259		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFDoA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFHpA	0.105		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFHxA	0.655		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFHxS	0.368		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFNA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFOA	0.0695		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFOS	0.107		0.00455	LOD	0.00906	LOQ	ug/L	J	StoE
PFTeDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE
PFUnA	0.00455	U	0.00455	LOD	0.00906	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/15/2018 10:53

Sample ID: A1-MW-14-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFBS	0.101		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFDoA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFHpA	0.0658		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxA	0.327		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFHxS	0.253		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFNA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFOA	0.0527		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFOS	0.0604		0.00431	LOD	0.00860	LOQ	ug/L	J	StoE
PFTeDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE
PFUnA	0.00431	U	0.00431	LOD	0.00860	LOQ	ug/L	UJ	StoE

11/15/2018 10:07

Sample ID: A1-MW-15-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFBS	0.363		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFDoA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFHpA	0.0773		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFHxA	0.596		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFHxS	0.322		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFNA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFOA	0.190		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFOS	0.0185		0.00450	LOD	0.00902	LOQ	ug/L	J	StoE
PFTeDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE
PFUnA	0.00450	U	0.00450	LOD	0.00902	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/15/2018 2:16:0

Sample ID: A1-MW-31-SA2 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFBS	0.0235		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFDoA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFHpA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFHxA	0.0732		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFHxS	0.00855		0.00427	LOD	0.00855	LOQ	ug/L	J	StoE
PFNA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFOA	0.00388	J	0.00427	LOD	0.00855	LOQ	ug/L	J	RI, StoE
PFOS	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFTeDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE
PFUnA	0.00427	U	0.00427	LOD	0.00855	LOQ	ug/L	UJ	StoE

11/15/2018 11:54:

Sample ID: A1-MW-37-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFBS	0.151		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFDoA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFHpA	0.0856		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFHxA	0.520		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFHxS	0.438		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFNA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFOA	0.0599		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFOS	0.0288		0.00424	LOD	0.00851	LOQ	ug/L	J	StoE
PFTeDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE
PFUnA	0.00424	U	0.00424	LOD	0.00851	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803676

Method Category: SVOA

Method: 537 MOD **Matrix:** AQ

11/15/2018 12:04:

Sample ID: A1-MW-37-SA2D **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFBS	0.150		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFDoA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFHpA	0.0830		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFHxA	0.529		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFHxS	0.429		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFNA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFOA	0.0555		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFOS	0.0275		0.00435	LOD	0.00870	LOQ	ug/L	J	StoE
PFTeDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE
PFUnA	0.00435	U	0.00435	LOD	0.00870	LOQ	ug/L	UJ	StoE

11/15/2018 2:30:0

Sample ID: FRB-20181115 **Collected:** PM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
NEtFOSAA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
NMeFOSAA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFBS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFDoA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHpA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHxA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFHxS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFNA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFOA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFOS	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFTeDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE, Ccv
PFTrDA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE
PFUnA	0.00450	U	0.00450	LOD	0.00904	LOQ	ug/L	UJ	StoE

* denotes a non-reportable result

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista

eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

SDG: 1803678

Method Category: SVOA
Method: 537 MOD **Matrix:** AQ

11/16/2018 8:12:0
Sample ID: A1-MW-01-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00446	U	0.00446	LOD	0.00894	LOQ	ug/L	UJ	Ccv

11/16/2018 9:17:0
Sample ID: A1-MW-42-SA2 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00424	U	0.00424	LOD	0.00849	LOQ	ug/L	UJ	Ccv

11/16/2018 9:50:0
Sample ID: EB-20181116 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00424	U	0.00424	LOD	0.00849	LOQ	ug/L	UJ	Ccv

11/16/2018 9:40:0
Sample ID: FRB-20181116 **Collected:** AM **Analysis Type:** RES **Dilution:** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
PFTeDA	0.00481	U	0.00481	LOD	0.00965	LOQ	ug/L	UJ	Ccv

* denotes a non-reportable result

Data Qualifier Summary

1803676, 1803678
EDD Filename: Prep1803615, Prep1803626, Prep1803659, Prep1803676, Prep1803678

Laboratory: Vista
eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista

Reason Code Legend

Reason Code	*Description*
Ccv	Continuing Calibration Verification Percent Difference Lower Estimation
Lcs	Laboratory Control Spike Upper Estimation
Ms	Matrix Spike Precision
Ms	Matrix Spike Upper Estimation
RI	Reporting Limit Trace Value
StoE	Sampling to Extraction Estimation

* denotes a non-reportable result

Enclosure I

Stage 2B ADR Outliers

(Including Manual Review Outliers)

Quality Control
Outlier Reports

280-116898-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA2 (RES/TOT)	Sampling To Analysis	267.00	24.00	HOURS	J (all detects)
A1-MW-05-SA2 (RES/TOT)		335.00	24.00	HOURS	
A1-MW-49-SA2 (RES/TOT)		341.00	24.00	HOURS	
A1-MW-50-SA2 (RES/TOT)		270.00	24.00	HOURS	
A1-MW-51-SA2 (RES/TOT)		268.75	24.00	HOURS	
A1-MW-52-SA2 (RES/TOT)		265.75	24.00	HOURS	
A1-PZ-19-SA2 (RES/TOT)		336.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-04-SA2 (RES/TOT)	Sampling To Analysis	222.75	24.00	HOURS	J(all detects)
A1-MW-05-SA2 (RES/TOT)		220.00	24.00	HOURS	R(all non-detects)
A1-MW-49-SA2 (RES/TOT)		226.00	24.00	HOURS	
A1-MW-50-SA2 (RES/TOT)		225.00	24.00	HOURS	
A1-MW-51-SA2 (RES/TOT)		223.75	24.00	HOURS	
A1-MW-52-SA2 (RES/TOT)		220.75	24.00	HOURS	
A1-PZ-19-SA2 (RES/TOT)		221.75	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-437370/6	11/13/2018 12:25:00 PM	Sulfate	0.3332 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2
MB 280-437371/6	11/13/2018 12:25:00 PM	NITRATE	0.04530 mg/L	A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2

Reporting Limit Outliers

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: 280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-50-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.564 0.780	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-50-SA2D	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.630 0.949	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-52-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.458 0.811	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-PZ-19-SA2	TRICHLOROETHENE	J	0.430	1.00	LOQ	ug/L	J (all detects)

Method: 9056A
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-PZ-19-SA2	NITRATE	J B	0.896	1.00	LOQ	mg/L	J (all detects)

Method: SM3500 Fe B D
Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-05-SA2	Ferrous Iron	J HF	0.119	0.200	LOQ	mg/L	J (all detects)
A1-MW-51-SA2	Ferrous Iron	J HF	0.0278	0.200	LOQ	mg/L	J (all detects)
A1-PZ-19-SA2	Ferrous Iron	J HF	0.0591	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-116898-1 **Laboratory: TA DEN**

EDD Filename: Prep280-116898-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	A1-MW-50-SA2	A1-MW-50-SA2D			
1,1-DICHLOROETHENE	0.564	0.630	NC	30.00	No Qualifiers Applied
TRICHLOROETHENE	0.780	0.949	NC	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888A1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/18
SDG #: 280-116898-1 ADR/Stage ~~2B~~ 4 Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: DM
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20 %
IV.	Continuing calibration	A	CCV ≤ 20/50 %
V.	Laboratory Blanks	N	Not reviewed for ADR validation.
VI.	Field blanks		
VII.	Surrogate spikes		Not reviewed for ADR validation.
VIII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation.
IX.	Laboratory control samples		Not reviewed for ADR validation.
X.	Field duplicates		
XI.	Internal standards	A	Not reviewed for ADR validation.
XII.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation.
XIII.	Target compound identification		Not reviewed for ADR validation.
XIV.	System performance		Not reviewed for ADR validation.
XV.	Overall assessment of data		Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	A1-MW-50-SA2D**	280-116898-5**	Water	11/12/18
6	A1-MW-51-SA2**	280-116898-6**	Water	11/12/18
7	TB-20181112	280-116898-7	Water	11/12/18
8	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
9	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
10	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
11	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
12				
13	MB 280-498700/6 - 498747/4			

LDC #: 43888A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-116898-1 ADR/~~Stage 4~~ Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	Not reviewed for ADR validation. MS/MSD
VII.	Duplicate sample analysis	A	Not reviewed for ADR validation. DUP
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for ADR validation.
XI	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	A1-MW-51-SA2	280-116898-6	Water	11/12/18
6	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
7	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
8	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
9	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
10	A1-MW-50-SA2DUP	280-116898-4DUP	Water	11/12/18
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1 → 7	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+3)
QC 8 → 10	↓	pH TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: MG
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:		9040C		SM 3500 Fe B			
Parameters:		pH		Ferrous Iron			
Technical holding time:		24 hr		24 hr			
Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	11:40 11-12-18	14:43 11-23-18	(11 days)				J/UJ/P (det)
2	14:24 11-12-18	13:37 11-26-18	(14)				( )
3	08:32 11-12-18	13:36 11-26-18	(14)				( )
4	09:35 11-12-18	15:19 11-23-18	(11)				( )
5	10:46 11-12-18	15:33 11-23-18	(11)				( )
6	12:43 11-12-18	13:32 11-26-18	(14)				( )
7	13:39 11-12-18	15:23 11-23-18	(11)				( )
1	11:40 11-12-18			18:30 11-21-18	(9 days)		J/R/P (N.D.)
2	14:24 11-12-18				( )		(det)
3	08:32 11-12-18				( )		(ND)
4	09:35 11-12-18				( )		(det)
5	10:46 11-12-18				( )		( )
6	12:43 11-12-18				( )		( )
7	13:39 11-12-18				( )		(ND)

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all **(NO3-N: 2x dil, SO4: 20x dil, >5x or ND)**

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
NO3-N	0.04530	0.04526	0.4526									
SO4	0.3332	0.3841	38.41									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-116942-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA2 (RES/TOT)	Sampling To Analysis	316.00	24.00	HOURS	J (all detects)
16-MW-06-SA2 (RES/TOT)		318.50	24.00	HOURS	
16-MW-08-SA2 (RES/TOT)		314.75	24.00	HOURS	
16-MW-09-SA2 (RES/TOT)		314.50	24.00	HOURS	
A1-MW-18-SA2 (RES/TOT)		317.50	24.00	HOURS	
A1-MW-19-SA2 (RES/TOT)		316.25	24.00	HOURS	
A1-MW-53-SA2 (RES/TOT)		312.75	24.00	HOURS	

Method: 9056A **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-18-SA2 (RES/TOT)	Sampling To Analysis	62.25	48.00	HOURS	J(all detects)
		62.50	48.00	HOURS	UJ(all non-detects)

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
16-HS-03-SA2 (RES/TOT)	Sampling To Analysis	198.50	24.00	HOURS	J(all detects)
16-MW-06-SA2 (RES/TOT)		200.75	24.00	HOURS	R(all non-detects)
16-MW-08-SA2 (RES/TOT)		197.50	24.00	HOURS	
16-MW-09-SA2 (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2DUP (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2MS (RES/TOT)		196.75	24.00	HOURS	
16-MW-09-SA2MSD (RES/TOT)		196.75	24.00	HOURS	
A1-MW-18-SA2 (RES/TOT)		200.00	24.00	HOURS	
A1-MW-19-SA2 (RES/TOT)		199.25	24.00	HOURS	
A1-MW-53-SA2 (RES/TOT)		195.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-MW-06-SA2MS 16-MW-06-SA2MSD (16-MW-06-SA2)	Sulfate	80	74	87.00-112.00	-	Sulfate	J (all detects) UJ (all non-detects)

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
16-MW-09-SA2MS 16-MW-09-SA2MSD (16-MW-09-SA2)	Ferrous Iron	53	51	85.00-113.00	-	Ferrous Iron	J(all detects) UJ(all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-116942-1 **Laboratory: TA DEN**

EDD Filename: 280-116942-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA2	TRICHLOROETHENE	J	0.195	1.00	LOQ	ug/L	J (all detects)
16-MW-08-SA2	TETRACHLOROETHENE	J	0.538	1.00	LOQ	ug/L	J (all detects)
16-MW-09-SA2	TETRACHLOROETHENE	J	0.271	1.00	LOQ	ug/L	J (all detects)
A1-MW-19-SA2	TRICHLOROETHENE	J	0.545	1.00	LOQ	ug/L	J (all detects)

LDC #: 43888B1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-116942-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: DG
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%.
IV.	Continuing calibration	A	CCV ≤ 20/50%.
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	280-116942-1	Water	11/13/18
2	16-MW-06-SA2	280-116942-2	Water	11/13/18
3	16-MW-08-SA2	280-116942-3	Water	11/13/18
4	16-MW-09-SA2	280-116942-4	Water	11/13/18
5	A1-MW-18-SA2	280-116942-5	Water	11/13/18
6	A1-MW-19-SA2	280-116942-6	Water	11/13/18
7	TB-20181113	280-116942-7	Water	11/13/18
8	A1-MW-53-SA2	280-116942-8	Water	11/13/18
9	16-HS-063-SA2D	280-116942-9	Water	11/13/18
10				
11				
12	MB 280-438817/4			
13				

(H, AA, S only)

LDC #: 43888B6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-116942-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}; NO3 out for #5
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#8/9: SO4 fails, #11/12: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	280-116942-1	Water	11/13/18
2	16-MW-06-SA2	280-116942-2	Water	11/13/18
3	16-MW-08-SA2	280-116942-3	Water	11/13/18
4	16-MW-09-SA2	280-116942-4	Water	11/13/18
5	A1-MW-18-SA2	280-116942-5	Water	11/13/18
6	A1-MW-19-SA2	280-116942-6	Water	11/13/18
7	A1-MW-53-SA2	280-116942-8	Water	11/13/18
8	16-MW-06-SA2MS	280-116942-2MS	Water	11/13/18
9	16-MW-06-SA2MSD	280-116942-2MSD	Water	11/13/18
10	16-MW-06-SA2DUP	280-116942-2DUP	Water	11/13/18
11	16-MW-09-SA2MS	280-116942-4MS	Water	11/13/18
12	16-MW-09-SA2MSD	280-116942-4MSD	Water	11/13/18
13	16-MW-09-SA2DUP	280-116942-4DUP	Water	11/13/18
14	PBW1			
15	PBW2			

Notes:

LDC #: 43888B6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→7	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 8→10	↓	pH TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
↓ 11→13	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888B6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-4,6 (various dilutions, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
SO4		0.6931	3.466									

Conc. units: mg/L **Associated Samples:** 2,3,4,7 (various dilutions, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.3086	1.543									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117007-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA2 (RES/TOT)	Sampling To Analysis	363.25	24.00	HOURS	J (all detects)
A1-MW-23-SA2 (RES/TOT)		362.25	24.00	HOURS	
A1-MW-25-SA2 (RES/TOT)		359.75	24.00	HOURS	
A1-MW-27-SA2 (RES/TOT)		359.25	24.00	HOURS	
A1-MW-54-SA2 (RES/TOT)		356.75	24.00	HOURS	
A1-MW-55-SA2 (RES/TOT)		361.00	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-07-SA2 (RES/TOT)	Sampling To Analysis	177.50	24.00	HOURS	J(all detects)
A1-MW-23-SA2 (RES/TOT)		176.50	24.00	HOURS	R(all non-detects)
A1-MW-25-SA2 (RES/TOT)		174.25	24.00	HOURS	
A1-MW-27-SA2 (RES/TOT)		173.50	24.00	HOURS	
A1-MW-54-SA2 (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2DUP (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2MS (RES/TOT)		171.25	24.00	HOURS	
A1-MW-54-SA2MSD (RES/TOT)		171.25	24.00	HOURS	
A1-MW-55-SA2 (RES/TOT)		175.50	24.00	HOURS	

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **SM3500 Fe B D**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-54-SA2MS A1-MW-54-SA2MSD (A1-MW-54-SA2)	Ferrous Iron	34	35	85.00-113.00	-	Ferrous Iron	J (all detects) UJ (all non-detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117007-1 **Laboratory: TA DEN**

EDD Filename: 280-117007-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-07-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.357 0.826	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-25-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.273 0.539	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

LDC #: 43888C1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117007-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JV
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	280-117007-1	Water	11/14/18
2	A1-MW-23-SA2	280-117007-2	Water	11/14/18
3	A1-MW-25-SA2	280-117007-3	Water	11/14/18
4	A1-MW-27-SA2	280-117007-4	Water	11/14/18
5	A1-MW-55-SA2	280-117007-5	Water	11/14/18
6	TB-20181114	280-117007-6	Water	11/14/18
7	A1-MW-54-SA2	280-117007-7	Water	11/14/18
8	A1-MW-07-SA2MS	280-117007-1MS	Water	11/14/18
9	A1-MW-07-SA2MSD	280-117007-1MSD	Water	11/14/18
10				
11	MB 280-438841/6			
12				
13				

(H, AA, S only)

LDC #: 43888C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117007-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#7/8: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	280-117007-1	Water	11/14/18
2	A1-MW-23-SA2	280-117007-2	Water	11/14/18
3	A1-MW-25-SA2	280-117007-3	Water	11/14/18
4	A1-MW-27-SA2	280-117007-4	Water	11/14/18
5	A1-MW-55-SA2	280-117007-5	Water	11/14/18
6	A1-MW-54-SA2	280-117007-7	Water	11/14/18
7	A1-MW-54-SA2MS	280-117007-7MS	Water	11/14/18
8	A1-MW-54-SA2MSD	280-117007-7MSD	Water	11/14/18
9	A1-MW-54-SA2DUP	280-117007-7DUP	Water	11/14/18
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888C6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→6	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 7→9	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888C6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 1-5 (10x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.2558	12.79									

Conc. units: mg/L **Associated Samples:** 6 (10x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual.								
Cl		0.2618	13.09									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117103-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA2 (RES/TOT)	Sampling To Analysis	340.75	24.00	HOURS	J (all detects)
A1-MW-13-SA2 (RES/TOT)		341.00	24.00	HOURS	
A1-MW-14-SA2 (RES/TOT)		338.75	24.00	HOURS	
A1-MW-14-SA2DUP (RES/TOT)		338.75	24.00	HOURS	
A1-MW-15-SA2 (RES/TOT)		339.75	24.00	HOURS	
A1-MW-31-SA2 (RES/TOT)		335.50	24.00	HOURS	
A1-MW-37-SA2 (RES/TOT)		337.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-11-SA2 (RES/TOT)	Sampling To Analysis	153.50	24.00	HOURS	J(all detects)
A1-MW-13-SA2 (RES/TOT)		154.25	24.00	HOURS	R(all non-detects)
A1-MW-14-SA2 (RES/TOT)		151.75	24.00	HOURS	
A1-MW-15-SA2 (RES/TOT)		152.50	24.00	HOURS	
A1-MW-31-SA2 (RES/TOT)		148.25	24.00	HOURS	
A1-MW-37-SA2 (RES/TOT)		150.75	24.00	HOURS	

Method Blank Outlier Report

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **9056A**
Matrix: **AQ**

Method Blank Sample ID	Analysis Date	Analyte	Result	Associated Samples
MB 280-437914/6	11/16/2018 5:36:00 PM	CHLORIDE Sulfate	0.2635 mg/L 0.3386 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2
MB 280-437915/6	11/16/2018 5:36:00 PM	NITRATE	0.04638 mg/L	A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: 280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-14-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.635 0.728	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-15-SA2	TRICHLOROETHENE	J	0.426	1.00	LOQ	ug/L	J (all detects)
A1-MW-37-SA2	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.379 0.914	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-37-SA2D	1,1-DICHLOROETHENE TRICHLOROETHENE	J J	0.373 0.909	1.00 1.00	LOQ LOQ	ug/L ug/L	J (all detects)

Method: SM3500 Fe B D

Matrix: AQ

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
A1-MW-37-SA2	Ferrous Iron	J HF	0.156	0.200	LOQ	mg/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 280-117103-1 **Laboratory: TA DEN**

EDD Filename: Prep280-117103-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 8260B
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA2	**A1-MW-37-SA2D**			
1,1-DICHLOROETHENE	0.379	0.373	NC	30.00	No Qualifiers Applied
TRICHLOROETHENE	0.914	0.909	NC	30.00	

LDC #: 43888D1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117103-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: SV6
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15? ICV ≤ 20?
IV.	Continuing calibration	A	CCV ≤ 20/50?
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	280-117103-1	Water	11/15/18
2	A1-MW-13-SA2	280-117103-2	Water	11/15/18
3	A1-MW-14-SA2	280-117103-3	Water	11/15/18
4	A1-MW-15-SA2	280-117103-4	Water	11/15/18
5	A1-MW-37-SA2	280-117103-5	Water	11/15/18
6	A1-MW-37-SA2D	280-117103-6	Water	11/15/18
7	TB-20181115	280-117103-7	Water	11/15/18
8	A1-MW-31-SA2	280-117103-8	Water	11/15/18
9				
10				
11				
12	MB 280-438823/9			
13				

(H, AA, S only)

LDC #: 43888D6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117103-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	client specified
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	280-117103-1	Water	11/15/18
2	A1-MW-13-SA2	280-117103-2	Water	11/15/18
3	A1-MW-14-SA2	280-117103-3	Water	11/15/18
4	A1-MW-15-SA2	280-117103-4	Water	11/15/18
5	A1-MW-37-SA2	280-117103-5	Water	11/15/18
6	A1-MW-31-SA2	280-117103-8	Water	11/15/18
7	A1-MW-14-SA2DUP	280-117103-3DUP	Water	11/15/18
8				
9				
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888D6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→6	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 7	↓	(pH) TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888D6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all (20x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.2982	29.82									
SO4		0.4094	40.94									

Conc. units: mg/L **Associated Samples:** 1-5 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
NO3-N		0.04805	0.2402									

Conc. units: mg/L **Associated Samples:** 6 (>5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual.								
NO3-N		0.04749	0.2374									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

280-117110-1

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: 9040C **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA2 (RES/TOT)	Sampling To Analysis	318.00	24.00	HOURS	J (all detects)
A1-MW-42-SA2 (RES/TOT)		316.75	24.00	HOURS	

Method: SM3500 Fe B D **Preparation Method: METHOD**

Matrix: AQ

Sample ID	Type	Actual	Criteria	Units	Flag
A1-MW-01-SA2 (RES/TOT)	Sampling To Analysis	130.25	24.00	HOURS	J(all detects)
A1-MW-42-SA2 (RES/TOT)		129.25	24.00	HOURS	R(all non-detects)
A1-MW-42-SA2DUP (RES/TOT)		129.25	24.00	HOURS	
A1-MW-42-SA2MS (RES/TOT)		129.25	24.00	HOURS	
A1-MW-42-SA2MSD (RES/TOT)		129.25	24.00	HOURS	

Surrogate Outlier Report

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**
Matrix: **AQ**

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
EB-20181116	1,2-DICHLOROETHANE-D4	122	81.00-118.00	All Target Analytes	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: SM3500 Fe B D
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-42-SA2MS A1-MW-42-SA2MSD (A1-MW-42-SA2)	Ferrous Iron	27	27	85.00-113.00	-	Ferrous Iron	J (all detects) R (all non-detects)

Method: 8260B
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
A1-MW-01-SA2MSD (A1-MW-01-SA2)	1,1-DICHLOROETHENE	-	-	71.00-131.00	22 (20.00)	1,1-DICHLOROETHENE	J(all detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 280-117110-1 **Laboratory: TA DEN**

EDD Filename: 280-117110-1 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Denver**

Method: **8260B**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-42-SA2	1,1-DICHLOROETHENE	J	0.238	1.00	LOQ	ug/L	J (all detects)
	TRICHLOROETHENE	J	0.367	1.00	LOQ	ug/L	

LDC #: 43888E1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-117110-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: JV
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	TB
VII.	Surrogate spikes	N	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N	
X.	Field duplicates	N	
XI.	Internal standards	NA	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	280-117110-1	Water	11/16/18
2	A1-MW-42-SA2	280-117110-2	Water	11/16/18
3	TB-20181116	280-117110-3	Water	11/16/18
4	EB-20181116	280-117110-4	Water	11/16/18
5	A1-MW-01-SA2MS	280-117110-1MS	Water	11/16/18
6	A1-MW-01-SA2MSD	280-117110-1MSD	Water	11/16/18
7				
8				
9				

Notes:

(H, AA, S only)

LDC #: 43888E6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18
SDG #: 280-117110-1 ADR Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: MG
2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	HT out for all pH, Fe^{+2}
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	ICB/CCB only
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	MS/MSD (#3/4: Fe^{+2} fails)
VII.	Duplicate sample analysis	N	DUP
VIII.	Laboratory control samples	N	LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	280-117110-1	Water	11/16/18
2	A1-MW-42-SA2	280-117110-2	Water	11/16/18
3	A1-MW-42-SA2MS	280-117110-2MS	Water	11/16/18
4	A1-MW-42-SA2MSD	280-117110-2MSD	Water	11/16/18
5	A1-MW-42-SA2DUP	280-117110-2DUP	Water	11/16/18
6				
7				
8				
9				
10				
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888E6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1, 2	W	(pH) TDS (Cl) F (NO3) NO2 (SO4) PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
QC 3→5	↓	pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4 (Fe+2)
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4
		pH TDS Cl F NO3 NO2 SO4 PO4 ALK CN- NH3 TKN TOC CR6+ ClO4

Comments:

LDC #: 43888E6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** 2 (20x dil, >5x)

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.								
Cl		0.6147	61.47									
SO4		0.3987	39.87									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

Quality Control
Outlier Reports

1803615

Reporting Limit Outliers

Lab Reporting Batch ID: 1803615 **Laboratory: Vista**

EDD Filename: 1803615 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-04-SA2	PFOA	J	0.00646	0.00881	LOQ	ug/L	J (all detects)
A1-MW-05-SA2	PFHxS	J, Q	0.00359	0.00864	LOQ	ug/L	J (all detects)
A1-MW-50-SA2	PFHpA	J, Q	0.00474	0.00894	LOQ	ug/L	J (all detects)
A1-MW-50-SA2D	PFHpA	J	0.00494	0.00874	LOQ	ug/L	J (all detects)
A1-MW-52-SA2	PFOS	J	0.00356	0.00872	LOQ	ug/L	J (all detects)
A1-PZ-19-SA2	PFHpA PFOS	J J, Q	0.00548 0.00321	0.00884 0.00884	LOQ LOQ	ug/L ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803615 **Laboratory: Vista**

EDD Filename: Prep1803615 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-50-SA2	**A1-MW-50-SA2D**			
PFBS	0.0250	0.0264	5	30.00	
PFHpA	0.00474	0.00494	NC	30.00	
PFHxA	0.0806	0.0829	3	30.00	No Qualifiers Applied
PFHxS	0.0367	0.0355	3	30.00	
PFOA	0.00947	0.00878	8	30.00	

LDC #: 43888K96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803615 ADR/Stage 4 Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JM
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 20% Individual ≤ 30% ICV ≤ 30%
IV.	Continuing calibration/ISC	A	CCV ≤ 30% true conc.
V.	Laboratory Blanks	N	Not reviewed for ADR validation.
VI.	Field blanks		
VII.	Matrix spike/Matrix spike duplicates		Not reviewed for ADR validation.
VIII.	Laboratory control samples		Not reviewed for ADR validation.
IX.	Field duplicates		
X.	Labeled Compounds	A	Not reviewed for ADR validation.
XI.	Compound quantitation RL/LOQ/LODs	N	Not reviewed for ADR validation.
XII.	Target compound identification		Not reviewed for ADR validation.
XIII.	System performance		Not reviewed for ADR validation.
XIV.	Overall assessment of data		Not reviewed for ADR validation.

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
SW = See worksheet FB = Field blank EB = Equipment blank
** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	1803615-01**	Water	11/12/18
2	A1-MW-05-SA2**	1803615-02**	Water	11/12/18
3	A1-MW-49-SA2**	1803615-03**	Water	11/12/18
4	A1-MW-50-SA2**	1803615-04**	Water	11/12/18
5	A1-MW-50-SA2D**	1803615-05**	Water	11/12/18
6	A1-MW-51-SA2**	1803615-06**	Water	11/12/18
7	A1-MW-52-SA2**	1803615-07**	Water	11/12/18
8	FRB-20181112	1803615-08	Water	11/12/18
9	A1-~~MW~~ PZ-19-SA2**	1803615-09**	Water	11/12/18
10	A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
11	A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18
12				
13				
14	PBW0091-BLK1			
15				

Quality Control
Outlier Reports

1803626

Reporting Limit Outliers

Lab Reporting Batch ID: 1803626 **Laboratory: Vista**

EDD Filename: 1803626 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
16-MW-06-SA2	PFOS	J	0.00582	0.00835	LOQ	ug/L	J (all detects)
16-MW-09-SA2	PFOA PFOS	J J	0.00449 0.00503	0.00852 0.00852	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-18-SA2	PFOA	J	0.00309	0.00856	LOQ	ug/L	J (all detects)
A1-MW-19-SA2	PFDA PFNA	J J	0.00721 0.00398	0.00861 0.00861	LOQ LOQ	ug/L ug/L	J (all detects)
A1-MW-53-SA2	PFOS	J, Q	0.00400	0.00841	LOQ	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803626 **Laboratory: Vista**

EDD Filename: 1803626 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	16-HS-03-SA2	**16-HS-03-SA2D**			
PFBS	1.34	1.39	4	30.00	
PFHpA	0.405	0.412	2	30.00	
PFHxA	10.3	11.7	13	30.00	No Qualifiers Applied
PFHxS	0.324	0.312	4	30.00	
PFOA	0.0206	0.0200	3	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888L96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803626 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JVC
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	r² Individual ≤30% Mean value ICV ≤30%
IV.	Continuing calibration/ISC	A	CCV ≤30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	N/A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	16-HS-03-SA2	1803626-01	Water	11/13/18
2	16-MW-06-SA2	1803626-02	Water	11/13/18
3	16-MW-08-SA2	1803626-03	Water	11/13/18
4	16-MW-09-SA2	1803626-04	Water	11/13/18
5	A1-MW-18-SA2	1803626-05	Water	11/13/18
6	A1-MW-19-SA2	1803626-06	Water	11/13/18
7	FRB-20181113	1803626-07	Water	11/13/18
8	A1-MW-53-SA2	1803626-08	Water	11/13/18
9	16-HS-03-SA2D	1803626-09	Water	11/13/18
10				
11				

Notes:

Quality Control
Outlier Reports

1803659

Reporting Limit Outliers

Lab Reporting Batch ID: 1803659 **Laboratory: Vista**

EDD Filename: 1803659 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-23-SA2	PFHxS	J	0.00594	0.00849	LOQ	ug/L	J (all detects)

LDC #: 43888M96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803659 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: SM
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	~~r~~ r Individual ≤30% ICV ≤ 30% True value
IV.	Continuing calibration/ISC	A	CCV ≤ 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	~~N~~ A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-07-SA2	1803659-01	Water	11/14/18
2	A1-MW-23-SA2	1803659-02	Water	11/14/18
3	A1-MW-25-SA2	1803659-03	Water	11/14/18
4	A1-MW-27-SA2	1803659-04	Water	11/14/18
5	A1-MW-55-SA2	1803659-05	Water	11/14/18
6	A1-MW-54-SA2	1803659-06	Water	11/14/18
7	FRB-20181114	1803659-07	Water	11/14/18
8				
9				
10				

Notes:

	B8K0149-BLK1						

Quality Control
Outlier Reports

1803676

QC Outlier Report: HoldingTimes

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD **Preparation Method: Gen Prep**

Matrix: AQ

Sample ID	*Type*	*Actual*	*Criteria*	*Units*	*Flag*
A1-MW-11-SA2 (RES)	Sampling To Extraction	15.00	14.00	DAYS	J (all detects)
A1-MW-13-SA2 (RES)		15.00	14.00	DAYS	UJ (all non-detects)
A1-MW-14-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-15-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-31-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-37-SA2 (RES)		15.00	14.00	DAYS	
A1-MW-37-SA2D (RES)		15.00	14.00	DAYS	
FRB-20181115 (RES)		15.00	14.00	DAYS	

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*LCS %R*	*LCSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
B8K0153-BS1 (A1-MW-11-SA2 A1-MW-13-SA2 A1-MW-14-SA2 A1-MW-15-SA2 A1-MW-31-SA2 A1-MW-37-SA2 A1-MW-37-SA2D FRB-20181115)	PFTeDA	140	-	70.00-130.00	-	PFTeDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Reporting Limit Outliers

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**

Matrix: **AQ**

SampleID	*Analyte*	*Lab Qual*	*Result*	*Reporting Limit*	*RL Type*	*Units*	*Flag*
A1-MW-31-SA2	PFOA	J	0.00388	0.00855	LOQ	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 1803676 **Laboratory: Vista**

EDD Filename: 1803676 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

Analyte	*Concentration (ug/L)*		*Sample RPD*	*eQAPP RPD*	*Flag*
	A1-MW-37-SA2	**A1-MW-37-SA2D**			
PFBS	0.151	0.150	1	30.00	No Qualifiers Applied
PFHpA	0.0856	0.0830	3	30.00	
PFHxA	0.520	0.529	2	30.00	
PFHxS	0.438	0.429	2	30.00	
PFOA	0.0599	0.0555	8	30.00	
PFOS	0.0288	0.0275	5	30.00	

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

LDC #: 43888N96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803676 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: DG
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A, ~~A~~SW	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	r r Individual ≤30% ICV≤30% true value
IV.	Continuing calibration/ISC	SW	CCV≤30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	~~N~~ A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-11-SA2	1803676-01	Water	11/15/18
2	A1-MW-13-SA2	1803676-02	Water	11/15/18
3	A1-MW-14-SA2	1803676-03	Water	11/15/18
4	A1-MW-15-SA2	1803676-04	Water	11/15/18
5	A1-MW-37-SA2	1803676-05	Water	11/15/18
6	A1-MW-37-SA2D	1803676-06	Water	11/15/18
7	FRB-20181115	1803676-07	Water	11/15/18
8	A1-MW-31-SA2	1803676-08	Water	11/15/18
9				
10				
11				

Notes:

	B8K0153-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC #: 43588 N96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: MG
2nd Reviewer:

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y N N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
	12/03/18	181203M1_3	I	42.4	All (ND)	J/UJ/A

Quality Control
Outlier Reports

1803678

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803678 **Laboratory: Vista**

EDD Filename: 1803678 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: **537 MOD**
Matrix: **AQ**

QC Sample ID (Associated Samples)	*Compound*	*MS %R*	*MSD %R*	*%R Limits*	*RPD (Limits)*	*Affected Compounds*	*Flag*
A1-MW-01-SA2MS A1-MW-01-SA2MSD (A1-MW-01-SA2)	PFTeDA	139	-	70.00-130.00	31.7 (30.00)	PFTeDA	J (all detects)

Project Name and Number: 4663.3803 - CTO 17F3803 Yuma

Lab Control Spike/Lab Control Spike Duplicate Outlier Report

Lab Reporting Batch ID: 1803678 **Laboratory: Vista**

EDD Filename: 1803678 **eQAPP Name: SW RAC 6_CTO 3803 YUMA - Vista**

Method: 537 MOD
Matrix: AQ

QC Sample ID (Associated Samples)	Compound	LCS %R	LCSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
B8K0153-BS1 (A1-MW-01-SA2 A1-MW-42-SA2 EB-20181116 FRB-20181116)	PFTeDA	140	-	70.00-130.00	-	PFTeDA	J (all detects)

LDC #: 43888O96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 1803678 ADR Page: 1 of 1
Laboratory: Vista Analytical Laboratory Reviewer: JW
2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	te r² Individual ≤ 30% ICV ≤ 30% True value
IV.	Continuing calibration/ISC	SW	CCV ≤ 30%
V.	Laboratory Blanks	N	
VI.	Field blanks	N	FRB = 3 EB = 4
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Field duplicates	N	
X.	Labeled Compounds	N/A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank
SB=Source blank
OTHER:

	Client ID	Lab ID	Matrix	Date
1	A1-MW-01-SA2	1803678-01	Water	11/16/18
2	A1-MW-42-SA2	1803678-02	Water	11/16/18
3	FRB-20181116	1803678-03	Water	11/16/18
4	EB-20181116	1803678-04	Water	11/16/18
5	A1-MW-01-SA2MS	1803678-01MS	Water	11/16/18
6	A1-MW-01-SA2MSD	1803678-01MSD	Water	11/16/18
7				
8				
9				
10				

Notes:

	B8K0153-BLK1						

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC #: 43888096

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: JVG
2nd Reviewer: C

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a continuing calibration standard analyzed after every 10 injections for each instrument?

Y (N) N/A Were all continuing calibration percent differences (%D) ≤30 %?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding RRF (Limit:)	Associated Samples	Qualifications
	12/03/18	181203M1_2	I	42.4		All (ND)	J/UJ/A

Enclosure II

Manual Stage 2B and Stage 4 Data Validation Reports

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: Volatiles

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-116898-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	280-116898-1	Water	11/12/18
A1-MW-05-SA2	280-116898-2	Water	11/12/18
A1-MW-49-SA2	280-116898-3	Water	11/12/18
A1-MW-50-SA2	280-116898-4	Water	11/12/18
A1-MW-50-SA2D	280-116898-5	Water	11/12/18
A1-MW-51-SA2	280-116898-6	Water	11/12/18
A1-PZ-19-SA2	280-116898-8	Water	11/12/18
A1-MW-52-SA2	280-116898-9	Water	11/12/18
A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample TB-20181112 was identified as a trip blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

Samples A1-MW-50-SA2 and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ug/L)				
Compound	A1-MW-50-SA2	A1-MW-50-SA2D	RPD (Limits)	Flag	A or P
1,1-Dichloroethene	0.564	0.630	Not calculable	-	-
Trichloroethene	0.780	0.949	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All compounds reported below the LOQ.	J (all detects)	A

XIII. Target Compound Identifications

All target compound identifications met validation criteria.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Volatiles - Data Qualification Summary - SDG 280-116898-1

Sample	Compound	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Volatiles - Laboratory Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Volatiles - Field Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

LDC #: 43888A1a **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: 280-116898-1 ADR/Stage ~~2B~~ 4 Page: 1 of 1
Laboratory: Test America, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50 %
V.	Laboratory Blanks	A	~~Not reviewed for ADR validation.~~
VI.	Field blanks	ND	TB = 7
VII.	Surrogate spikes	A	~~Not reviewed for ADR validation.~~
VIII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ADR validation.
IX.	Laboratory control samples	A	~~Not reviewed for ADR validation.~~ LCS
X.	Field duplicates	SW	D = 4/5
XI.	Internal standards	A	~~Not reviewed for ADR validation.~~
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for ADR validation.
XIII.	Target compound identification	A	Not reviewed for ADR validation.
XIV.	System performance	A	Not reviewed for ADR validation.
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation.~~

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2** D	280-116898-4**	Water	11/12/18
5	A1-MW-50-SA2D** D	280-116898-5**	Water	11/12/18
6	A1-MW-51-SA2**	280-116898-6**	Water	11/12/18
7	~~TB-20181112~~	280-116898-7	Water	11/12/18
8	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
9	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
10	A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
11	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
12	MB 280-438700/6			
13	L - 438747/4			

(H, AA, S only)

LDC #: 43888A1N

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓	*		
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	

LDC #: 93888A1a

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene	A2.
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane	B2.
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane	C2.
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene	D2.
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11	E2.
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12	F2.
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113	G2.
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114	H2.
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane	I2.
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide	J2.
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane	K2.
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane	L2.
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane	M2.
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane	N2.
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane	O2.
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane	P2.
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane	Q2.
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane	R2.
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane	S2.
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methylcyclohexane	T1. 2-Methylhexane	T2.
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal	U2.
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene	V2.
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol	W2.
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene	X2.
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.	Y2.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.	Z2.

LDC#: 43888A1a

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GCMS VOA (EPA SW 846 Method 8260B)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤30%)	Qualifications (Parent only)
	4	5		
H	0.564	0.630	NC	
S	0.780	0.949	NC	

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LDC #: 43888A1a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL GC MSV G	10/29/2018	Trichloroethene (IS1)	0.4141	0.4141	0.3989	0.3989	3.0	3.0
			Tetrachloroethene (IS2)	1.5494	1.5494	1.4974	1.4974	2.5	2.5
2	ICAL GC MSV Z	11/3/2018	Trichloroethene (IS1)	0.4665	0.4665	0.4837	0.4837	6.8	6.8
			Tetrachloroethene (IS2)	1.6975	1.6975	1.7599	1.7599	5.9	5.9

LDC # 43888A1a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CCV)	Recalculated RRF (CCV)	Reported % D	Recalculated %D
1	G2197 GC MSV G	11/26/2018	Trichloroethene (IS1)	0.3989	0.4216	0.4216	5.7	5.7
			Tetrachloroethene (IS2)	1.4974	1.5171	1.5171	1.3	1.3
2	Z3472 GC MSV Z	11/26/2018	Trichloroethene (IS1)	0.4837	0.5081	0.5081	5.0	5.0
			Tetrachloroethene (IS2)	1.7599	1.7106	1.7106	2.8	2.8

LDC #: 43888 A1a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	10.0	10.1	101	101	0
1,2-Dichloroethane-d4		9.22	92	92	
Toluene-d8		10.3	103	103	
Bromofluorobenzene		10.1	101	101	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 42888A1a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC)

MSC = Matrix spike concentration; MSDC = Matrix spike duplicate concentration

MS/MSD sample: 10/11

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.00	5.00	0.564	5.549	5.972	100	100	108	108	7	7
Trichloroethene	↓	↓	0.780	5.580	5.935	96	96	103	107	6	6
Benzene											
Toluene											
Chlorobenzene											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 93888 A1a

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: LCS 280-438700/4

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	NA	4.874	NA	97	97				
Trichloroethene	5.00	↓	5.029	↓	101	101				
Benzene										
Toluene										
Chlorobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A1a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 4, TCE:

Conc. = $\frac{(13951)(12.5)(\quad)}{(560722)(0.3989)(\quad)(\quad)}$

= 0.780 ug/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
			0.780		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: January 2, 2019

Parameters: Wet Chemistry

Validation Level: Stage 4

Laboratory: TestAmerica, Inc.

Sample Delivery Group (SDG): 280-116898-1

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	280-116898-1	Water	11/12/18
A1-MW-05-SA2	280-116898-2	Water	11/12/18
A1-MW-49-SA2	280-116898-3	Water	11/12/18
A1-MW-50-SA2	280-116898-4	Water	11/12/18
A1-PZ-19-SA2	280-116898-8	Water	11/12/18
A1-MW-52-SA2	280-116898-9	Water	11/12/18
A1-MW-50-SA2MS	280-116898-4MS	Water	11/12/18
A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
A1-MW-50-SA2DUP	280-116898-4DUP	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Chloride, Nitrate as Nitrogen, and Sulfate by Environmental Protection Agency (EPA) SW 846 Method 9056A
Ferrous Iron by Standard Method 3500-Fe B
pH by EPA SW 846 Method 9040C

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Time From Sample Collection Until Analysis	Required Holding Time From Sample Collection Until Analysis	Flag	A or P
A1-MW-04-SA2 A1-MW-50-SA2 A1-MW-52-SA2	pH	11 days	24 hours	J (all detects)	P
A1-MW-05-SA2 A1-MW-49-SA2 A1-PZ-19-SA2	pH	14 days	24 hours	J (all detects)	P
A1-MW-04-SA2 A1-MW-49-SA2 A1-MW-52-SA2	Ferrous Iron	9 days	24 hours	R (all non-detects)	P
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	Ferrous Iron	9 days	24 hours	J (all detects)	P

II. Initial Calibration

All criteria for the initial calibration of each method were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Nitrate as N Sulfate	0.04530 mg/L 0.3332 mg/L	All samples in SDG 280-116898-1
ICB/CCB	Nitrate as N Sulfate	0.04526 mg/L 0.3841 mg/L	All samples in SDG 280-116898-1

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

V. Field Blanks

No field blanks were identified in this SDG.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable.

All analytes reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All analytes reported below the LOQ.	J (all detects)	A

XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

Due to technical holding time, data were rejected in three samples.

Due to technical holding time and results below the LOQ, data were qualified as estimated in six samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Wet Chemistry - Data Qualification Summary - SDG 280-116898-1

Sample	Analyte	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	pH	J (all detects)	P	Technical holding times
A1-MW-04-SA2 A1-MW-49-SA2 A1-MW-52-SA2	Ferrous Iron	R (all non-detects)	P	Technical holding times
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	Ferrous Iron	J (all detects)	P	Technical holding times
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-PZ-19-SA2 A1-MW-52-SA2	All analytes reported below the LOQ.	J (all detects)	A	Sample result verification

MCAS Yuma, CTO 17F3803
Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Wet Chemistry - Field Blank Data Qualification Summary - SDG 280-116898-1

No Sample Data Qualified in this SDG

LDC #: 43888A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-20-18

SDG #: 280-116898-1 ~~ADR~~/Stage 4 Page: 1 of 1

Laboratory: Test America, Inc. Reviewer: MG

2nd Reviewer:

METHOD: (Analyte) Chloride, Nitrate-N, Sulfate (EPA SW846 Method 9056A), Ferrous Iron (SM3500-Fe B), pH (EPA SW846 Method 9040C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	SW	
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	SW	
V	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	A	Not reviewed for ADR validation. MS/MSD
VII.	Duplicate sample analysis	A	Not reviewed for ADR validation. DUP
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. LCS/LCSD
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for ADR validation.
XI	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	280-116898-1**	Water	11/12/18
2	A1-MW-05-SA2**	280-116898-2**	Water	11/12/18
3	A1-MW-49-SA2**	280-116898-3**	Water	11/12/18
4	A1-MW-50-SA2**	280-116898-4**	Water	11/12/18
5	~~A1-MW-51-SA2~~	280-116898-6	Water	11/12/18
6	A1-PZ-19-SA2**	280-116898-8**	Water	11/12/18
7	A1-MW-52-SA2**	280-116898-9**	Water	11/12/18
8	~~A1-MW-50-SA2MS~~	280-116898-4MS	Water	11/12/18
9	A1-MW-50-SA2MSD	280-116898-4MSD	Water	11/12/18
10	~~A1-MW-50-SA2DUP~~	280-116898-4DUP	Water	11/12/18
11				
12				
13				
14				
15	PBW			

Notes:

LDC #: 43888A6

VALIDATION FINDINGS CHECKLIST

Reviewer: MG
2nd Reviewer:

Method: Inorganics (EPA Method See cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Specific Analysis Reference

Reviewer: MG
2nd reviewer:

All circled methods are applicable to each sample.

Sample ID	Matrix	Parameter
1→7	W	(pH) TDS (Cl) F (NO_3) NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4 (Fe+2)
QC 8→10	↓	pH TDS (Cl) F (NO_3) NO_2 (SO_4) PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4
		pH TDS Cl F NO_3 NO_2 SO_4 PO_4 ALK CN^- NH_3 TKN TOC CR^{6+} ClO_4

Comments:

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: MG
2nd reviewer:

All circled dates have exceeded the technical holding time.
(Y) N N/A Were all samples preserved as applicable to each method?
(Y) N N/A Were all cooler temperatures within validation criteria?

Method:	9040C	SM 3500 Fe B				
Parameters:	pH	Ferrous Iron				
Technical holding time:	24 hr	24 hr				

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier	
1	11:40 11-12-18	14:43 11-23-18	(11 days)				J/UJ/P	(det)
2	14:24 11-12-18	13:27 11-26-18	(14)					( )
3	08:32 11-12-18	13:36 11-26-18	(14)					( )
4	09:25 11-12-18	15:19 11-23-18	(11)					( )
~~5~~	~~10:46 11-12-18~~	~~15:33 11-23-18~~	(11)					( )
6	12:43 11-12-18	13:32 11-26-18	(14)					( )
7	13:39 11-12-18	15:23 11-23-18	(11)					( )
1	11:40 11-12-18			18:30 11-21-18	(9 days)		J/R/P	(N.D.)
2	14:24 11-12-18				( )			(det)
3	08:32 11-12-18				( )			(ND)
4	09:25 11-12-18				( )			(det)
~~5~~	~~10:46 11-12-18~~				( )			( )
6	12:43 11-12-18				( )			( )
7	13:39 11-12-18				( )			(ND)

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Conc. units: mg/L **Associated Samples:** all **(NO3-N: 2x dil, SO4: 20x dil, >5x or ND)**

Analyte	Blank ID	Blank ID	Blank Action Limit									
	PB	ICB/CCB (mg/L)		No Qual's.									
NO3-N	0.04530	0.04526	0.4526									
SO4	0.3332	0.3841	38.41									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See cover

The correlation coefficient (r) for the calibration of Cl was recalculated. Calibration date: 9-1-18

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of Analysis	Analyte	Standard ID	Conc. Found (units)	Area True (units)	Recalculated r or %R	Reported r or %R	Acceptable (Y/N)
Initial calibration	Cl	Blank	-	-	r=1.000	r= 1.000	Y
		Standard 1	1.0 (mg/L)	17320827			
		Standard 2	2.5 ( )	46063990			
		Standard 3	5.0 ( )	94576246			
		Standard 4	60.0 ( )	1169987193			
		Standard 5	120.0 ( )	2305131911			
		Standard 6	200.0 ( )	3845262113			
		Standard 7	-	-			
Calibration verification	Ferrous Iron	1830 ICV	1.045 (mg/L)	1.00 (mg/L)	104	105	
Calibration verification	NO_3-N	1052 CCV	4.85 (mg/L)	5.00 (mg/L)	97	97	
Calibration verification	SO_4	1646 CCV	102.2 (mg/L)	100 (mg/L)	102	102	

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: MG
2nd Reviewer:

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
1830 LCS	Laboratory control sample	Ferrous Iron	2.13 (mg/L)	2.00 (mg/L)	106	106	Y
1801 8	Matrix spike sample	Cl	(SSR-SR) 512 (mg/L)	500 (mg/L)	102	102	
1724/1743 10	Duplicate sample	SO_4	894 (mg/L)	866 (mg/L)	3	3	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer:

METHOD: Inorganics, Method see cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for #1, SO_4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $Y = mx + b$
where
$m = 14253830$
$b = -272056$
dil = 20 x

Recalculation:

$$601084316 = 14253830\left(\frac{x}{20}\right) - 272056$$

$$843.78 \text{ mg/L} = x$$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	SO_4	847	844	Y
2	2	Ferrous Iron	0.119	0.119	
3	3	pH	7.9 (SU)	7.9 (SU)	
4	4	NO_3-N	3.26	3.18	
5	6	Ferrous Iron	0.0591	0.0591	
6	7	pH	8.0 (SU)	8.0 (SU)	

Note:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B & 4

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846366

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2**	L1846366-01**	Water	11/12/18
A1-MW-05-SA2**	L1846366-02**	Water	11/12/18
A1-MW-49-SA2**	L1846366-03**	Water	11/12/18
A1-MW-50-SA2**	L1846366-04**	Water	11/12/18
A1-MW-50-SA2D	L1846366-05	Water	11/12/18
A1-MW-51-SA2**	L1846366-06**	Water	11/12/18
A1-PZ-19-SA2**	L1846366-07**	Water	11/12/18
A1-MW-52-SA2**	L1846366-08**	Water	11/12/18
A1-MW-50-SA2MS	L1846366-04MS	Water	11/12/18
A1-MW-50-SA2MSD	L1846366-04MSD	Water	11/12/18

**Indicates sample underwent Stage 4 validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Stage 4 data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-50-SA2** and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (ng/L)				
Compound	A1-MW-50-SA2**	A1-MW-50-SA2D	RPD (Limits)	Flag	A or P
1,4-Dioxane	592	591	0 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Stage 4 validation. Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846366

No Sample Data Qualified in this SDG

LDC #: 43888F2b

SDG #: L1846366

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

~~ADR/~~Stage 4 2B

Date: 12/19/18

Page: 1 of 1

Reviewer: JG

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	A	~~Not reviewed for ADR validation~~.
VI.	Field blanks	N	
VII.	Surrogate spikes	A	~~Not reviewed for ADR validation~~.
VIII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ~~ADR~~ validation.
IX.	Laboratory control samples	A	~~Not reviewed for ADR validation~~. LCS/D
X.	Field duplicates	SW	D = 4/5
XI.	Internal standards	A	~~Not reviewed for ADR validation~~.
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for ADR validation.
XIII.	Target compound identification	A	Not reviewed for ADR validation.
XIV.	System performance	A	Not reviewed for ADR validation.
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation~~.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	L1846366-01**	Water	11/12/18
2	A1-MW-05-SA2**	L1846366-02**	Water	11/12/18
3	A1-MW-49-SA2**	L1846366-03**	Water	11/12/18
4	A1-MW-50-SA2** D	L1846366-04**	Water	11/12/18
5	A1-MW-50-SA2D D	L1846366-05	Water	11/12/18
6	A1-MW-51-SA2**	L1846366-06**	Water	11/12/18
7	A1-PZ-19-SA2**	L1846366-07**	Water	11/12/18
8	A1-MW-52-SA2**	L1846366-08**	Water	11/12/18
9	A1-MW-50-SA2MS	L1846366-04MS	Water	11/12/18
10	A1-MW-50-SA2MSD	L1846366-04MSD	Water	11/12/18
11				
12				
13	NG118091I-1 BLANK			

LDC #: 43888F2b

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Method: ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤30% or percent recoveries (%R) 70-130%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 43858F26

VALIDATION FINDINGS CHECKLIST

Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓	-		
Were target compounds detected in the field duplicates?		✓		
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 43888F2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (500 std)	Recalculated RRF (500 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL MS16	11/15/2018	1,4-Dioxane (DXN-d8)	1.428	1.428	1.407	1.407	3.61	3.60

LDC #: 43888 F2b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
~~Nitrobenzene-d5~~ 1,4-Dioxane-d8	500	126.288	25	25	0
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					

LDC #: 43888 F26

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 9/10

Compound	Spike Added (ng/L)		Sample Concentration (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Acenaphthene											
Pyrene											
1,4-Dioxane-d8	5000	5000	592	6560	6760	119	119	123	123	3	3

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888F2b

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: WG11 80911-2/3

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Acenaphthene										
Pyrene										
1,4-Dioxane	5000	5000	5780	5890	116	116	118	118	2	2

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888 F26

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: JVG
2nd reviewer:

METHOD: GC/MS ~~PAH~~ SVOA (EPA SW 846 Method 8270D-SIM)

(Y) N N/A Were all reported results recalculated and verified for all level IV samples?
Y (N) N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
V_o	=	Volume or weight of sample extract in milliliters (ml) or grams (g).
V_i	=	Volume of extract injected in microliters (ul)
V_t	=	Volume of the concentrated extract in microliters (ul)
Df	=	Dilution Factor.
%S	=	Percent solids, applicable to soil and solid matrices only.
2.0	=	Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, 1,4-Dioxane

Conc. = $\frac{(9071)(500)(5\ ml)(\ )(\ )(\ )}{(7476)(1.407)(0.5\ L)(\ )(\ )(\ )}$

= 4311 ng/L

#	Sample ID	Compound	Reported Concentration (ng/L)	Calculated Concentration ( )	Qualification
			4310		

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846592

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
16-HS-03-SA2	L1846592-01	Water	11/13/18
16-MW-06-SA2	L1846592-02	Water	11/13/18
16-MW-08-SA2	L1846592-03	Water	11/13/18
16-MW-09-SA2	L1846592-04	Water	11/13/18
A1-MW-18-SA2	L1846592-05	Water	11/13/18
A1-MW-19-SA2	L1846592-06	Water	11/13/18
A1-MW-53-SA2	L1846592-07	Water	11/13/18
16-HS-03-SA2D	L1846592-08	Water	11/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples 16-HS-03-SA2 and 16-HS-03-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	16-HS-03-SA2	16-HS-03-SA2D			
1,4-Dioxane	5330	6120	14 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846592

No Sample Data Qualified in this SDG

LDC #: 43888G2b **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: L1846592 ADR Stage2B Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	N/A	
VI.	Field blanks	N	
VII.	Surrogate spikes	N/A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	N/A	LCS/D
X.	Field duplicates	SW	D = 1/8
XI.	Internal standards	N/A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	N/A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	16-HS-03-SA2	D	L1846592-01	Water	11/13/18
2	16-MW-06-SA2		L1846592-02	Water	11/13/18
3	16-MW-08-SA2		L1846592-03	Water	11/13/18
4	16-MW-09-SA2		L1846592-04	Water	11/13/18
5	A1-MW-18-SA2		L1846592-05	Water	11/13/18
6	A1-MW-19-SA2		L1846592-06	Water	11/13/18
7	A1-MW-53-SA2		L1846592-07	Water	11/13/18
8	16-HS-03-SA2D	D	L1846592-08	Water	11/13/18
9					
10					

Notes:

	WG 1180911-1 BLANK						

LDC#: 43888G2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: GCMS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent only)
	1	8		
1,4-Dioxane	5330	6120	14	

V:\Josephine\FIELD DUPLICATES\43888G2b ttech yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1846856

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-07-SA2	L1846856-01	Water	11/14/18
A1-MW-23-SA2	L1846856-02	Water	11/14/18
A1-MW-25-SA2	L1846856-03	Water	11/14/18
A1-MW-27-SA2	L1846856-04	Water	11/14/18
A1-MW-55-SA2	L1846856-05	Water	11/14/18
A1-MW-54-SA2	L1846856-06	Water	11/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1846856

No Sample Data Qualified in this SDG

LDC #: 43888H2b **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18
SDG #: L1846856 ~~ADR~~ Stage2B Page: 1 of 1
Laboratory: Alpha Analytical, Inc. Reviewer: SW
2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	~~N~~ A	
VI.	Field blanks	N	
VII.	Surrogate spikes	~~N~~ A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	~~N~~ A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~N~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
+ 1	A1-MW-07-SA2	L1846856-01	Water	11/14/18
— 2	A1-MW-23-SA2	L1846856-02	Water	11/14/18
+ 3	A1-MW-25-SA2	L1846856-03	Water	11/14/18
+ 4	A1-MW-27-SA2	L1846856-04	Water	11/14/18
— 5	A1-MW-55-SA2	L1846856-05	Water	11/14/18
— 6	A1-MW-54-SA2	L1846856-06	Water	11/14/18
7				
8				
9				

Notes:

—	WG1181575-1 BLANK						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847243

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-11-SA2	L1847243-01	Water	11/15/18
A1-MW-13-SA2	L1847243-02	Water	11/15/18
A1-MW-14-SA2	L1847243-03	Water	11/15/18
A1-MW-15-SA2	L1847243-04	Water	11/15/18
A1-MW-37-SA2	L1847243-05	Water	11/15/18
A1-MW-37-SA2D	L1847243-06	Water	11/15/18
A1-MW-31-SA2	L1847243-07	Water	11/15/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

No field blanks were identified in this SDG.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

X. Field Duplicates

Samples A1-MW-37-SA2 and A1-MW-37-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	A1-MW-37-SA2	A1-MW-37-SA2D			
1,4-Dioxane	13100	13200	1 (≤30)	-	-

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847243

No Sample Data Qualified in this SDG

LDC #: 43888I2b

SDG #: L1847243

Laboratory: Alpha Analytical, Inc.

VALIDATION COMPLETENESS WORKSHEET

ADR Stage 2B

Date: 12/19/18

Page: 1 of 1

Reviewer: JM

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	ICAL ≤ 15% ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20/50%
V.	Laboratory Blanks	~~N~~ A	
VI.	Field blanks	N	
VII.	Surrogate spikes	~~N~~ A	
VIII.	Matrix spike/Matrix spike duplicates	N	
IX.	Laboratory control samples	~~N~~ A	LCS/D
X.	Field duplicates	SW	D = 5/6
XI.	Internal standards	~~N~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~N~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID		Lab ID	Matrix	Date
1	A1-MW-11-SA2		L1847243-01	Water	11/15/18
2	A1-MW-13-SA2		L1847243-02	Water	11/15/18
3	A1-MW-14-SA2		L1847243-03	Water	11/15/18
4	A1-MW-15-SA2		L1847243-04	Water	11/15/18
5	A1-MW-37-SA2	D	L1847243-05	Water	11/15/18
6	A1-MW-37-SA2D	D	L1847243-06	Water	11/15/18
7	A1-MW-31-SA2		L1847243-07	Water	11/15/18
8					
9					

Notes:

	WG1181805-1 BLANK						

(EB - on hold)

LDC#: 43888I2b

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GCMS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent only)
	5	6		
1,4-Dioxane	13100	13200	1	

V:\Josephine\FIELD DUPLICATES\43888I2b ttech yuma.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: December 20, 2018

Parameters: 1,4-Dioxane

Validation Level: Stage 2B

Laboratory: Alpha Analytical, Inc.

Sample Delivery Group (SDG): L1847316

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-01-SA2	L1847316-01	Water	11/16/18
A1-MW-42-SA2	L1847316-02	Water	11/16/18
EB-20181116	L1847316-03	Water	11/16/18
A1-MW-01-SA2MS	L1847316-01MS	Water	11/16/18
A1-MW-01-SA2MSD	L1847316-01MSD	Water	11/16/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8270D in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample EB-20181116 was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Stage 2B validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIV. System Performance

Raw data were not reviewed for Stage 2B validation.

XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
1,4-Dioxane - Field Blank Data Qualification Summary - SDG L1847316

No Sample Data Qualified in this SDG

LDC #: 43888J2b

VALIDATION COMPLETENESS WORKSHEET

~~ADR~~ Stage2B

Date: 2/19/19

SDG #: L1847316

Page: 1 of 1

Laboratory: Alpha Analytical, Inc.

Reviewer: JVG

2nd Reviewer:

METHOD: GC/MS 1,4-Dioxane (EPA SW 846 Method 8270D-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	ICAL ≤ 15%. ICV ≤ 20%
IV.	Continuing calibration	A	CCV ≤ 20%/50%.
V.	Laboratory Blanks	~~X~~ A	
VI.	Field blanks	ND	EB = 3
VII.	Surrogate spikes	~~X~~ A	
VIII.	Matrix spike/Matrix spike duplicates	~~X~~ A	
IX.	Laboratory control samples	~~X~~ A	LCS
X.	Field duplicates	N	
XI.	Internal standards	~~X~~ A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~X~~ A	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER:

	Client ID	Lab ID	Matrix	Date
+ 1	A1-MW-01-SA2	L1847316-01	Water	11/16/18
+ 2	A1-MW-42-SA2	L1847316-02	Water	11/16/18
− 3	EB-20181116	L1847316-03	Water	11/16/18
4	A1-MW-01-SA2MS	L1847316-01MS	Water	11/16/18
5	A1-MW-01-SA2MSD	L1847316-01MSD	Water	11/16/18
6				
7				
8				

Notes:

−	WG1181887-1 BLANK						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: MCAS Yuma, CTO 17F3803

LDC Report Date: January 2, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 4

Laboratory: Vista Analytical Laboratory

Sample Delivery Group (SDG): 1803615

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
A1-MW-04-SA2	1803615-01	Water	11/12/18
A1-MW-05-SA2	1803615-02	Water	11/12/18
A1-MW-49-SA2	1803615-03	Water	11/12/18
A1-MW-50-SA2	1803615-04	Water	11/12/18
A1-MW-50-SA2D	1803615-05	Water	11/12/18
A1-MW-51-SA2	1803615-06	Water	11/12/18
A1-MW-52-SA2	1803615-07	Water	11/12/18
FRB-20181112	1803615-08	Water	11/12/18
A1-PZ-19-SA2	1803615-09	Water	11/12/18
A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan for Groundwater Long-Term Monitoring Program at Operable Unit-1 Area 1, Marine Corps Air Station Yuma, Arizona (April 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.

U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were less than or equal to 30% of their true value.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample FRB-20181112 was identified as a field rinsate blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Ongoing Precision Recovery

Ongoing precision recovery (OPR) samples were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples A1-MW-50-SA2 and A1-MW-50-SA2D were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD (Limits)	Flag	A or P
	A1-MW-50-SA2	A1-MW-50-SA2D			
PFTeDA	0.0250	0.0264	5 (≤30)	-	-
PFHxA	0.0806	0.0829	3 (≤30)	-	-
PFHpA	0.00474	0.00494	Not calculable	-	-
PFHxS	0.0367	0.0355	3 (≤30)	-	-
PFOA	0.00947	0.00878	Not calculable	-	-

RPDs were not calculated when sample results in one or both samples were less than 5x the limit of quantitation (LOQ).

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that the parent/product transition ion ratios met laboratory requirements with the following exceptions:

Sample	Compound	Finding
A1-MW-05-SA2 A1-MW-50-SA2 A1-PZ-19-SA2	All compounds qualified 'Q' by the laboratory	The parent/product transition ion ratio was outside of the 70-130% laboratory limits.

Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

All compounds reported below the limit of quantitation (LOQ) were qualified as follows:

Sample	Finding	Flag	A or P
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to results below the LOQ, data were qualified as estimated in eight samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable.

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG 1803615

Sample	Compound	Flag	A or P	Reason
A1-MW-04-SA2 A1-MW-05-SA2 A1-MW-49-SA2 A1-MW-50-SA2 A1-MW-50-SA2D A1-MW-51-SA2 A1-MW-52-SA2 A1-PZ-19-SA2	All compounds reported below the LOQ.	J (all detects)	A	Compound quantitation

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

MCAS Yuma, CTO 17F3803
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification Summary - SDG 1803615

No Sample Data Qualified in this SDG

LDC #: 43888K96 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/19/18

SDG #: 1803615 ADR/Stage 4 Page: 1 of 1

Laboratory: Vista Analytical Laboratory Reviewer: SVG

2nd Reviewer:

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A, A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	ICAL ~~≤~~ r² Individual ≤30% ICV ≤ 30%
IV.	Continuing calibration/ISC	A	CCV ≤ 30% True value
V.	Laboratory Blanks	A	Not reviewed for ADR validation.
VI.	Field blanks	ND	FRB = 8
VII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ADR validation.
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. OPR
IX.	Field duplicates	SW	D = 4/5
X.	Labeled Compounds	A	Not reviewed for ADR validation.
XI.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for ADR validation.
XII.	Target compound identification	A	Not reviewed for ADR validation.
XIII.	System performance	A	Not reviewed for ADR validation.
XIV.	Overall assessment of data	A	Not reviewed for ADR validation.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank; SB=Source blank; OTHER: FRB = Field Rinsate Blk

** Indicates sample underwent Stage 4 validation

	Client ID	Lab ID	Matrix	Date
1	A1-MW-04-SA2**	1803615-01**	Water	11/12/18
2	A1-MW-05-SA2**	1803615-02**	Water	11/12/18
3	A1-MW-49-SA2**	1803615-03**	Water	11/12/18
4	A1-MW-50-SA2**	1803615-04**	Water	11/12/18
5	A1-MW-50-SA2D**	1803615-05**	Water	11/12/18
6	A1-MW-51-SA2**	1803615-06**	Water	11/12/18
7	A1-MW-52-SA2**	1803615-07**	Water	11/12/18
8	FRB-20181112	1803615-08	Water	11/12/18
9	A1-MW-19-SA2**	1803615-09**	Water	11/12/18
10	A1-MW-50-SA2MS	1803615-04MS	Water	11/12/18
11	A1-MW-50-SA2MSD	1803615-04MSD	Water	11/12/18
12				
13				
14	B8K0091-BLK1			
15				

LDC #: 43888 K96

VALIDATION FINDINGS CHECKLIST

Reviewer: SK
2nd Reviewer: [illegible]

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Were all analytes within 70-130% or percent differences (%D) ≤30% of their true value for each calibration standard?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 30%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the continuing calibration < 30%?	✓			
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	✓			
Were all percent differences (%D) of the Instrument Sensitivity Check < 30%?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks?		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	✓			

LDC #: P3888K96

VALIDATION FINDINGS CHECKLIST

Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?	✓			
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	✓			
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	✓			
Did reported results include both branched and linear isomers?	✓			
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: PFAS

A. PFHxA			
B. PFHpA			
C. PFOA			
D. PFNA			
E. PFDA			
F. PFUnA			
G. PFDoA			
H. PFTriA			
I. PFTeDA			
J. PFBS			
K. PFHxS			
L. PFHpS			
M. PFOS			
N. PFDS			
O. FOSA			
P. PFBA			
Q. PFPeA			
R. 6:2FTS			
S. 8:2FTS			
T. MeFOSAA			
U. EtFOSAA			
V. Combined PFOAS/PFOS			

LDC#: 43888K96

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: JVG
2nd Reviewer:

METHOD: LCMS PFAS (EPA Method 537M)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD (≤30%)	Qualifications (Parent only)
	4	5		
J	0.0250	0.0264	5	
A	0.0806	0.0829	3	
B	0.00474	0.00494	NC	
K	0.0367	0.0355	3	
C	0.00947	0.00878	NC	

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LDC #: 43888K96

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported RLs

Reviewer: JVG
2nd Reviewer: A

METHOD: LCMS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Samples	Compound	Finding	Qualifications
	2, 4, 9	All compounds qualified "Q" by the lab.	The laboratory indicated that the parent/product transition ion ratio was outside of the 70-130% laboratory limits.	Since there are no established transition ion ratio requirements in the validation documents for this project, using professional judgment, no data were qualified.

Comments: See sample calculation verification worksheet for recalculations

LDC # 43888K96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537Mod)

Calibration Date	Instrument	Compound	Standard	(Y) Response ratio	(X) Conc. Ratio	(X^2) Conc. Ratio
11/19/2018	SCN960	PFOA	1	0.0327	0.02	0.00040
			2	0.0593	0.04	0.0016
		13C2-PFOA	3	0.1197	0.08	0.0064
			4	0.2358	0.16	0.0256
			5	0.5699	0.40	0.1600
			6	1.0165	0.80	0.6400
			7	5.1296	4.00	16.0000
			8	10.3516	8.00	64.0000
			9	25.6395	20.00	400.0000
			10	51.9892	40.00	1600.0000

Regression Output	**Calculated**		***Reported WQR***	
Constant	*c*	*0.03180*	*c*	*0.1398430*
Std Err of Y Est				
R Squared		*0.9999917*		*0.9999030*
Degrees of Freedom				
	m1	*m2*	*m1*	*m2*
X Coefficient(s)	*1.2736124*	*0.0006421*	*1.2814700*	*0.000032442*
Std Err of Coef.				
Correlation Coefficient		*0.999996*		
Coefficient of Determination (r^2)		*0.999992*		

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

METHOD: LC/MS PFCs (EPA Method 537Mod)

Calibration Date	System	Compound	Standard	(Y) Area ratio	(X) Conc ratio
11/19/2018	SCN960	PFOS	1	0.02405	0.020
			2	0.04028	0.040
			3	0.00828	0.080
		13C8-PFOS	4	0.15076	0.160
			5	0.42475	0.400
			6	0.84488	0.800
			7	4.25487	4.000
			8	8.43628	8.000
			9	21.03584	20.000
			10	43.32010	40.000

Regression Output	Calculated	Reported WLR
Constant	-0.073380	-0.0118865
Std Err of Y Est		
R Squared	0.999854	0.999775
Degrees of Freedom		
X Coefficient(s)	1.07855632	1.069710
Std Err of Coef.		
Correlation Coefficient	0.999927	
Coefficient of Determination (r^2)	0.999854	0.999775

LDC # 43888K96

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFAs (EPA Method 537Mod)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound	(IS)	Conc	Reported	Recalculated	Reported % R	Recalculated % R
1	181120M1_58	11/20/2018	PFOA	(13C2-PFOA)	1.00	1.139	1.139	113.9	113.9
			PFOS	(13C8-PFOS)	1.00	1.092	1.092	109.2	109.2

LDC #: 43888k9G

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFAS (EPA Method 537Mod)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 10/11

Compound	Spike Added (ng/L)		Sample Conc (ng/L)	Spiked Sample Concentration (ng/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
PFOA	0.0567	0.0863	0.00947	0.112	0.110	118	118	116	116	1.71	1.80
PFOS	↓	↓	0	0.0954	0.0910	110	110	105	105	4.65	4.72

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888K96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/ Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: LC/MS PFCs (EPA Method 537Mod)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: BSK0091-BS1

Compound	Spike Added (ng/L)		Spike Concentration (ng/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc..
PFOS	0.0800	~~0.086~~ NA	0.0864	NA	108	108				
PFOA	"	"	0.0969	"	119	119				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 43888 K96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd reviewer:

METHOD: LC/MS PFAS (EPA Method 537M)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1 , PFOA :

Conc. $= \frac{(437)(12.5)}{(5070)} = 3.24421e-5X^2 + 1.28147X + 0.B9843$

$X = 0.73163$

final conc. $= \frac{(0.73163)(1L)}{(0.113454)(1000)}$

$= 0.00645$ ng/L

#	Sample ID	Compound	Reported Concentration (ug/L)	Calculated Concentration ( )	Qualification
			0.00646		

LOCATION-NAME	SITE_NAME	INSTALLATION_ID	LOCATION_TYPE	LOCATION_TYPE_DESC	SDG	COORD_X	COORD_Y	ANALYTICAL_METHOD_GRP_DESC	SAMPLE_NAME	SAMPLE_MATRIX	SAMPLE_MATRIC_DESC	COLLECT_DATE
A1-MW-04	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801024	436280.9228	607319.2492	Perfluoroalkyl Compounds	A1-MW-04-SA1	WG	GROUNDWATER	5/22/2018
A1-MW-05	SITE 00019	YUMA_MCAS	WLM	Monitoring well	1801024	436301.6301	607443.138	Perfluoroalkyl Compounds	A1-MW-05-SA1	WG	GROUNDWATER	5/22/2018
A1-MW-49A	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1801024	436416.958	607790.698	Perfluoroalkyl Compounds	A1-MW-49-SA1	WG	GROUNDWATER	5/22/2018
A1-MW-50	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1801024	436424.214	607790.973	Perfluoroalkyl Compounds	A1-MW-50-SA1	WG	GROUNDWATER	5/22/2018
A1-MW-51	OU 0000001 AREA 1	YUMA_MCAS	WLM	Monitoring well	1801024	436441.752	607789.623	Perfluoroalkyl Compounds	A1-MW-51-SA1	WG	GROUNDWATER	5/22/2018